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Abstract:

Derek Parfit thought that his continuum argument in population ethics leading to the Repugnant Conclusion – viz., that a world with a vast number of people leading lives barely worth living is better than a world with many people enjoying excellent lives – raised a puzzle that must be solved before we can hope to arrive at a correct theory of morality, what he called ‘Theory X’. Since Parfit, others have offered continua arguments that similarly challenge our understanding of value – and of normativity more broadly.

This paper critically examines four possible ‘structural’ solutions to such arguments – solutions according to which the structure of continua is not as continua arguments suppose. It is argued that incommensurability, incomparability, indeterminacy, and indeed Parfit’s own preferred solution, ‘lexical imprecision’, fail to provide the break in structure needed to defuse continua arguments, including ones leading to the Repugnant Conclusion continuum. An alternative structural solution is then proposed according to which, somewhere along the continuum, items are on a par with their predecessors. Being on a par is a sui generis fourth basic way two items can be compared beyond being better or worse than one another or equal good. The parity solution holds two significant advantages over the other structural proposals. First, only the parity solution allows us to maintain the very plausible thought at the heart of continua arguments, viz., that as we proceed along the continuum, a small diminution in quality of value can be compensated for by a large increase in quantity of value. Second, by appealing to a tetrachotomous, rather than a trichotomous, view of value – a view of value that includes parity – we can vindicate first-blush, untutored, intuitive reactions as to what goes wrong in continua arguments. Thinking about what some may have too readily dismissed as a ‘mere puzzle’ opens up new ways of thinking about the very structure of normativity and the shape of Theory X.

How to Avoid the Repugnant Conclusion

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I propose a way to defuse continua arguments that exploit normative predicates like ‘stronger reason’, ‘better’, ‘more choiceworthy’, ‘preferable to’, ‘best’ and the like in order to generate puzzles or paradoxes of normativity. The most famous of these is Parfit’s continuum argument for the Repugnant Conclusion (Parfit 1984).² According to that argument, we can create a continuum of outcomes varying only by population size and quality of life such that each successive outcome is intuitively better than its predecessor until we arrive at an outcome in which there is a very large number of people, each with a life barely worth living. Given the transitivity of ‘better than’, it follows that this world, with a vast number of people with lives barely worth living, is better than the first world in the continuum, one with a large number of people all of whom are leading excellent lives. This is the Repugnant Conclusion.

Parfit thought his continuum argument was significant because it placed a challenging constraint on normative theorizing: the correct normative theory must be able to avoid the Repugnant Conclusion, but it is unclear how it is to be avoided. Indeed, the last (finished) paper Parfit published (Parfit 2016) before his unexpected death, was an attempt to answer the challenge he himself had made so famous.

Curiously, Parfit’s argument has made little impact on mainstream normative theorizing; instead it has given birth to – or at least breathed new life into – the branch of practical ethics now known as ‘population ethics’. This seems to me doubly unfortunate. First, there’s more to population ethics than contemplating the well-being and size of future populations; there is also the value of human existence, the importance of continuity in what we care about, what we owe to future persons and our species from our situated perspective, and various deontic considerations that, arguably, cannot be simply ‘added’ down the line to purely consequentialist conclusions. Samuel Scheffler’s *Why Worry?* (2018) provides a salutary example of how the field might be taken in new directions. Other issues relevant to the ethics of populations, beyond discussion of person-affecting views, impossibility arguments, and continua arguments inspired by Parfit’s writings include individual responsibility for creating new lives, the application of theories of justice to future generations, animal population ethics, gamete donation, disability and equality, climate change, and normative uncertainty, to name a few.³

Second, it seems to me even more unfortunate that Parfit’s continuum argument has been largely neglected by mainstream normative theorists. It has been taken seriously by a cadre of those with a consequentialist bent (sometimes self-

² A version of which is sometimes known as the ‘Mere Addition Paradox’ (Parfit 1984). Note that the argument does not involve a ‘continuum’ in a strict mathematical sense, and such arguments are sometimes also referred to as ‘spectrum’ arguments. Since some of the arguments made here also, I believe, apply to strict continua arguments, I follow Parfit’s original terminology.

³ See the forthcoming *Oxford Handbook on Population Ethics* (OUP) eds. Timothy Campbell, Gustaf Arrhenius, et al, which covers many of these issues.

styled ‘pluralists’), but it has been pretty much ignored by deontologists, virtue theorists, perfectionists, and other nonconsequentialists, perhaps because it has been mistakenly thought to be ‘a mere puzzle’ based on suspect consequentialist assumptions. As I want to suggest in this paper, thinking and worrying about Parfit’s argument bears interesting fruit. It gives us reason to doubt assumptions we make about the very warp and weave of normativity itself, and as such may have profound implications for any normative theory.

The continua arguments of interest proceed in broad outline follows (further features are to follow). Start with an item that instantiates a mix of two contributory factors relevant to evaluative assessment. Generate a second item that appears to stand in a transitive comparative relation, R, to the first. Continue to generate successive items along the continuum by modifying each predecessor through a small diminution in one factor and a large enhancement in the other so that R appears to hold between each item and its predecessor. Iterate. By the transitivity of R, it follows that the last item is R-related to the first item. But, it is intuitively clear that the last item is *not* R-related to the first item. Hence the puzzle.

I propose what I will call a ‘structural’ solution to such arguments.⁴ Despite initial appearances, the structure along the continuum is not uniform; the R-relation, say, ‘better than’, does *not* hold between each item and its predecessor. A break in structure halts the slide to the repugnant conclusion. All structural solutions deny that the R-relation, such as ‘better than’, holds between each item and its successor.

The challenge for structural solutions is to specify and defend the supposed change in structure as one moves along the continuum. As it turns out, appeal to any of three natural, possible accounts of structural change, namely *incommensurability*, *incomparability*, or *indeterminacy*, either will not allow us to avoid the repugnant conclusion or suffers from other grave difficulties. And a fourth possible ‘i’ explanation, namely Parfit’s own appeal to (lexical) *imprecision*, is also problematic; at best it fails to provide an answer to some continua arguments, including, arguably, a version of Parfit’s own.⁵

Instead, we must recognize that somewhere along the continuum, there is a qualitative shift among items such that successive items are not better than their immediate predecessors but *on a par*. Parity is a fourth, *sui generis* way in which two items can be compared beyond being better, worse, or equal to one another. If parity

⁴ One advantage of a structural solution is that it does not depend on the subject matter of the claims that generate the puzzle and so may have wide application.

⁵ A fifth ‘i’ explanation is *ignorance*; perhaps there is some point along the continuum at which an item is not better than its successor but we just do not know where. I endorse this explanation but with a twist: there is a zone of items, each on a par with its predecessor, but sometimes we do not know where this zone begins or ends. Our ignorance concerns parity, not some trichotomous relation. I have offered some arguments against ‘trichotomous ignorance’ doing work of this sort elsewhere (Chang 2002a).

holds somewhere along the continuum, the slide to the repugnant conclusion is halted, and continua arguments are thereby defused.

This proposed solution is perfectly general and so in principle applies to all continua arguments, such as those that counsel walking across the grass (Harrison 1953), having another cigarette, self-torture (Quinn 1984⁶), opting for a year's worth of torture over a lifetime of minor pains (Rachels 2001, Temkin 2012), and even, perhaps, calling a red patch blue (Graff 2001).⁷ In this paper, I focus on Parfit's argument in population ethics, but the application to other continua arguments can be more or less readily made.

None of this is to say that *no* continua arguments can be avoided by appeal to one of the 'i' explanations; the point is rather that none of these explanations can provide a general solution to *all* of them. Anyone looking to respond to continua arguments *writ large* must appeal to the parity solution to solve at least *some* continua arguments. I believe that parity provides a solution to the most interesting and compelling continua arguments, like Parfit's in population ethics, Quinn's self-torturer, and Rachels/Temkin pain cases. If my arguments are correct, those skeptical of parity must find some other, *nonstructural*, solution to challenges posed by such arguments.⁸

⁶ The specified features of the continua arguments of interest exclude those involving indiscernible differences as Quinn's does; it must seem that the next item in the continuum is better than its predecessor. But Quinn's argument could be reformulated so that the difference in pain is just discernible, and so reformulated would be included in the target class of arguments.

⁷ More work would be required to apply this solution to *nonnormative* continua arguments, but my suspicion is that at least some such arguments would be amenable to such treatment. So, for example, in Parfit's (1984) continuum of identity starting with Parfit and ending with the conclusion that Greta Garbo is identical to Parfit (via the transitivity of identity), there will be a zone of items in which items are on a par with respect to being identical. The same goes for continua arguments involving indiscernible differences in color (Graff 2001); while indeterminacy can play a role in such continua, in order to get from, say, red to blue along a continuum, there might well be a zone in which items are on a par with respect to being identical in color. This is controversial and could be nonsense. More apparently plausible might be a continuum of items with respect to bulkiness; I have suggested that a bicycle is on a par with a 2x4 plank in bulkiness (Chang 2002b) and perhaps a continuum argument could be generated for bulky items, which could then be avoided by an appeal to parity. For general discussion of different types of continua arguments see Wibren van der Burg (1991) and Anali Jefferson (2014).

⁸ Two main nonstructural 'solutions' to continua arguments have been proposed. (For a persuasive dispatching of some other proffered solutions, see Parfit 2016.)

First, Rachels (2001) and Temkin (2012) have suggested that 'better than, simpliciter' or (what is treated synonymously) 'all-things-considered-better-than' are nontransitive relations. (Their solution is not structural because they allow that each item is better than its predecessor but that since better than is nontransitive, the Repugnant Conclusion does not follow). I believe that there are two issues that can be raised about their arguments:

If the ‘parity solution’ to continua arguments is right, then our commonplace understanding of value, reasons and choice require reexamination. We should no longer assume that actions, events, and things can be only better, worse, or as good as one another, that one duty can be only more significant, less or as significant as another, or that the reasons for choice can only be stronger (or trump, exclude, bracket, cancel, or silence), less strong, or as strong as one another.⁹ Actions and states of affairs can be on a par in value; our obligations can be on a par with respect to what we ought to do; and our reasons to choose or to have some attitude can be on a par in normative significance. The possibility of parity in turn gives rise to a different way of thinking not only about value, reasons and choice but also about what it is to be a rational agent. This is a case, I believe, in which thinking about ‘a mere puzzle’ can open up new ways of thinking about fundamental aspects of the normative world and our place in it.

1. The Continuum Argument for the Repugnant Conclusion

Parfit asks us to consider a continuum of possible worlds or outcomes in which each successive world involves a slight decrease in the well-being of its people but some large addition of people leading lives with that diminished quality of well-being. All else is stipulated as irrelevant or equal. It seems that each successive world is

i) There is no genuine *substantive* relation, ‘better than, simpliciter’ or ‘all-things-considered-better-than’ whose transitivity we should expect. Such relations are, I have proposed instead, ‘placeholder relations’ – not themselves substantive relations but formal relations that hold the place of *substantive* relations, such as ‘better than with respect to justice’ or ‘better than with respect to honoring/maximizing social well-being’ (Chang 2004a & b, 1997). As placeholders for substantive relations, they cannot properly be thought to be in themselves transitive or nontransitive. There is related discussion in Kamm 1996, fn 34 pp. 350ff, and Thomson (2001) (there is no goodness, simpliciter).

ii) Even if Rachels and Temkin can dispose of the puzzle formulated with their stipulated relation, they also need to deal with the puzzle as formulated in terms of the familiar ‘better than’ relation, which is transitive. My suggestion is that we should accept a structural solution to such arguments. See also Parfit 2017 2017 (even if there is some stipulated relation of betterness that is ‘essentially comparative’, the relation we use in these arguments and predominantly in ordinary life involves comparing ‘intrinsic aspects’ of items (though it seems plausible that the ordinary betterness relation cuts across this distinction between ‘essentially comparative’ and ‘intrinsic aspect’ approaches to comparisons)).

Second, Gustaf Arrhenius (2011) has argued for an impossibility result – there is no way of resolving problems raised by continua arguments without giving up certain plausible assumptions. The ‘solution’, then, is that the paradox is genuine, admitting of no solution (and is therefore nonstructural since it does not deny that each item is better than its predecessor). If I have understood Arrhenius correctly, one his assumptions is what I call *Trichotomy*, discussed below, which of course is consistent with partial orderings that allow for (trichotomous) incomparability or indeterminacy. The arguments of this paper, if correct, suggest that we should give up this assumption.

⁹ For an argument that seemingly noncomparative relations among reasons or values depend on comparative relations, see Chang (2016b).

better than its predecessor; after all, it seems that a sufficiently large increase in the quantity of lives worth living can compensate for the small diminution in quality of life that obtains in each successor world. And if 'better than' is transitive, it follows that a world at the end of the continuum, Z, in which there are vast numbers of people whose lives are barely worth living, is better than a world at the beginning of the continuum, A, in which there is a smaller but still significant number of people all leading excellent lives. But that is a repugnant conclusion. Parfit's continuum is depicted in Figure 1 below.

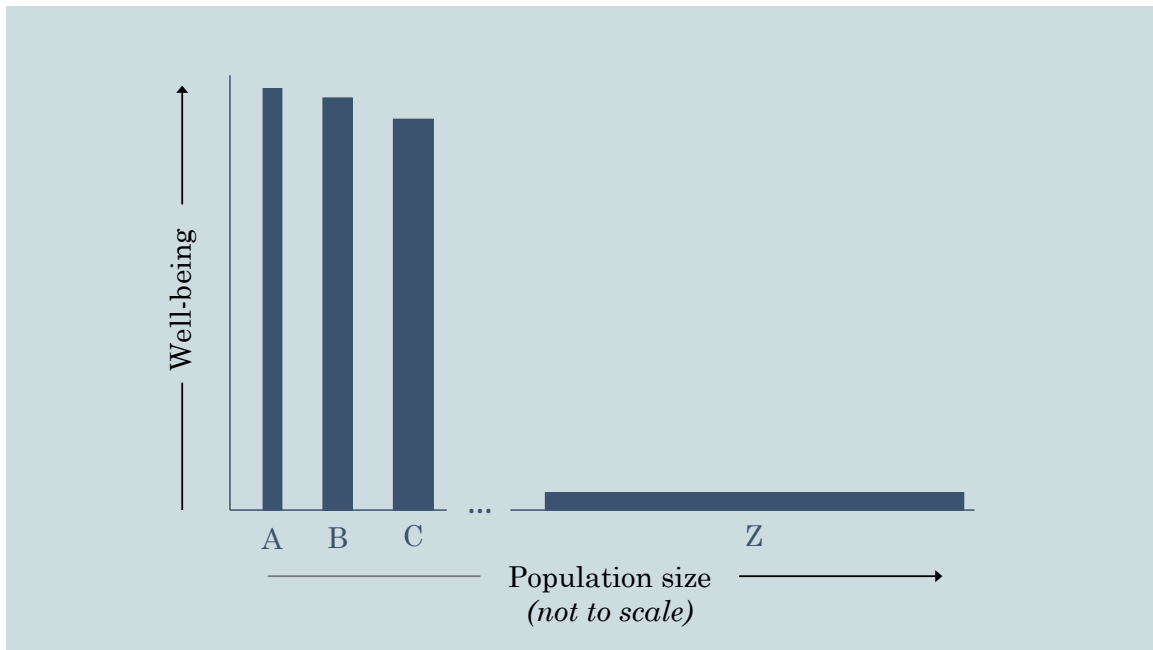


Figure 1. Parfit's Continuum

There are three assumptions of Parfit's argument worth noting, two of which we can set aside in order to make continua arguments as broad in scope and as challenging as possible. First, Parfit – and others who have put forward continua arguments – assume that an increase in quantity of lives at a fixed quality maps onto an evaluative difference in quantity. If you add 100 lives at quality q , you add more goodness than if you add only 80. A suitably large increase in the quantity of lives, then, should be understood to entail a suitably large increase in the goodness of the outcome. This assumption is not problematic for our purposes.

Second, Parfit sometimes discusses his continua argument as if comparative judgements about the goodness of worlds issue from a god's-eye point of view, impartial goodness, all-things-considered-goodness or goodness simpliciter. That there is such a viewpoint is highly controversial, and I suggest that we instead understand comparisons along the continuum as proceeding with respect to an ordinary substantive 'covering consideration', call it 'V', such as 'social well-being', 'beneficence', 'justice', etc. in terms of which each world is putatively better than its

successor. For our purposes, we can simply assume, for the sake of argument, that there is some or other V, understood as a unity or a collection of familiar considerations, in terms of which Parfit's, and other continua arguments, can proceed.¹⁰

Third, Parfit seems to assume that only consequentialist covering considerations are relevant to assessing how items on the continuum compare, and correspondingly that outcomes are the only items out of which a problematic continuum might be formed. Some proponents of such arguments defend this assumption by claiming that, at the very least, these consequentialist considerations are *a part* of the truth about how the outcomes compare. But Parfit's argument goes much deeper than that response allows. His continuum argument may well hold for actions and ways of being that differ in terms of some deontological V such as 'doing one's duty' or some perfectionist excellence. You might, for example, have an imperfect duty to give to charity. Facts about the comparative normative significance of giving one amount rather than another are relevant to the determination of what you have a duty to do. More controversially, when duties themselves conflict, they might be said to have respective 'strengths' that stand in comparative relations, especially since it is a mistake to think that comparative relations necessarily suppose aggregation, summation, cardinality, rates of tradeoff or any of the crude representational features with which they are often unfairly saddled (Chang 2016b). At the very least, we should leave open the possibility that continua arguments present a challenge to nonconsequentialist theories.¹¹

The plausibility of a continuum argument rests on the plausibility of three imprecisely-specified conditions obtaining, each of which is in principle neutral between different normative theories:

- i) the covering consideration, 'V', has at least two significant contributory factors that are what I have called 'bi-directional', that is, in some cases, one factor favors one item on the continuum while the other factor favors the other item,
- ii) each successive item on the continuum is generated by diminishing slightly one (particular) significant contributory factor of its predecessor while enhancing greatly the (particular) other so that these changes appear to make it R-related to its predecessor, and

¹⁰ Although I assume a suitable V for Parfit's argument, if you find this assumption problematic, you can throughout substitute a paradigmatic continuum involving painful experiences with the covering consideration being 'painfulness'. See also fn 7.

¹¹ See also Kamm 2007: 484ff and Arrhenius, this volume, but compare Boonin 1996 who argues that the continuum argument holds only for values and not duties. Note that theories that eschew normative comparative assessment *altogether* would be immune from continua arguments, but such theories are patently implausible. So long as a theory allows notions such as trumping, being more significant than, being less important than, and so on, it may be open in principle to continua arguments. I have argued that comparisons transcend the usual divide between axiology and deontology and that the question of value and the question of what one ought to do can be treated under the same rubric of comparisons with respect to an appropriate – deontological or axiological – covering consideration (Chang 2016b).

iii) a significantly ‘unbalanced’ package of these contributory factors of V – for example, one factor instantiated in a nominal (or notable) way relative to the other – is not R-related to a significantly *less* unbalanced package of these contributory factors.

I restrict my attention to continua that meet these three conditions. Going forward, I will assume that there is always a ‘V’ with respect to which a comparative claim is made even if not explicitly stated and, for simplicity, that ‘V’ has only two relevant contributory components, both of which make important contributions to V-ness. To simplify even further, I will assume that the two factors are quantity and quality of V-ness (though continua could also be generated by two bi-directional *qualities* of V-ness).

Parfit’s continuum argument (as well as all standard ones relativized to a V) meets the three conditions. It proceeds by trading off two bi-directional contributory factors of V: a small diminution in quality of V for a large increase in quantity of V. As we move along the continuum, each item involves a small diminution of quality which, it seems, can be compensated for by a large increase in quantity so that each item is better than its predecessor. At the start of the continuum, world A is, relatively speaking a ‘balanced’ package of quantity and quality of V-ness – a good number of people leading excellent lives – while Z, at the end of the continuum is, relative to A, an ‘unbalanced’ package of V-ness – a googol of people with lives barely worth living.

Now a key assumption of continua arguments is that a small diminution in quality in conjunction with a sufficient enhancement in quantity does not make a *qualitative difference that makes a difference* to how the items compare. That is, all continua arguments assume:

Uniformity: The R-relation holds between every item and its predecessor on the continuum because there are no qualitative differences between any two adjacent items that makes a difference to how they R-relate.

Structural solutions to continua arguments deny that Uniformity holds; they posit a ‘break’ somewhere along the continuum where there is a qualitative difference that makes a difference to how the items compare.¹²

¹² Theron Pummer (2018) points out that even some nonstructural solutions, like those that deny transitivity, must posit a break of sorts along the continuum, not between adjacent items but in what is true of each item with respect to the first item. Eventually, there will be an item along the continuum that is not better than A but whose predecessor is. That is not the sort of break of interest here. Note too that a possible ‘solution’ according to which every item along the continuum is on a par with its predecessor would count as non-structural; such a solution strikes me as not plausibly applicable to continua that *prima facie* lead to repugnant conclusions (if A is plausibly on a par with B which is plausibly on a par with C, we would never arrive at the putative repugnant conclusion that Z is better than

Could the break in structure be given by a single point? Perhaps, depending on how the continuum is constructed. But if the continuum is sufficiently fine-grained, a single break point will be implausible; how could there be a single item along the continuum before which all worlds are better than their predecessors but after which all worlds are not better than their predecessors, or a single item that is not better than its predecessor but which is followed by worlds each of which is better than their respective predecessors? For any putative structural break point, it seems plausible that we can construct worlds around it that would appear to be part of the structural break, too. To finesse this issue, I am going to assume that a plausible structural solution will posit a *zone* of items along the continuum that form a break in the structure along the continuum, in principle compatible with there being only one item in ‘The Zone’. There could in principle be many such zones scattered throughout the continuum but I will focus on the first such zone. In Parfit’s continuum, we might suppose that The Zone begins around, say, world P and ends around, say, world S (though of course these are arbitrarily selected). I say ‘around’ because The Zone might in principle – though I will be rejecting this possibility later – be surrounded by indeterminacy. Within The Zone, at least one item is not better than its predecessor and thus the slide to the Repugnant Conclusion is halted. The idea of a structural solution positing a zone of break points is depicted in Figure 2.

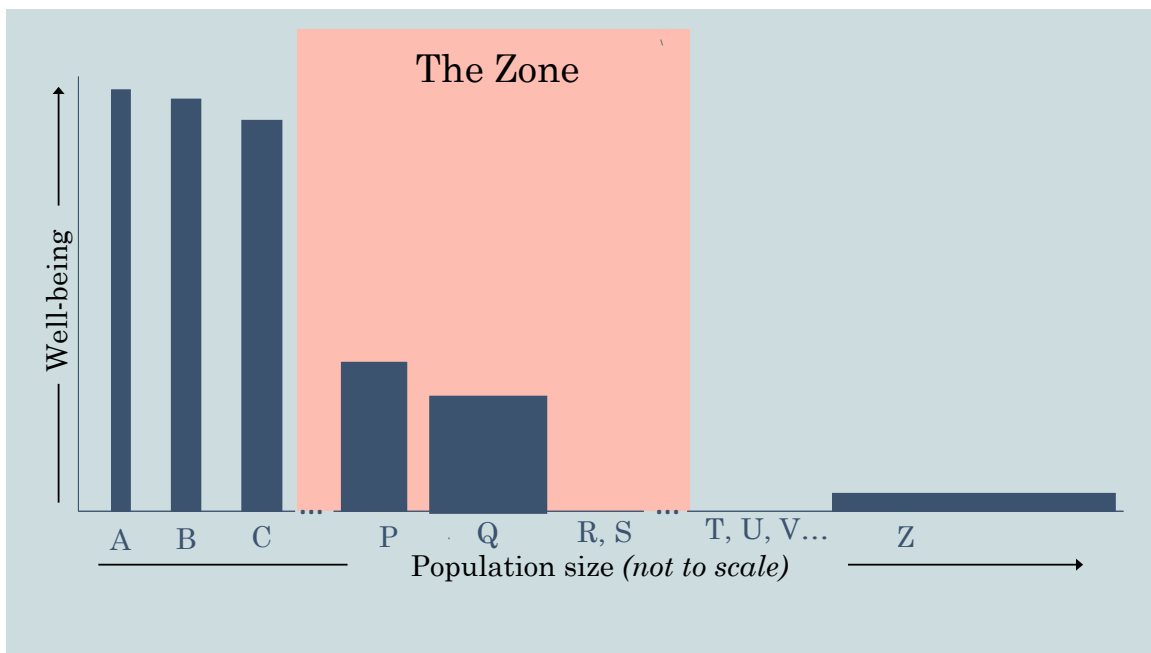


Figure 2. The Zone

A or even that Z is on a par with A since betterness is not at issue and parity is nontransitive). Thanks to Jimmy Goodrich for raising this question.

For a structural solution to succeed, it must explain and defend the claim that there must be some world in The Zone – Q – for which it is not true that it is better than its predecessor – P. But there are a number of ways in which this could be so. In the next section, we examine and reject three seemingly natural possibilities.

2. Three Standard Structural Solutions to Continua Arguments¹³

A. Incommensurability

Two items are *incommensurable* with respect to *V* if there is no common cardinal scale of units by which their *V-ness* can be represented or measured. For example, the pleasure you get from watching a comedic television sitcom cannot plausibly be measured by a hedonometer or some unit of well-being that also measures the satisfaction you achieve from attaining a life-long goal of, say, writing a best-selling novel. A cardinal unit of measure can give rise to either a ratio scale, as inches or pounds give rise to the scale of length or weight, or an interval scale, as degrees Fahrenheit or Celsius give rise to the scale of temperature. Two items are incommensurable with respect to *V* if their *V-ness* cannot be measured by either an interval or ratio scale.

Suppose that P is a world with a large population that is doing just fine – ‘middle class’ we might say by way of rough (if icky) shorthand. Q is a world with 50% more people all of whom enjoy very slightly less good middle-class lives than those enjoyed by those in P. Suppose now that Q and P are incommensurable with respect to *V*: there is no cardinal unit of *V-ness* by which we might ascertain that the *V-ness* of world P is 4.56 units worse or .876 times better than the *V-ness* of world Q. Is the slide to the repugnant conclusion thereby blocked?

The answer is a definitive ‘no’. One might think that some kind of cardinal scale is required to have trade-offs and that all trade-offs must be conceived in numerical terms. But this need not be so. Even if there is no cardinal unit by which achieving a life-long goal better conduces to your well-being than watching your favourite television programme, achieving the life-long goal might be better *ordinally*, that is, by a ranking that does not admit of (nonderivative) cardinal differences in your well-being. Similarly, while there may be no ratio or interval scale according to which Q might be more *V* than P, Q might nevertheless be better than P in *V-ness* in a merely ordinal ranking. And if Q is better than P, the slide to the Repugnant Conclusion is not halted since Q is better than P, R is better than Q...and so on. In short, incommensurability is no solution to continua arguments because incommensurability is compatible with comparability.

This is not to say that incommensurability does not hold in The Zone. It will if there is no numerically specifiable rate of trade-off among the factors that contribute

¹³ This section and the next are largely taken, with permission, from my ‘How *Not* to Avoid the Repugnant Conclusion’ (2020).

to the comparison of outcomes with respect to V , a condition that will plausibly hold of the continua of interest: could the goodness of the addition of a certain number of good lives really be worth 1.214 times the small drop in the well-being of the entire population? A structural solution to continua arguments, then, should countenance incommensurability in The Zone. But incommensurability itself is a non-starter as a solution to continua arguments.

B. Incomparability

If Q and P are *incomparable* (with respect to V), then the slide to the Repugnant Conclusion is halted. Is incomparability the right structural response to continua arguments? Some have so suggested (Handfield 2014¹⁴).

Much turns on how we understand ‘incomparability’. We should not, as many economists, philosophers and decision theorists do, define or assume incomparability to be the failure of the one item to be better, worse, or as good as the other (with respect to V). As I’ve argued elsewhere, *which* relations exhaust the conceptual space of comparability between two items is a substantive matter open to debate (Chang 1997, 2002a, 2016a). ‘Better than,’ ‘worse than,’ and ‘equally good’ are three such relations, but there could be more. So we should instead understand ‘incomparability’ neutrally – without prejudging what basic, positive value relations exhaust the conceptual space of comparability between two items – as the failure of *any* basic, positive value relation – whichever those might be – to hold between them.

Are Q and P incomparable with respect to V ? It is worth noting, as a first pass, that there is a dearth of strong arguments for the existence of incomparability. As I have argued elsewhere, the seven arguments in the extant literature each suffer from compelling problems (Chang 1997). Of course, it does not follow that there is no incomparability, only that establishing incomparability is not as straightforward as it might seem.

Even if incomparability holds between some items, there is good reason to doubt that it holds between Q and P . Suppose that P is a large number of people with middle-class lives. Q is an even larger number of people with slightly less good lives. (It does not matter how we characterize them so long as they conform to the pattern for generating consecutive items on the continuum, viz., a small diminution in quality of V and a large increase in quantity of V relative to its predecessor). Now consider $P+$ and $Q-$. $P+$ is identical to P in quality of lives but identical to Q in the quantity of lives. $Q-$ is identical to Q in quality but identical to P in quantity. See Figure 3.

¹⁴ Although Handfield (2014) appears to assume that if x and y are neither better than one another nor equally good, they are incomparable, we can excise the implication of incomparability and understand his proposal instead as consistent with the parity solution offered below.

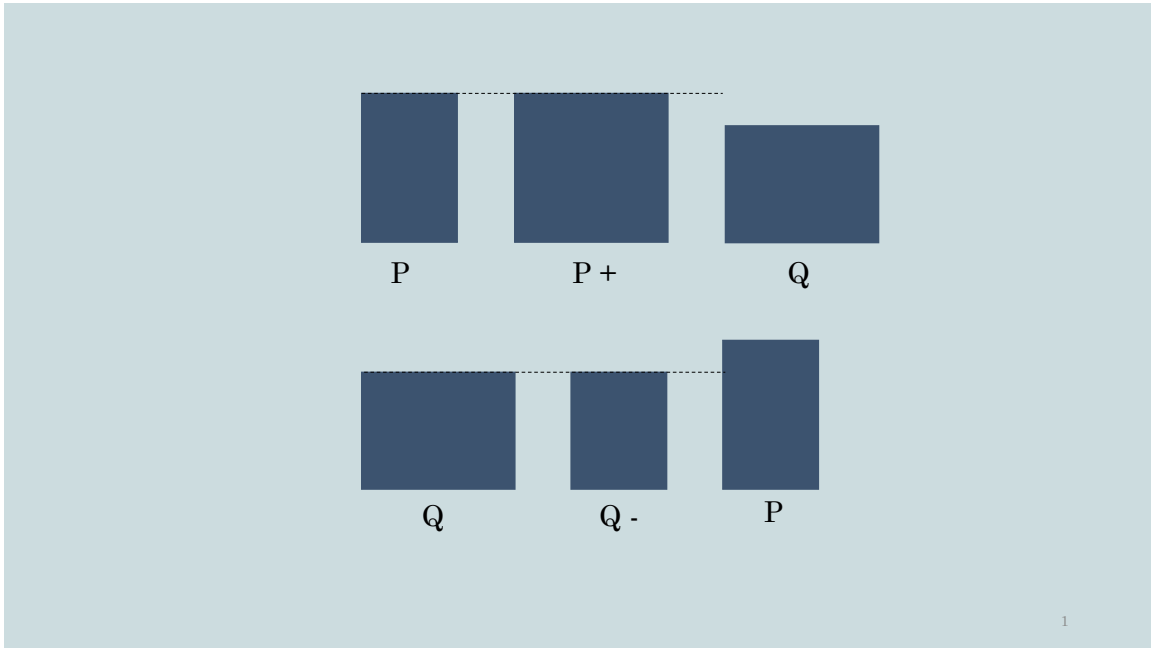


Figure 3. Against Incomparability

P+ is comparable with both P and Q: it is better than each of them as it is identical with each in one respect and an enhancement of each in the other respect (modulo organic unities and the like, but in any case they are comparable). Similarly, Q- is comparable with both P and Q – it is worse than both of them since it is identical with each in one respect and a diminution of each in one respect. Both P+ and Q- are each comparable with P and Q. So how could P and Q be incomparable with one another? To think that they could is to deny:

The Small Uni-Dimensional Difference Principle (“Difference Principle”): A small unidimensional (that is, single-factor) evaluative difference between two items cannot trigger incomparability between those items if they are comparable without that difference.¹⁵

Since P+ differs from Q by a small evaluative difference in one contributory factor and P+ is comparable with P, then according to the principle, a small difference in one contributory factor – the difference between P+ and Q – cannot trigger incomparability where before there was comparability. The same goes for Q-. The argument against incomparability goes as follows:

1. P is comparable with P+ (modulo organic unities and the like, P+ is better since it is evaluatively identical to P in quality but better in quantity).

¹⁵ See Chang 2002a, which restricts two ways in which this principle does not universally hold, neither of which are relevant here. The principle does not entail completeness.

2. Q differs from P+ by a small evaluative difference in one contributory factor (Q has a slightly lower quality of well-being than P+).

3. Difference Principle: A small evaluative change in one contributory factor cannot trigger incomparability where before there was comparability.

4. Since P is comparable with P+ (by 1), and the difference between P+ and Q is a small evaluative change in one contributory factor (by 2), and a small evaluative change in one contributory factor cannot trigger incomparability where before there was comparability (by 3), P is comparable with Q.

5. Therefore, P and Q are not incomparable.

The Difference Principle has intuitive support. If the principle did not hold, the continuum would be subject to a very strange pattern of comparison. At the beginning of the continuum, each successor is better than its predecessor. As we progress through the continuum, we reach a zone in which items can no longer be compared with their predecessors. Moving beyond The Zone, the items might then return to the same pattern before, viz., each item is better than its predecessor. The incomparabilist would have us believe that a continuum could display this pattern of comparison even though each item differs from its predecessor in exactly the same way: by only a small diminution in quality and a large enhancement in quantity. A structural solution challenges Uniformity, but incomparability seems like overkill.

There is a further, more theoretical, reason to think that P and Q are not incomparable with respect to V. It would be natural for there to be a correspondence between a comparative relation that holds between two items on a continuum and an appropriate practical response in a choice situation in which V-ness is all that matters and one must choose between those items. Of course, comparative merit and choice need not be so connected, but it would be highly attractive if we could 'read off' an appropriate practical response to two items from their comparative value and *vice versa*. I can think of no reason to doubt that there is such a correspondence.

If there were, then we might imagine a god faced with a choice between possible worlds along the continuum, where V-ness is what matters in determining which world to actualize. Since B is better than A, they should actualize B, but since C is better than B, they should actualize C, and so on, working their way through the continuum. Now suppose they reach P, which is better than O, and Q which, by hypothesis, is incomparable with P. Which world should they actualize? If two alternatives are incomparable, there can be no justified choice between them; we are stuck with existential plumping rather than rational choosing. But surely a god's choice of which world to create is guided by the value of the worlds they can create. In any case, we can substitute worlds with humdrum alternatives between which we mere mortals choose in the course of leading rational lives. Our choices along such continuum are not plausibly beyond the scope of justification.

Thus incomparability does not appear to be the right sort of phenomenon to hold in The Zone.¹⁶

C. Indeterminacy

We left open in principle the possibility that The Zone, whatever relations may hold within it, could be surrounded by indeterminacy. But what of the suggestion that indeterminacy holds *in* The Zone? The break in the continuum might consist in items that are indeterminately better or worse than or indeterminately equal to or comparable with their immediate predecessors with respect to V (Broome 1997; Knapp 2007; Qizilbash 2005, 2014; Thomas (this volume)). Perhaps The Zone is a zone of indeterminacy.

It is surprisingly difficult to arrive at an uncontroversial definition of indeterminacy (Taylor 2018; Greenough 2003). We do not have to settle the matter here, although as we will see, indeterminacy has one essential feature that will be important for our purposes.¹⁷

There is a quick argument against indeterminacy as a solution to continua arguments.¹⁸ If classical logic holds, then any structural solution must *deny* that one item on the continuum is better than its predecessor. This is because continua arguments proceed by asserting that each item is better than its predecessor, and so any structural solution must negate this premise, which is equivalent to maintaining that some item is *not better* than its predecessor. Now on a natural assumption (to be questioned later), if one item, say, Q, is *not better* than its predecessor, say, P, it must be incomparable with it, equally as good, or worse. We can dismiss incomparability given the arguments above. We can also dismiss evaluative equality since, presumably, if Q and P are equally good, then we can just increase the quantity of Q more (or diminish its quality less) and end up with an item that is better than P, leaving the continua argument intact. So it seems that the only possibility is that Q is worse than P. But this seems highly implausible. By diminishing the quality of P ever so slightly but enhancing the quantity significantly, could the resulting item really be *worse* than P? The indeterminist ‘softens the blow’ by offering that Q is not determinately worse than P but only indeterminately worse than P. But it is very

¹⁶ For a different argument against incomparability, see Toby Handfield and Wlodek Rabinowicz (2018). I discuss their argument in section 4. For an argument as to why rational choice is not possible among incomparables but is among items that are on a par, see Chang 2016b and 2017.

¹⁷ Kit Fine has recently proposed a novel account of indeterminacy as a global and not local phenomenon (Fine 2017). His account does not have the essential feature upon which I rely in criticizing indeterminacy as a solution to continua arguments, but it requires rejecting classical logic. I believe it would be nice to hang onto classical logic if we can.

¹⁸ Theron Pummer (this volume) offers some defense against the idea that certain continua arguments, like those that lead to Parfit’s repugnant conclusion, can be understood as sorites arguments. The arguments explored here, if successful, do the same but indirectly.

unclear how, given that it is so implausible that Q is worse than P, adding the thought that it is only indeterminately so makes indeterminacy an attractive solution.

There is a deeper and I think much more interesting problem with the indeterminacy solution. That will be my focus here.

We can start by distinguishing two sorts of indeterminacy, although the problem with them will be the same. In semantic indeterminacy (due to vagueness), there is indeterminacy in the application of a predicate; it is indeterminate whether 'bald' applies to Herbert, whose cranial hairs, we can imagine, are sparse and non-uniformly distributed. Sometimes this idea is taken to be a matter of the sentence 'Herbert is bald' being neither determinately true nor determinately false, or the idea that 'bald' admits of certain 'tolerances', or that there are multiple legitimate 'sharpenings' of the predicate not all of which agree on whether Herbert is or is not bald, or that Herbert is a 'borderline' case of being bald, and so on.

If it is semantically indeterminate whether Q is better than P with respect to V, there is vagueness somewhere in the predicate 'better than with respect to V' such that the sentence, 'Q is better than P' is semantically indeterminate. And if it is indeterminate whether Q is better than P (and perhaps indeterminate whether R is better than Q, and so on), then, as we go along the continuum, we cannot assert 'Z is better than A' since the chain of betterness inferences has been interrupted, and thus the slide to the Repugnant Conclusion is halted.

In metaphysical indeterminacy, there is indeterminacy in the way the world is rather than in our words. A property or relation, such as identity or part-whole, may indeterminately hold of an item; it may be indeterminate whether, after undergoing fission or some other operation, the resultant person(s) are identical to me, and it may be indeterminate whether this clump of rock in Tanzania is a part of Mount Kilimanjaro. One way of cashing out the idea holds that there are multiple fully determinate worlds, some in which this patch of dirt is part of Mount Kilimanjaro and some in which it is not, but it is indeterminate which world is actual. (Akiba 2004, Barnes 2010, Williams 2010).

If it is metaphysically indeterminate whether Q is better than P, then although in every world it is determinate whether Q is better than P – in some worlds it is and in some worlds it is not – it is indeterminate which of these worlds is actual. If it is indeterminate whether Q is better than P, then Q is not determinately better than P and so gain, it might be thought that the slide to the Repugnant Conclusion is halted.

But indeterminacy – whether due to vagueness in our words or indeterminacy in the facts – does not provide a good structural solution to continua arguments. To see why, we start with semantic vagueness. Due to vagueness in the word 'bald', it is neither true nor false that Herbert is bald. Suppose that we must *resolve* the indeterminacy; we must sort Herbert into one of two camps – the 'bald' or the 'not-bald' – and that this resolution must be based solely on how Herbert stands to the

word 'bald'. Extrinsic factors, such as the fact that if you resolve the indeterminacy one way rather than another you will receive Herbert's gratitude, must be put aside. Basing our resolution only on facts about how Herbert stands to the semantic item, 'bald', we can resolve the indeterminacy only *arbitrarily*. We might 'precisify' the word 'bald' to include Herbert or we might not. The precisification we choose must be arbitrarily chosen.¹⁹ In short, we can resolve the matter of whether 'bald' applies to Herbert by the flip of a coin. But it would be odd to think that continua arguments could be defused by making an arbitrary linguistic stipulation (Chang 2001; Schoenfield 2015).²⁰

The same goes for metaphysical indeterminacy. Suppose it is metaphysically indeterminate whether this clump of rock is part of Mount Kilimanjaro. There are fully determinate worlds in which Kilimanjaro includes within its boundaries the clump of rock and fully determinate worlds in which it does not, but it is indeterminate which world is the actual world. Suppose now that we must draw a map that specifies whether the clump is a part of Mount Kilimanjaro. Again, we stipulate that no extrinsic factors are relevant to the case; we simply need to determine whether this clump of rock is part of Kilimanjaro solely on the basis of the facts about whether the mountain stands in the part-whole relation to the clump of rock. As far as these facts go, there is nothing to be said in favour of drawing the map one way as opposed to another since it is indeterminate whether the clump is a part of the mountain. The resolution of how to draw the map must be *arbitrary*; we are permitted arbitrarily to select a world in which the clump belongs or a world in which it does not belong. Resolution under indeterminacy is, as R.J. Williams puts it, a matter of "randomly and groundlessly" making a judgment call (Williams 2016). In short, whether the clump is a part of Kilimanjaro can be settled with the flip of a coin.

Now consider Parfit's continuum. Q is a world like P except that there are many more people leading slightly less good lives. Is Q better than P with respect to V? The question is a *substantive* one on which we should bring to bear substantive arguments concerning, for instance, the question of whether a doubling in quantity of lives in P more than compensates for the slight loss in quality of life in P. Suppose P is a world of ten million people leading solidly middle-class lives. If we double the number of people and diminish the quality slightly, do we have a better world? This is a question

¹⁹ Indeterminists who go in for degrees of truth might suggest that it could be 'more true' that Herbert is bald than that he is not bald if, say, there are more sharpenings that favour his being bald. But appealing to a ratio of possible sharpenings to resolve the indeterminacy is to appeal to something extrinsic to the facts about how Herbert stands to the word 'bald', such as 'majority rule'. Moreover, there may still be an arbitrary choice when it is between options whose degree of truth is $\frac{1}{2}$.

²⁰ In this volume, Teruji Thomas suggests that we can avoid this difficulty by supposing that each precisification of a value relation such as 'better than' is itself a real relation in the world. This then brings us to the discussion of metaphysical indeterminacy below. My objection there, I believe, applies to Thomas' suggested solution in terms of metaphysical indeterminacy.

to be argued over by substantive debate – the kind of debate that forms the bread and butter of first-order normative theorizing. It is not a question to be settled by “random and groundless” fiat. Indeed, if a god had to choose which world to create, it would be odd to think that the choice could be properly resolved by the flip of a coin.

Of course, *some* substantive matters are up for arbitrary resolution: if two items are equally good, then a resolution in favour of one can be determined by the flip of a coin. But P and Q are not equally good. If they were, then the continuum argument could be reformulated with Q+, which is better than P, in place of Q. Moreover, a small improvement in one of them need not make it thereby better, which it must if they were equally good (Chang 1997 & 2002a).

The problem with indeterminacy as a structural solution to continua arguments is that the question of whether items in The Zone, or for that matter, throughout the continuum, are better than their predecessor is a substantive matter not appropriately resolved by arbitrary stipulation. If we arbitrarily stipulate that Q is not better than P, we are left with ‘resolutional remainder’ – the substantive question at issue remains open rather than settled (Chang 2002a). Things are different when confronted with indeterminacy; it is always permissible to resolve the indeterminacy arbitrarily.

It might be countered that arbitrarily resolving that, say, Q is better than P leaves resolutional remainder only because it is *important* whether Q is better than P; any appearance that the substantive question has not been settled by an arbitrary fiat is due to uncertainty or anxiety over, for instance, whether one has judged the matter correctly (Williams 2016). Perhaps *any* ‘high stakes’ case will leave resolutional remainder in the wake of arbitrary judgment (Constantinescu 2012; Williams 2016).

Resolutional remainder is not psychological anxiety over whether one has employed the right epistemic procedure in coming to a judgment nor is it concern about the fact that epistemic peers may arbitrarily resolve the indeterminacy in different ways. It is the normative fact – left in place after arbitrary fiat – that the substantive question of whether Q *is* better than P remains open. And there may be resolutional remainder even when the matter at hand is trivial and unimportant. Suppose you are to judge which of two poems should win the Woodbury Junior High School poetry prize. Perhaps one poem has great rhythm while the other has an arresting tone. If you flip a coin to decide between them, the substantive question of which is better is not thereby settled. Or you might have to adjudicate the relative aesthetic merits of two tea services, one delicate and muted while the other graphic and bold. If you arbitrarily stipulate that one is more beautiful, you do not thereby settle the question of which is in fact more beautiful – the question remains. You may, of course, arbitrarily stipulate that one is more beautiful than the other on extrinsic grounds – you do not want to waste time working out the substantive truth of the matter – and ‘settle’ the question in a pragmatic sense. But the substantive issue on the merits remains.

The indeterminist might now shift his position, accepting that it is not only high stakes cases that involve resolutional remainder but insisting that *any normative* case will have resolutional remainder after arbitrary resolution (where equality does not hold) (Constantinescu 2012). Normative questions – apart from cases of equality – are not the sort of questions that can be resolved by arbitrary stipulation. Another way to put this point, borrowing from Gallie (1956), is to say that semantic questions about the application of normative predicates and metaphysical questions about the normative facts are *essentially contested* matters that are by their nature always open to substantive debate. Arbitrary stipulation, will thus always leave resolutional remainder. But notice that if the indeterminist maintains that there can be indeterminacy about normative matters, such as whether Q is better than P, they have shifted ground by abandoning indeterminacy as it is usually understood. It is essential to indeterminacy, whether semantic or metaphysical, that there can be arbitrary – “random and groundless” – resolution among the permissible ways of resolving the indeterminacy. The permissibility of arbitrary resolution is essential to what indeterminacy *is*.

None of this is to say that normative matters are never vague. It is plausibly vague whether certain things are good – is a life filled with a great deal of suffering and a single moderate achievement a good one? Exactly where we ‘draw the line’ of a good life may be an arbitrary matter. The same goes for many normative predicates; is a shiny beetle beautiful? And, although a trickier matter, there may also be indeterminacy in normative comparisons. It could be indeterminate which of two poems is better; the poems might be identical but for an extra comma that alters the rhythm very slightly – making it not better or worse but just very slightly different. It could be perfectly in order arbitrarily to resolve the indeterminacy by stipulating that one is better. The same goes for ‘high stakes’ cases, although examples of such cases will be more controversial because of the ‘noise’ created by their importance. Indeterminacy in comparison most plausibly holds only if the items are extremely similar in all contributory factors, and yet the difference is so marginal as to make it indeterminate what relation holds. Items on a continuum do not follow this paradigm; while appearing similar in quality, they are very different in quantity.

I suggest that indeterminacy, like incomparability, is not the right sort of phenomenon to defuse continua arguments.

3. Parfit’s Solution: Imprecise Lexicality

Some philosophers have suggested that the solution to Parfit’s continua argument lies in lexicality: there is a point along the continuum at which an item is lexically superior to each of its successors. At that point, we reach a threshold quality of life such that any diminution in that quality, however small (but not diminishingly so), makes the outcome inferior, no matter the number, even a googol, of people living that quality of life. So, for example, you might think that a world with a sufficient

number of people enjoying an upper-class life, say, with the music of Beethoven and the artwork of Picasso, is lexically superior to any number of people leading middle-class lives, say, with the music of Supertramp and some stellar limericks. Or that a world with a sufficient number of people living at subsistence is lexically superior to a world with any number of people living lives below subsistence. Any drop from an upper-class life to a middle-class life, or from subsistence to below subsistence, is so significant a qualitative difference that it marks a lexically: no number of lives at the lower quality of life can be better (or equal) to a sufficient number of lives at the higher quality.

The trouble with lexically is a specific version of the problem already encountered in thinking that there could be a single break point along the continuum: it is hard to believe that there is a point on the continuum which is better than all possible successors. Suppose that P is such a point. We can imagine a world, Q, which involves a small diminution in quality of life relative to P and an enormous increase in the number of people leading such lives. It would be hard to maintain that P is better than Q let alone that P is *lexically* better than Q – i.e., that P would be better even if there were any, even a googol, number of people leading lives at the slightly lesser quality of life. For any putative point of lexical superiority, it seems that we can generate an item that involves a small diminution in quality of life and a large enhancement in quantity such that it would be hard to believe that the first is lexically superior to the second. It is this implausibility that has led most to abandon lexically as a solution to continua arguments.²¹

Parfit offers an ingenious response on behalf of lexicalists (Parfit 2016). His defense of lexically starts with a distinction between two kinds of comparability – precise and imprecise. When things can be compared precisely, there is a cardinal unit – analogous to inches or degrees Celsius – by which you can measure the goodness of each item. In other words, precisely comparable items are commensurable – there is a cardinal scale by which the values of the two items can be measured. When things can only be compared imprecisely, by contrast, there is no ‘precise’ cardinal unit (or level) by which their value can be measured. Perhaps there is an ‘imprecise’ cardinal unit, or, what might amount to the same thing: an imprecise cardinal scale with ‘units’ perhaps given by interval ranges or something like probability distributions, which measures the value of items. Imprecisely comparable items are incommensurable but comparable. Parfit did not put things quite this way. He talked instead of a linear scale of value, like a number line, and suggested that imprecisely comparable items cannot be put on such a scale.²² It is not entirely clear

²¹ Note that if the arguments in the previous section are correct, an appeal to indeterminacy will not help the lexicalist with this difficulty.

²² Here is what Parfit writes: “Many people assume that, when there are truths about the relative goodness of different things, these truths must be precise, though we may not know what these truths are. There is one way of thinking which can make this seem the only possible view. If things of some kind can be better or worse than others, and by more or

whether Parfit meant to include mere ordinality within imprecise comparability – perhaps merely ordinal rankings are the most imprecise rankings of all – but for present purposes we can set mere ordinality aside since it is not relevant to Parfit’s solution. In sum, we can think of Parfit as offering *six* ways two things could be (more-than-merely-ordinally) comparable: precisely better, precisely worse, precisely equal, imprecisely better, imprecisely worse, and imprecisely equal. Whether we have precise comparability or imprecise (sometimes he called it ‘rough’ (Parfit 1984: 461) comparability depends entirely on whether there is a cardinal ratio or interval scale by which the value of the two items can be measured.

Parfit thought that lexicality is the right sort of solution to the continua argument he made famous, but not lexicality as it is ordinarily understood. Assuming precision in comparisons, if P is lexically superior to Q, there is some number representing the value of P (or more accurately, some function unique up to affine transformations), say 100, such that a diminution in the quality of life in Q, however small, cannot be compensated for by an increase in the quantity of such lives in Q, no matter how large. But how could this be, Parfit thought, if, as is plausible, the addition

less, it may seem that the goodness of these things corresponds to their positions on some line or scale of value. On this *Linear Model*, truths about goodness must be precise because positions on a line are precise.... But when two things are qualitatively very different, that could not be true. So when we think about the goodness of such things, we should reject this Linear Model. Nor could the goodness of such things correspond to different real numbers, since such numbers are also precise. Nor could some of these things be better than others by some imprecise amount or to some imprecise degree, since the concepts of an amount or a degree also imply precision. We should think only about *differences* between the value of these things, since the concept of a difference does not imply precision.” (Parfit 2016: 114) It is perhaps worth noting that from conversations with Parfit over the years, it became clear to me that Parfit’s key point in introducing imprecise or rough comparability was that the value of an individual item could not be located on a linear scale of value. This seems to me a very important point and can be captured by the idea of items being incommensurable. The last two sentences of Parfit’s explanation may seem jarring to the reader as Parfit moves from a claim about measuring the goodness of individual items to a claim about *differences* between items. When Parfit was preparing for his Schock Prize lecture, he asked me whether I thought he should add in this paper reference to *differences* between items since he knew that I understood the related idea of ‘parity’ in terms of evaluative differences. I urged him to do so in order to i) make clear that his concern was not with mere ordinality, ii) move imprecise comparability away from the difficult idea of ‘imprecise’ cardinal units, and iii) bring the idea of imprecise equality closer to parity. Still, for Parfit, the foundational idea concerns how to represent the value of individual items, and the upshots for evaluative differences come down the road. I have suggested that this explanatory priority should be reversed: we should understand comparisons between incommensurables in terms of features of the *differences* between items first, and what follows about how to represent the value of individual items being compared is of less importance. I explore other differences between parity and imprecise equality in Chang 2016c, the main one being that Parfit is still thinking ‘trichotomously’, i.e., that ‘better than’, ‘worse than’ and ‘equally good’ form the foundation of comparisons, while I favour ‘tetrachotomy’, to be explored below.

of lives worth living in Q each adds value to Q? With enough such lives, Q's value should surpass 100. The same holds for any putative point of lexicality. Parfit thought that the presumed precision is the problem. Once we give up the idea that the value of P could be represented by some number on a cardinal scale, we can save lexicality.²³

We should, Parfit argues, understand comparisons along the continuum as *imprecise* rather than precise. As we move along the continuum, each item is imprecisely better than its predecessor. Eventually we reach a point, P, which, while imprecisely better than its predecessor, O, is also *imprecisely lexically better* than every item beyond The Zone – U, V...Z. An item *x* is imprecisely lexically better than an item *y* just in case *x* is imprecisely better than *y* and no increase in the quantity of *y*, even a googol, could change this fact. But the transition from P, the lexically superior item, to U, a lexically inferior item, is not implausibly abrupt. In between, there are a number of items comprising The Zone in which each item is *imprecisely equally as good* as its predecessor. Thus, there is a gradual transition from P, the lexical threshold, to U, the first item beyond The Zone, through a series of items that are imprecisely equally as good as their immediate predecessor. And, Parfit adds, there can be indeterminacy around The Zone. Since the chain of betterness is broken, the slide to the Repugnant Conclusion is halted. Parfit's solution is depicted in Figure 5.

²³ Parfit rejects the idea that each additional life in Q has diminishing marginal value because he holds what he calls the 'Simple View': "Anyone's existence is in itself good if this person's life is worth living. Such goodness has non-diminishing value, so if there were more such people, the combined goodness of their existence would have no upper limit." (Parfit 2016: 112) But we could modify the Simple View to be more plausible and understand it as the claim that the addition of each life worth living adds overall value to an outcome without insisting that the value is non-diminishing. In that case, while each additional life in Q adds overall value, the V-ness of Q might only asymptotically approach the value of P. Insofar as this possibility is plausible, it may remove some of the motivation for Parfit's introduction of imprecision to save lexicality. (Indeed, when Parfit first introduces the Simple View, he describes it in a way that is compatible with diminishing marginal value: he writes: "On what I shall call *the Simple View*: Anyone's existence is in itself good, and makes the world in one way better, if this person's life is good to live, or worth living." (p. 110).) For a useful discussion of diminishing marginal value in the context of thinking about continuum arguments, see Arrhenius and Rabinowicz 2005. Yet another, perhaps less plausible, possibility here is that the increase in overall value of each additional life beyond a certain point is infinitesimal.

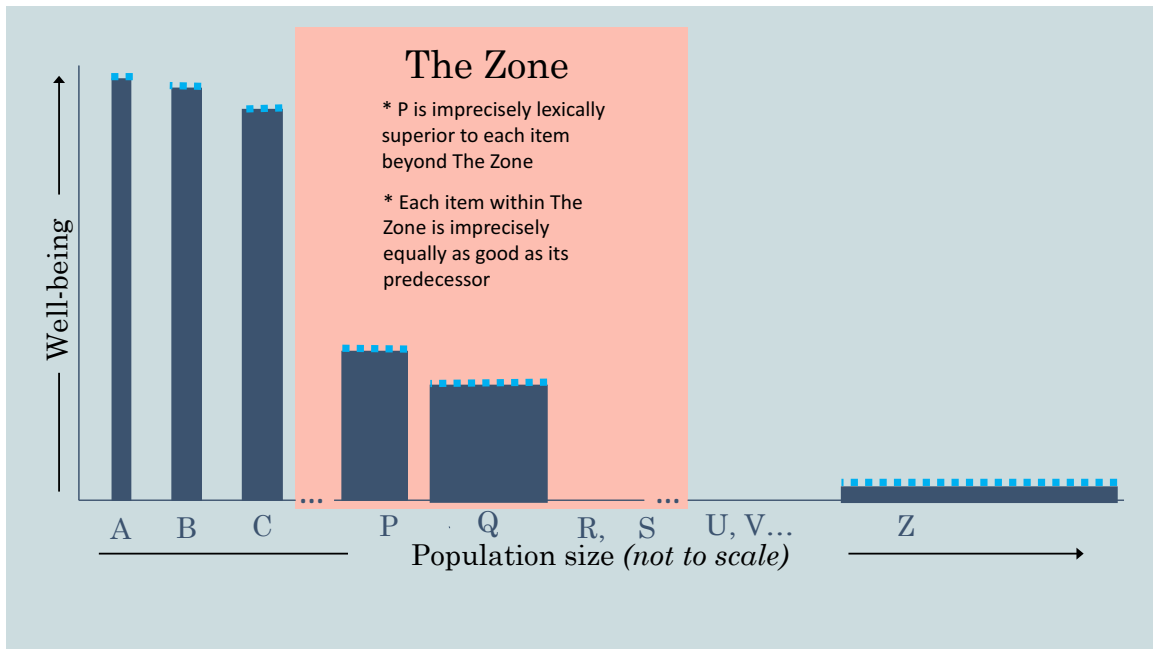


Figure 5. Parfit's Imprecise Lexicality Solution

There are two worries we might have about Parfit's solution.

First, it is unclear how an appeal to imprecise equality helps Parfit's lexical solution. *If* imprecise equality is a form of equality (equality without precise cardinal measurability) just as imprecise betterness is a form of betterness (betterness without precise cardinal measurability), then for each item in The Zone of imprecise equality, we can presumably improve the item sufficiently to achieve imprecise betterness. If R is imprecisely equally as good as Q, then why not just make sufficient improvements to R so that R+ is now better than Q? We could then reconstitute the continuum with R+ instead of R. The Zone of imprecise equality would then become The Zone of betterness. But if P is imprecisely lexically superior to every item beyond The Zone, then the other members of The Zone, Q, R, and S, each of which is, by hypothesis, better than its predecessor, must also be lexically superior to every item beyond The Zone since each is better than P. Once again, we are left with an implausibly abrupt transition from an item, S (the last item in The Zone), that is putatively imprecisely lexically superior to its successor, T (the first item beyond The Zone). In this way, Parfit's appeal to imprecision may not avoid the original difficulty with a precise lexical solution. If Parfit's solution is to succeed, it must do so by relying on the claim that there is at least one item, S, that is imprecisely lexically superior to

its successor, T. That is how the continuum argument can be stopped.²⁴ Whether the solution is plausible will then turn on whether imprecise lexicality is plausible.²⁵

The second worry concerns the scope of Parfit's solution. If imprecise lexicality and imprecise equality exist and are not a mere chimera, *some* continua arguments could surely be constructed that surreptitiously exploit this fact, and thus pointing out an imprecise lexical threshold with a buffer zone of imprecisely equally good items could defuse such arguments. But lexicality, whether precise or imprecise, as a solution to continua arguments has limited scope. This is because lexicality is a very strong condition, and continua arguments can be generated without it.

Parfit's argument begins with a world, A, with a large number of people living excellent lives and ends up with a world, Z, with a googol people leading lives barely worth living. What gives the appearance that lexicality is relevant to avoiding the Repugnant Conclusion is that it is plausible to think that A is lexically superior to Z – it does not matter how many people there are with lives barely worth living, a world with a sufficient number of exquisite lives will always be better. The same goes for the Rachels/Temkin continua arguments involving pain – a sufficient amount of torture is plausibly lexically inferior to any number of years of mosquito bites – and Quinn's self-torturer argument – mild pain for any length of time is plausibly lexically superior to some period of excruciating pain. Apparent lexicality between the first and last items on the continuum has been so common a feature of continua arguments that some authors treat it as a fixed feature of such arguments (Handfield and Rabinowicz 2018).

Might it be possible to generate continua arguments without apparent lexicality? One strategy might be to take standard continua and simply remove all items that appear to stand in lexical relations. In some cases, there would be nothing left, if, for instance, each item on the continuum represents one seemingly lexical superior item relative to its successor. In most cases, however, a continuum could remain that leads to a false, if perhaps not repugnant, conclusion. Continua leading to false conclusions need avoiding, too. So appeals to lexicality will not help. Once we recognize that we need some other solution for such continua arguments, we might

²⁴ In this way, I believe that Rabinowicz's characterization of Parfit's solution as one according to which none of the usual trichotomy of relations 'better than', 'worse than', or 'equally good' holds – what he calls 'incommensurability' – is potentially misleading. Instead, we might understand Rabinowicz' solution as an argument in support of the parity solution. See Rabinowicz, forthcoming. I discuss Rabinowicz' solution in fn 41 below, though it deserves a fuller discussion than I can give it here.

²⁵ In the alternative, Parfit might allow, as he sometimes seems to suggest (Parfit 2016, 120), that *every* item beyond The Zone is imprecisely equally as good as its predecessor; that is, that The Zone occupies all worlds of the continuum after the world that provides the threshold of lexical superiority. But this suggestion, too, leaves Parfit with a sharp boundary between P, which is by hypothesis lexically superior to all subsequent items in the continuum, and Q, which is only imprecisely equally as good as P but not lexically superior to R.

also see that this alternative solution holds even for continua where there is apparent lexicality. Or so I will suggest in the final section.

It is difficult to generate continua that *clearly* lead to false conclusions while at the same time not relying on lexicality because all such continua trade on controversial substantive claims. But we can offer an example and an abstract argument for thinking that such continua exist.

Suppose world A_1 contains 1000 people leading upper-class lives. Its successor, A_2 , involves a slight diminution in quality of life but also one extra life. If the diminution is sufficiently small, it can be traded off against the value of a whole extra life. Everyone in A_2 leads nearly as good lives as they do in A_1 , and there is a whole extra person enjoying that excellent level of well-being. Thus, we suppose, A_2 is better than A_1 . (If you don't agree, jigger the numbers until you do²⁶). A_3 then involves a slight diminution in the quality of life in A_2 and the addition of another life such that A_3 is better than A_2 . The same for A_4 until we arrive at A_{50} , which involves, suppose, 1050 people leading lower-class lives. In fifty small steps we move from an upper-class to a lower-class quality of life, but with each successive world containing an extra life. Since the change in quality of lives is so slight, each successor is better than its predecessor. By the transitivity of 'better than with respect to V ', 1050 people leading lower class lives is better than 1000 people leading upper-class lives. While perhaps not exactly repugnant, the conclusion seems false. Could 50 extra people leading lower class lives make A_{50} better than a world where nearly everyone is leading significantly better upper-class lives? Suppose our covering consideration, V , is beneficence. It seems more beneficent for a god to create world A_1 with 1000 people leading excellent upper-class lives than to create world A_{50} , a world with an extra 50 people but everyone leading much worse lower-class lives. Nonetheless, it does not seem correct to think that A_1 is lexically superior to A_{50} ; a sufficiently large, perhaps a googol, number of people leading lower-class lives might be thought to be clearly better than a mere 1000 people leading upper-class lives. A god would be elitist to think otherwise. If these claims are correct, we have a continua argument leading to a false conclusion but no lexicality between the any of the items along the continuum.

There is a general, abstract argument for thinking that there are many such continua, despite the fact that any given continuum will be open to challenge and controversy. Suppose a covering consideration, V , admits of hierarchical categories of quality of V -ness. Take, for instance, the very general categories of quality: excellent, very good, good, mediocre, and poor – most naturally understood as occupying some region on some (perhaps imprecise) cardinal scale. Some things might be of an excellent quality with respect to V while others might be a poor quality with respect to V . Now perhaps some sufficient amount of the excellent will be lexically superior to some amount of the poor; that is, a sufficient amount of the

²⁶ Jiggering the numbers in any way will not necessarily lead to a plausible continuum argument, however. My claim is existential; there are plausibly *some* continua arguments that don't involve even apparent lexicality between the first and last items of the continua.

excellent will always be better than any, even a googol, amount of the poor (though the plausibility of this will depend on the 'V' at stake). But it is less plausible to think that a sufficient amount of the excellent will always be superior to any amount of the very good or the mediocre. Lexicality does not plausibly hold between the excellent, on the one hand, and the very good or even the mediocre, on the other.

When a continuum is generated by having successive items move from one qualitative category to a hierarchically-near one, lexicality is less plausible. At the same time, such a continuum could plausibly lead to a false conclusion, e.g., some relatively large quantity of mediocrity is better than some sufficiently small quantity of excellence. These considerations suggest that, insofar as there are many such Vs with hierarchical qualitative categories, there could be many continua arguments that do not involve apparent lexicality. Thus Parfit's solution, even if successful, will not provide an answer to the general problem raised by continua arguments.

4. Parity

I propose that we avoid false and repugnant conclusions from continua arguments by recognizing that each item in The Zone is *on a par* with its predecessor.²⁷ 'On a par' is a fourth positive value relation beyond the usual trichotomy of 'better than', 'worse than', and 'equally good' that can hold between two items with respect to V. It is nontransitive (if x is on a par with y with respect to V and y is on a par with z with respect to V, it does not follow that x is on a par with z with respect to V), symmetric (if x is on a par with y then y is on a par with x), and irreflexive (x is not on a par with itself; x is equally V as itself). According to the parity solution, we can defuse continua arguments leading to false or repugnant conclusions by allowing that somewhere along the continuum, there is a zone of items in which each item is on a par with its predecessor. Because the chain of betterness is broken by parity, we avoid the conclusion that the last item is better than the first. The Parity Solution is depicted in Figure 6.

²⁷ Mozaffar Qizilbash (2007) proposes that 'parity' can be a solution to Parfit's Repugnant Conclusion argument, but what he means by 'parity' is what most would consider 'incomparability'. So, for example, he urges that the 'mark' of parity is susceptibility to the 'Small Improvement Argument', but that argument was first used to establish what many consider incomparability, that is, the failure of any of the usual trichotomy of positive value relations to hold. Without argument that this trichotomy fails to exhaust the space of comparability between items, what he calls the 'mark' of parity in fact is the 'mark' of incomparability. Joseph Raz, for instance, thinks that this is so. (Raz 1986). Qizilbash instead defines 'incomparability' as holding when no matter how much we improve one of two incomparable items, neither will be better than the other (p. 134). But this is an implausible account of incomparability. Most incomparabilists would want to allow that although a mediocre musician and a mediocre physicist may be incomparable in creativity, improve the creativity of the physicist enough, and the resulting Einstein will be more creative than the musician.

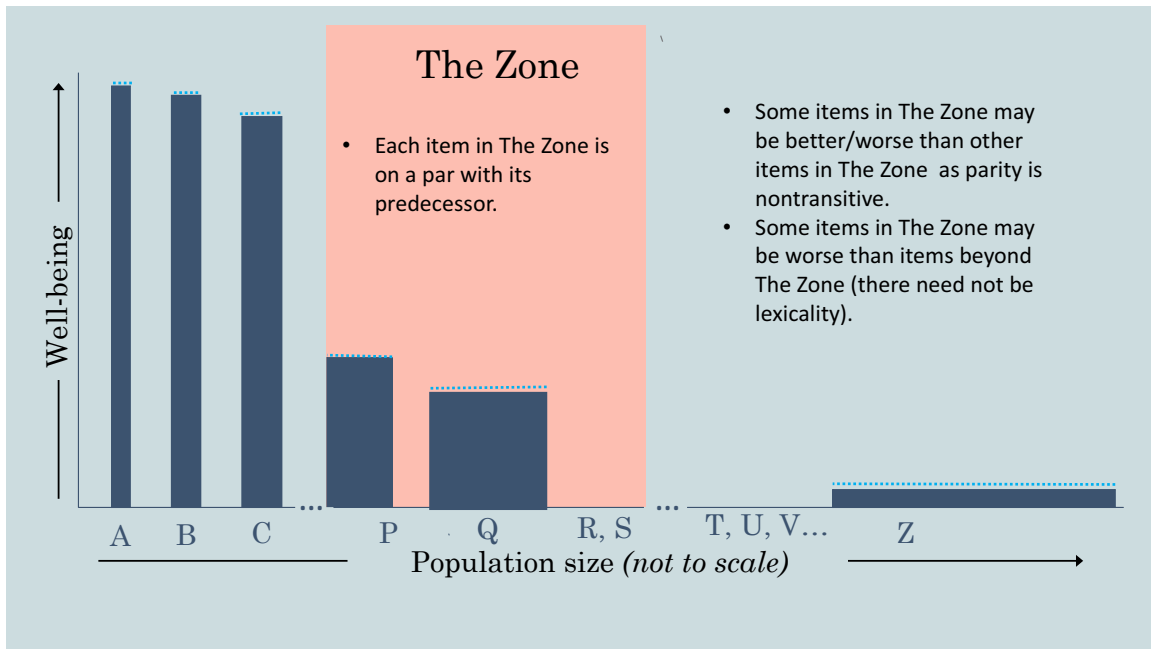


Figure 6. The Parity Solution

If parity holds, then we must reject what I have elsewhere called ‘Trichotomy’:

Trichotomy: If two items can be compared with respect to some V , one must be better or worse than the other or the two must be equally good. So if none of these relations holds, the items are incomparable with respect to V .

We should instead accept ‘Tetrachotomy’:

Tetrachotomy: If two items can be compared with respect to some V , one must be better or worse than the other, the two must be equally good, or they must be on a par with one another. So if none of these relations holds, the items are incomparable with respect to V .

If parity is the right solution to continua arguments, then we’ve misunderstood the structure of value – and of normativity more generally. Values do not have the same structure as nonevaluative considerations and nor can their qualitative dimensions be resolved or represented in terms of the trichotomy of better, worse, and equal, whether precise or imprecise. Moreover, just as values can stand in parity relations, so too can reasons – reasons can be stronger, weaker, and equally as strong as one another but they can also be on a par. This has implications for normative theories – consequentialism, certain forms of deontology, virtue theory, perfectionism, and pluralism – that implicitly assume trichotomy among their elements in answering the question of how one ought to live. I have argued for the possibility of parity and its intuitiveness, suggested an informal model, and given examples of the work it can do elsewhere (Chang 1997, 2002a, 2016a, 2017). I have

also distinguished parity from imprecise equality (Chang 2016c). I will not repeat those arguments here. Instead, I want to suggest answers to two questions: 1) *Why* should we think that parity holds as opposed to any other structural solution? And, 2) *How*, on a tetrachotomous view of value, could parity hold?

Why should we think the parity solution holds? As already noted, Trichotomy is not definitional of our ordinary notion of comparability but a substantive thesis that must be won by argument. Since our concept of comparability leaves open the possibility of a fourth basic value relation, then the arguments of this paper can be seen to comprise an argument for parity by elimination: incommensurability, incomparability, indeterminacy and lexical imprecision are not good solutions to continua arguments and so we are left with the parity solution. And if parity is a better solution than the others, we should, as far as structural solutions go, opt for parity as the best way to defuse continua arguments.

Is parity a better solution? There is a significant reason to think that parity *is* better than the other solutions. Parity is the only structural solution that can respect the compelling intuition that lies at the heart of continua arguments, namely:

*Compensation: A small diminution in quality can be compensated for by a large enhancement in quantity.*²⁸

Compensation explains why, when we slightly diminish the quality of lives in a world but significantly enhance the quantity of such lives, we end up with a world that seems better than its predecessor. It is the pre-theoretic and intuitive idea that when we start with something and we diminish it in one way, we can bring it up to at least where it was before without removing it from the sphere of comparability with how it was with the diminishment.

²⁸ A generalized version would hold that a small diminution in one contributory factor can be compensated for by a large enhancement in another. Neither the original nor the generalized versions necessarily hold *tout court* – for example, a small diminution in a very significant contributory factor may not always be compensable by a large increase in a very insignificant one and there is always the further possibility of organic unities – but the principles must be plausible in the context of generating continua arguments since they are what permit the generation of problematic continua upon which such arguments rely. Of course, a competing compensation principle might hold that enough of an enhancement in quantity can always compensate by making the enhanced item *better*, which would preclude the first advantage of the parity solution discussed below. But such a principle is arguably false; to take just one possible case, a doubling in some number of crummy lives is not obviously better than that number of lives only slightly worse in quality. At any rate, for continua arguments to be as strong as possible, they must appeal to principles that are as plausible and widely applicable as possible. Compensation, as I understand it, holds that a sufficiently enhanced quantity can always make a small diminution in quality *not worse and still comparable*. Thanks to Jimmy Goodrich and Theron Pummer for inviting me to say more about why I understand Compensation as I do.

Suppose you make a mean chocolate cake. Your recipe calls for a teaspoon of pure vanilla extract but you are all out. You could compensate for the diminution in the tastiness of the cake that results from the lack of vanilla by adding orange essence instead. You succeed in compensating for the diminution in taste by making the cake not worse than it was before but still comparable with the tried and true version. In the same way, continua arguments crucially rely on this intuitive idea of compensation. A diminution in quality of life can be compensated by a sufficient increase in quantity of such lives, making the new item, B not worse and still comparable with A. Most continua arguments assume that the way a sufficient quantity compensates for a diminution in quality is by making the item *better*. Iterated application of the principle gives rise to continua arguments. Without Compensation, we could not have Parfit's (or Rachels', Temkin's, Quinn's, etc.) continua argument. But making *better* is only one way in which enhancing the quantity can compensate for a loss in quality.

The intuitive strength of Compensation makes the problem posed by continua arguments deep and difficult. A solution that allows us to keep the principle while still avoiding false or repugnant conclusions is significantly better than ones that require us to reject it. As it turns out, only parity allows us to maintain Compensation while incomparability, indeterminacy, and imprecise lexicality require us to reject it. If this is right, the mistaken assumption of continua arguments is Trichotomy. Once we abandon Trichotomy for Tetrachotomy, we can defuse continua arguments while maintaining Compensation.

Consider world A with, say, 1000 people leading upper-class lives. To mark the quality of their lives, we can call it '100', though nothing of cardinal significance should be attached to this number. We might represent A as (100, 1000), where the first number in the ordered pair represents the quality of V-ness and the second the quantity of V-ness.

Now consider world B, which is identical to A except for a slight diminution in quality. We might represent B as (99, 1000). B – (99, 1000) – is worse than A – (100, 1000) – since it is identical in all respects and worse in one (we can assume that a Pareto criterion holds in the case). Thus the *relative position* of B to A is that the former is worse. By Compensation, we should be able to improve B's relative position to A by compensating for the small diminution in quality by a large enhancement in quality.

According to Trichotomy, there are only two ways we can do this. We can compensate, that is improve the relative position of B to A, by making B equally as good as A or by making it better.

Consider B+, which we might represent as (99, 1500). Suppose, for the sake of argument, that B+ is equally as good as A. (Note that nothing turns on whether there is such a B+). But if there is some enhancement in quantity that makes B equally as good as A, we can always find a larger enhancement that makes it better. Any

improvement in an item that is equally as good as another makes it better. So we might have B++, which is represented as (99, 1501). B++ is better than A. In this way, Compensation in conjunction with Trichotomy allows us to generate a continuum of items, each of which is better than its predecessor, until we end up with an item at the end of the continuum which is clearly not better than the first. It is this trichotomous form of compensation that generates continua that lead to false or repugnant conclusions.

If, however, we reject Trichotomy and adopt Tetrachotomy, we can avoid the problems posed by continua arguments. According to Tetrachotomy, there are *three* ways an enhancement in quantity can compensate for a diminution in quality: it can make an item equally good, better, or *on a par*. We deny that there is B+ that is equally as good as A and maintain that both B+ and B++ are on a par with A. The enhancement in quantity compensates for the loss in quality not by making the item equal or better but by making it on a par. We improve the relative position of B to A changing it from being worse to being on a par. And if B is on a par with A, the chain of betterness is broken and the slide to a false or repugnant conclusion is halted. Thus the parity solution allows us to defuse continua arguments while maintaining the principle of Compensation.

The incomparability solution requires us to reject Compensation because it holds that when we reach The Zone, the enhancement in quantity does *not* compensate; instead an item becomes incomparable with its predecessor – there is *no* positive relation that holds between them.²⁹ The same holds for indeterminacy; there is no compensation, only an indeterminate failure of compensation. Imprecise lexicality also denies that Compensation holds throughout the continuum; at some point an item will be lexically superior to all items beyond The Zone – indeed, an increase in quantity expressly *fails* to compensate for a drop in quality for that is what it is to be lexically inferior. Finally, although incommensurability, since it is compatible with betterness, allows Compensation to hold throughout the continuum, it is a non-starter because it makes no progress whatsoever in providing a solution to continua arguments. Only parity allows us both to maintain Compensation and to defuse continua arguments. In this way, parity is superior to any of its structural rivals. We thus have strong reason to prefer it.

But we haven't yet explained *how* parity might hold. To see how items in The Zone could be on a par, we need to step back and examine value as seen through tetrachotomous eyes. Doing so will have an important upshot: it allows us to see how the parity solution provides theoretical underpinning for a common, 'on the street', untutored response that many have to continua arguments.³⁰

²⁹ It would be like trying to compensate for the lack of vanilla by adding a ton of cement instead, turning the product into something arguably incomparable in tastiness with the cake-without-vanilla.

³⁰ From unscientific polling of non-philosophers and philosophers alike.

On a trichotomous view, values can be understood as dividing into ‘categories’, ‘levels’, ‘divisions’, ‘leagues’, and so on – for example, ‘outstanding’, ‘excellent’, ‘very good’, ‘good’, ‘mediocre’, ‘poor’ – where each category occupies some rough region on a trichotomous, hierarchical, perhaps imprecise, cardinal or ordinal scale. With respect to justice, something can be excellent or poor; with respect to tastiness, fantastic or mediocre; with respect to beneficence, great or just okay. There will be multiple ways to carve up categories of V-ness, but crucially categories are hierarchically related as better, worse, or equal to one another – the fantastic is a better category of V-ness than the okay, which is better than the terrible (e.g., Andreou 2015). This way of thinking about values is, I believe, mistaken.

Rather than think of values as dividing into hierarchical categories, we should instead think of them as demarcated by different *neighbourhoods* of V-ness. According to a tetrachotomous view of value, values can be marked out by different neighbourhoods of that value. When we understand values as falling into neighbourhoods, as opposed to hierarchical categories of value, we focus not on the amount or extent or degree of V-ness, as categories suggest, but rather on the *significance* of V-ness. Values have different ‘significances’, that is, there are ways of being V-significant, and these need not be hierarchically ordered as better, worse, or equal to one another. Neighbourhoods or ‘significances’ do not occupy regions of a trichotomous cardinal or ordinal scale of value. They are distinct ways in which a value can have evaluative significance that need not be better, worse, or equal to one another but can be on a par.

Consider, by way of analogy, literal neighbourhoods – the kind in which people live. Surely with respect to being a good place to live, some neighbourhoods are better than others. Hunts Point in the South Bronx is worse than Hell’s Kitchen in New York City. Moreover, some neighbourhoods will be excellent, while others only mediocre. But many neighborhoods are not so hierarchically structured. Is the Upper West Side better, worse, or equally as good as Soho? (To convince yourself that they are not equally good, just run the Small Improvement Argument – adding an extra coffee bar makes a neighbourhood better, but adding an extra coffee bar to the Upper West Side does not make it better than Soho). Neighborhoods are often just *different* with respect to being a good place to live without being representable as occupying hierarchical regions on a cardinal scale. I suggest that the right thing to say is that, with respect to being a good place to live, Soho and the Upper West Side are *on a par*. Different neighbourhoods can represent different ways in which being a good place to live has evaluative significance without one significance being better than another.

The demarcation of neighbourhoods is a profoundly tricky matter (and of course could be vague), but for our purposes, we can dodge this question (nothing I say below about neighbourhoods below presupposes that they are not vague or

indeterminate in some other way) and focus instead on how neighbourhoods might help support the parity solution.³¹

Neighbourhoods allow us to vindicate a common intuitive response to continua arguments. It is natural to think that continua arguments go wrong because they ride roughshod over what is clearly a qualitative change along the continuum. The quality of items at the beginning and end of the continuum are very different, so there must be some qualitative shift somewhere along the continuum that explains why it is no longer true that an item is better than its predecessor.

One way to flesh out this intuition is to think that the qualitative shift is a change in the *quality of V-ness*; we move, for example, from upper-class qualities of life to middle-class ones, and somehow that shift explains why the continuum argument is mistaken. The trouble with this way of understanding the intuition is that it runs afoul of *Compensation*, according to which every small diminution in quality can be compensated for by a large increase in quantity. As we slowly diminish the quality of lives from upper-class ones to middle-class ones, each diminution can be compensated by an increase in quantity. Under the assumption of Trichotomy, the compensation makes the item better than its predecessor. So an appeal to the change in *quality of V-ness* – from upper-class quality lives to middle- or even lower-class quality lives – does not vindicate the intuition; on the contrary it allows the continua argument to proceed as usual.

If instead we understand the intuitive response as one about *neighbourhoods* of value, that is, as noting a qualitative change in the *significance* of V-ness as we move along the continuum, and we accept Tetrachotomy instead of Trichotomy, we can vindicate the intuition and defuse the argument.

At the beginning of the continuum, we have items each of which involves a large number of people leading upper-class lives. Although each successive item involves a slight diminution in quality, the resulting lives are still upper-class and all such items belong to the same neighbourhood of V-ness, what we might call the ‘large numbers of upper-class lives’ neighbourhood. Note that this neighbourhood is marked by both quantities and qualities of life – the number of lives must be large and the quality must be upper-class. As we progress through the continuum, eventually we come upon a different neighbourhood of V-ness, where we have significantly larger numbers of people with middle-class lives, what we might call the ‘very large numbers of middle-class lives’ neighbourhood. Again each of those items, although involving successively slight diminutions in quality, are nevertheless middle-class lives and in very large quantities. By hypothesis, as we move along the continuum, each item is better than its predecessor. By the transitivity of betterness, every item in the ‘very large numbers of middle-class lives’ neighbourhood is better than every

³¹ Neighbourhoods should *not* be understood as clumpy regions on a trichotomously-ordered scale of value (for understandings of parity along these trichotomous lines, see Hsieh (2005) and Andreou (2015)).

item in the 'large numbers of upper-class lives' neighbourhood. We can account for this fact by noting that the former neighbourhood is better than the latter. If a god had to create either a world from the 'large number of upper-class lives' neighbourhood or a world from the 'very large numbers of middle class lives' neighbourhood, they should create a world from the second neighbourhood, since the neighbourhood, and consequently all worlds belonging to it, are better than all of those belonging to the first.

Thus, if one neighbourhood is better than another, then all items belonging to the better neighbourhood are better than all items in the worse neighbourhood. Think of the analogue with a necessarily hierarchical category: every item belonging to the category of the 'excellent' will be better than every item belonging to the category of the 'mediocre'. Neighbourhoods can, but crucially need not be hierarchical; they can be on a par. This means that if two neighbourhoods are on a par, then every item belonging to the one neighbourhood is on a par with every item belonging to the other.

Now as we progress further along the continuum, we might reach another neighbourhood, the 'extremely large numbers of lower-class lives' neighbourhood that is once again, suppose, hierarchically related to the previous two neighbourhoods by being better. Of course, you might disagree with this evaluation – the substantive judgments about these neighbourhoods are subject to dispute and will depend upon various factors including the role of perfectionism in V-ness. What is important is the thought that eventually we will reach a neighbourhood that is not better than its predecessor neighbourhood but on a par with it.

Let us suppose that following the 'extremely large numbers of lower-class lives' neighbourhood, we reach the 'vast numbers of lives-at-subsistence' neighbourhood and that those neighbourhoods are on a par. In the 'vast numbers of lives-at-subsistence' neighbourhood, each person has a life worth living but has only the minimum needed to survive in an industrialized Western democracy -- in 2016, the U.S. Department of Labour estimated this to be an annual income of \$12,228.³² Vast numbers of such people mark an evaluative significance that is not better than the significance marked by extremely large people enjoying lower-class lives, but on a par with it. If the neighbourhoods are on a par, then every item belonging to the 'extremely large numbers of lower-class lives' neighbourhood is on a par with every item belonging to the 'vast numbers of lives-at-subsistence' neighbourhood. And since they are, by hypothesis, adjacent neighbourhoods, the last item in the former neighbourhood will be on a par with first item in the latter neighbourhood. We can allow, moreover, that neighbourhoods overlap; it may be indeterminate where one neighbourhood ends and another begins; nonetheless, adjacent items can still be on

³² <https://www.bls.gov/opub/reports/working-poor/2016/home.htm#technical-notes>

a par since the neighbourhoods are on a par.³³ We thus have two adjacent items that are on a par; the one item is not better than its predecessor. Hence the slide to the false or repugnant conclusion is halted. And it is halted for precisely the untutored, intuitive reason continua arguments are thought to be fishy: there is a qualitative change along the continuum that defuses the argument. That qualitative change is a change in a neighbourhood of value not being better than its predecessor neighbourhood but on a par with it.³⁴

Toby Handfield (2014) has shown, on certain natural assumptions, if there is a failure of the trichotomy of relations, which is true of parity, that failure must occur at more than one point.³⁵ So we should think of the parity solution involving a zone of items, each of which is on a par with its predecessor. There may be many such zones along a continuum. But all such zones will include items that comprise the border between two neighbourhoods that are on a par.

We end by examining a challenge posed by Toby Handfield and Wlodek Rabinowicz (2018, Rabinowicz (this volume)) to *any* solution to continua arguments that posits both the failure of the usual trichotomy of relations to hold between adjacent items and a lexical relation between the first and last items on the continuum.³⁶ (Their argument applies not just to determinate failures but also to

³³ It would be a mistake to think that because there is indeterminacy as to where a neighbourhood begins and ends that it follows that the relations between items in that indeterminate zone are themselves indeterminately related. The indeterminacy at issue is as to where a neighbourhood begins and ends, not as to how to adjacent items in that zone compare.

³⁴ Tom Parr, Sam Bagg, and Jimmy Goodrich suggested to me that if parity holds, we might even insist that parity holds throughout the continuum since all the neighbourhoods that could be drawn are on a par. I believe they are right for some continua. But consider the most difficult case for a parity solution, one in which Compensation holds at the beginning of the continuum by each successor item being *better than* its predecessor, and then shifting to a zone in which each successor item is on a par with its predecessor.

³⁵ Handfield's proof applied to the parity solution would run as follows. Suppose A, the first item in the continuum, is better than Z, the last item on the continuum. Suppose too that P is on a par with Q, and that everywhere else on the continuum, each item is better than its predecessor. By the transitivity of 'better than (with respect to V)', P is better than A and Z is better than Q (since P occurs further down the continuum from A and Z occurs further down the continuum from Q). But if P is better than A, which is better than Z, which is better than Q, it would follow that P is better than Q. But P is supposedly on a par with Q. Thus we need more than one point at which items are on a par.

³⁶ There is another possible objection to the parity solution that is worth mentioning here. If A is a pretty great world and Z is a pretty bad one, we need an explanation of how we get such a drastic change in value through parity. This objection, I believe, involves misconceiving of parity as a kind of rough equality. I explain why parity is not in Chang (2002b, 2016a). We explain the drastic change in value by appealing to the very large change in quality from A to Z, most plausibly through multiple parity zones and perhaps by a single parity zone. As we move from A along the continuum, there is, as it were, a 'first'

indeterminate ones, though I discuss only the former since it is relevant to parity). As we have suggested, not all continua arguments need to involve lexicality, but since parity purports to be in principle available as a solution all continua arguments, their challenge must be addressed.

Handfield and Rabinowicz argue that any failure of the usual trichotomy to hold between two adjacent items on the continuum must, if it is to stop the chain of betterness along the continuum, be 'radical' or 'persistent', that is, it must continue to hold no matter how much the quantity of the successor item is increased. Consider P with, say, 1000 people living excellent lives and Q with, say, 2000 people living slightly less excellent lives. If Q is neither better, worse, nor equally as good as P, then it must be so no matter how many additional lives we add to Q. This is because if by adding a large number of lives to Q we can make Q better than P, then we will not have broken the chain of betterness – Q is better than P and the continua argument proceeds as usual. This is an important argument that helps to underscore a key difference between a trichotomous and tetrachotomous understanding of value.

I believe that Handfield and Rabinowicz are right that the persistence of the failure of trichotomy is a problem if we assume Trichotomy. But is it a problem if we assume Tetrachotomy? On the assumption of Trichotomy, the failure of the usual trichotomy entails *incomparability*. We have already argued that since adjacent items differ by a small diminution in quality and large enhancement in quality, it is implausible to think that they are incomparable. Assuming for the sake of argument that they are, Handfield and Rabinowicz's argument shows that they must be incomparable no matter how much we enhance the quantity of the successor item; the incomparability must be persistent. If P – 1000 people living middle-class lives – is incomparable with Q – 2000 people living only slightly less excellent lives – then no matter how many people we add to Q, P and Q must remain incomparable. It is hard to believe, however, that a googol of people leading only slightly diminished excellent lives is incomparable with 1000 people leading only slightly better lives. Persistent incomparability is indeed a cost of an incomparabilist solution.

On the assumption of Tetrachotomy, however, the failure of the trichotomy of relations (and no other failure) entails a form of comparability, *parity*. If parity holds between adjacent items in The Zone, then, by the Handfield/Rabinowicz argument,

item that is worse than A. That 'first' item represents a qualitative shift that emerges from a zone of parity. There may be many such qualitative shifts in serial diminutions in quality along the continuum, each emerging from a zone of parity or perhaps a single shift from which Z emerges. Put another way, parity can operate in continua arguments either as successive terraces, each with successively less overall value, or as a steep cliff. Which model is more plausible depends on the details of the continuum at issue. Note that their objection also helps to highlight how the parity solution provides a potential solution to a wide range of continua arguments, not just those in which the first item is lexically superior to the last. Many thanks to Victor Tadros and Ralf Bader for raising the worry.

parity must continue to hold no matter how much we increase the quantity in Q.³⁷ Is such ‘persistent’ parity plausible?

It is not plausible in general; it is not the case that for *any* two items on a par that differ by one being a slight diminution in quality and a large enhancement in quantity, that no matter how much we increase the quantity, the items will remain on a par – two careers may be on a par, but if we increase the salary of one of them enough, it can be better. But in the case of items in The Zone, I now want to suggest, persistent parity is plausible.³⁸

Whether parity persists depends on the character of the neighbourhood(s) to which the items that are on a par belong. In the case discussed above, we suggested that the ‘extremely large numbers of lower-class lives’ neighbourhood is on a par with the ‘vast numbers of lives-at-subsistence’, and thus, that there would be a zone of items at the transition between such neighbourhoods, each of which would be on a par with its predecessor. Let us zero in on two such items, say P and Q. Suppose P belongs to the first neighbourhood and Q to the second. Would Q remain on a par with P even if we increased the quantity of lives at subsistence to a googol? Since a googol of people at subsistence would still belong to the neighbourhood of ‘vast numbers of lives-at-subsistence’, Q would still belong in the same neighbourhood as it did before and so would remain on a par with P. So there would be no problem with parity’s persistence in this case.

³⁷ A quick informal proof: If increasing the quantity in Q makes P and Q equally good, then any further quantitative enhancement in Q makes Q better than P – by the logic of equality and the assumption at the outset (and one needed for continua arguments to get going) that an increase in quantity makes for an evaluative increase in quantity of V-ness, entailing that there are no organic unities present. In either case, the chain of betterness would not be halted. Increasing the quantity in Q could make Q tetrachotomously incomparable with P, but for the reasons given above, this would be highly implausible. Therefore, the right conclusion to draw from the Handfield/Rabinowicz argument is that parity continues to hold.

³⁸ In this way, parity does not have what Qizilbash (2018) thinks is the ‘mark’ of parity – viz., that a large enough improvement always breaks the parity into betterness. Qizilbash appears to understand parity as ‘rough’ or imprecise equality so that enough of an improvement guarantees that the improved item will be better. While I think this is often true of items that are on a par, it need not be true. Unsurprisingly, whether it is true depends on the values at stake. Note, too, that just because some arguments for parity allow that enough of an improvement can ‘break’ the parity, e.g. my Chaining Argument (Chang 2002), it does not follow that it is feature of parity that whenever there is a sufficiently significant improvement in one item, the improved item is better. Indeed, the main principle on which the Chaining Argument relies, the ‘Uni-dimensional Difference Principle’ explicitly does not hold universally but is subject to what I called the ‘Aristotleian’ and ‘Hegelian’ provisos. Anders Herlitz (forthcoming) helpfully underscores the point that parity, if it is to block continua arguments, must sometimes persist as Handfield and Rabinowicz argued.

But what about other cases? Is parity along the continuum restricted to neighbourhoods of value in which, beyond a certain threshold, an increase in quantity does not change the parity relation that otherwise holds? The answer is, 'yes', and I now want to explain why this result is both expected and perfectly natural.

There are two ways in which increasing the quantity of a value can make no difference to whether two items are on a par. They both have to do with the character of the neighbourhood to which the items belong. First, as we have just seen, sometimes, a value is significant in a way that is marked by a certain quantity, e.g., 'vast numbers of lives-at-subsistence' so that any increase in quantity leaves the item in the same neighbourhood. But, second, some neighbourhoods do not mark any quantity of V; beyond a certain threshold of quantity and quality, it is the *quality* of V-ness that determines the relation between items belonging to the neighbourhood. In this case, the qualitative aspect of a neighbourhood becomes critical.

Consider pain. There is a way in which pain could have evaluative significance, what we might call '*life-debilitating*', that is, pain so intense and severe that it prevents you from having anything like a normal human life. There are, of course, substantive matters for dispute as to which pains belong to such a neighbourhood, the contours of such a neighbourhood, how that neighbourhood overlaps with other neighbourhoods, and so on, but there will be some fixed points: a lifetime of excruciating torture would certainly belong to his neighbourhood. So too would 65 years of such torture – or so I will suppose. Sixty-five years of excruciating torture leaves you a shell of a person unable to have anything approximating a normal human life.

Now consider 70 years of slightly less excruciating torture. Let us suppose this experience also belongs to the neighbourhood of 'life-debilitating' pain; while the painfulness is discernibly less awful, 70 years of it still leaves you a shell of a person with no prospect of leading a normal human life. Is 70 years of slightly less excruciating pain worse than 65 years of slightly more excruciating pain? It might seem obvious that 70 years of only slightly less excruciating torture is worse – after all, it involves an extra 5 years of excruciating torture. But that judgment ignores the *significances* of such pains. Sixty-five years of excruciating torture leaves you a shell of a person; seventy years of slightly less excruciating torture makes no difference in this regard; you are still left a shell of a person. The evaluative quantity of the pain is greater, but the *significance* of the experience of painfulness remains the same. Psychologists suggest that short-lived intense trauma can be like this – they can make leading certain kinds of lives going forward impossible. Different traumas have different evaluative significances. Excruciating torture for 65 years or slightly less excruciating torture for 70 has the same significance: your prospects for a normal life have been ruined.

Are the experiences, then, equally painful? The Small Improvement Argument shows that they are not; if we improve the 65-year experience by decreasing the intensity of the pain slightly but discernibly, the improved 65-year

experience, 65+, is better than the original experience, 65. However, 65+ is not better than 70. Both 65+ and 70 are still in the same neighbourhood of lifetime debilitating painfulness. Of course the same is true of 65 and 65+, but the qualitative improvement in 65+ renders 65+ better than 65. The point here is that being in the 'lifetime debilitating' neighbourhood of pain is what we might call a *'quantity swamper'*; once the pain debilitates you for life, that is, meets a certain threshold of quantity and quality, increasing the quantity doesn't make the experience worse and nor does decreasing it make it better; the fact that the pain debilitates you for life 'swamps' the badness of the additional quantity of such pain. The phenomenon of swamping is a familiar one in axiology. Here we apply it to tradeoffs between quantities and qualities.

Belonging to a neighbourhood that is a quantity swamper does not entail that membership in the neighbourhood *qualitatively* swamps; you can make a qualitative improvement to a painful experience, thereby making it better than it was before. The swamping, then, is specifically a swamping of *quantitative* improvements or detractions. In this way, 65+ can be better than 65 while not being better than 70, while all three nevertheless belong to same quantity swamping neighbourhood of 'lifetime debilitating' pain. Since 65+ can be better than 65 and not better than 70, it follows, by the principle of the substitutability of equally good items, that 65 and 70 are not equally good.

I suggest that, because 70 years is not worse than 65 years, could not be better, and yet nor are they equally painful, the right thing to say is that they are on a par in painfulness. Crucially, they remain on a par no matter how much the quantity of pain is increased. Quantity swamping is a feature of some neighbourhoods in which, beyond a certain threshold of quantity and quality, the fact of belonging to that neighbourhood 'swamps' any quantitative improvement so that whatever evaluative relation held before will continue to hold despite the quantitative improvement. 'Lifetime debilitating' is a neighbourhood of pain that has this feature.³⁹

The same goes for other values, such as 'social well-being'. There are neighbourhoods of social well-being, understood as some combination of quantity of lives and quality of lives, where, at a certain threshold of quantity of quality, the character of the neighbourhood swamps any increases in quantity in determining how the items belonging to that neighbourhood compare. Take for instance, the 'vast numbers at subsistence' neighbourhood of the value of social well-being. One way social well-being can be significant is by being instantiated by vast swathes of humanity living at the minimal level for survival in an advanced industrialized

³⁹ Note that none of this is to say that belonging to the same neighbourhood precludes one item being better than the other. The point is rather that *some* neighbourhoods of value, such as 'life-debilitating painfulness' are ones in which at a certain threshold level of quantity and quality of painfulness, the addition of quantity won't make a difference to how items in the neighbourhood compare.

nation – still with lives worth living – as we saw, earning \$12,228 or less per annum. Suppose there are a billion people living at subsistence. Compare that world to another with a billion plus one hundred thousand people living at subsistence. Is the second world better than the first? I suggest that such worlds belong to the ‘vast subsistence’ neighbourhood of social well-being and are on a par with respect to social well-being. The additional one hundred thousand people with lives worth living adds value, but the fact that the neighbourhood of value is that of ‘vast numbers at subsistence’ swamps the quantitative value added to ensure that the items remain on a par. And since ‘vast numbers at subsistence’ is a neighbourhood that, beyond a certain threshold of number of lives and quality of lives, quantitatively swamps, the second world will be on a par with first no matter how many additional lives are added. A billion lives at subsistence will be on a par with any number of lives at subsistence so long as they belong to the same quantitative swamping neighbourhood of social well-being.

If this is right, then we have explained how two items belonging to the same quantity-swamping neighbourhood of value can be on a par and remain on a par no matter how much the quantity is increased. And once we have shown this, it readily follows that the parity that holds between an item, P, belonging to a predecessor neighbourhood, and an item, Q, belonging to the successor *quantity swamping* neighbourhood, will also persist. If we increase the quantity of Q even to a googol, the fact of membership in the neighbourhood will swamp the quantitative value added and the items will remain on a par. The persistence of parity can be explained by appeal to features of neighbourhoods of value.

Of course it remains to be shown that *every* continuum of *every* continua argument will involve either i) a neighbourhood of value where vastness of quantity is a mark of that neighbourhood and items in that neighbourhood are on a par with their immediate predecessors, *or* ii) parity among items that belong to a quantity swamping neighbourhood. But I believe the prospects are good. After all, for continua arguments to minimize controversy over each step, they will need to involve vast numbers. And many such arguments do seem to invoke neighbourhoods of value where, beyond a certain threshold, quantity may be swamped, e.g. many years of torture, vast numbers of lives at poverty, very long periods of mild pains, etc. Rather than a bug, the persistence of parity is a feature of a tetrachotomous understanding of value.^{40, 41}

⁴⁰ That values have such significances is, strictly speaking, a defense against the charge of ‘persistence’ that even Trichotomists could help themselves to. However, unless neighbourhoods are understood *not* as regions of a trichotomous cardinal or ordinal scale of value, the thought that neighbourhoods could have this quantitative swamping feature is hard to defend.

⁴¹ It is perhaps worth noting that the parity solution does not require giving up Parfit’s modified Simple View, viz., the view that adding lives worth living adds value to an outcome. The parity solution allows that the modified Simple View may be true but cautions that that

5. Conclusion

A structural solution to continua arguments posits a break in the chain of betterness (or worseness) relations that putatively hold throughout the continuum: somewhere along the continuum there is a zone of items, each of which is not better than its predecessor. We examined and raised significant difficulties for four such possible solutions: incommensurability, indeterminacy, incomparability, and Parfit's own solution, imprecise lexicality. Some of these solutions fail to defuse continua arguments (incommensurability); others provide formal solutions but suffer from serious substantive flaws (indeterminacy and incomparability); and some may, at best, successfully defuse only a small class of continua arguments (imprecise lexicality).

We proposed instead that the chain of betterness relations is broken by a zone of *parity*. Being *on a par* is a fourth basic way items can compare beyond being 'better than', 'worse than', or 'equally as good as' one another. If parity holds then the slide to a false or repugnant conclusion is halted. We offered two reasons for accepting parity in preference to other possible solutions. Unlike other structural solutions, parity allows us to maintain the strong intuition at the heart of all continua arguments, the idea that a slight diminution in quality can be compensated for by a

value can be swamped by the fact that the items in question belong to a quantity swamping neighbourhood of value. Wlodek Rabinowicz suggests an alternative solution that grows out of his elegant modelling of parity in terms of permissible fitting attitudes to have towards values and their bearers. His idea is that sometimes it is permissible to have an attitude towards an item in The Zone that favours, say, Q over P, while it is also permissible to have an attitude that favours P over Q, and that when these conditions obtain, Q and P are on a par. He argues that these attitudes can continue to be permissible no matter how much one increases the quantity of Q because there are multiple substantive views about value that deliver different rankings of P and Q no matter how much we increase the quantity of Q. If some of those rankings tell us that P is better than Q and some tell us that Q is better than P no matter how much we increase the quantity of Q, parity persists between P and Q even if we increase the number of people in Q to a googol. My worry about his solution is that the range of substantive approaches to values that he must countenance to account for the persistence of parity will undermine the otherwise elegant model of value relations he proposes more generally: we might think that some item X is clearly better than some item Y with respect to V, but because the range of eligible weightings of the contributory aspects of V that Rabinowicz must countenance in order to explain the persistence of parity in continuum arguments is so broad, those weightings must also be eligible in cases when we are contemplating the comparative relation between X and Y. And although intuitively it will be clear that X is better than Y with respect to V, Rabinowicz's permissiveness about weightings of contributory factors of V-ness will require us to say instead that X and Y are on a par since on some eligible weightings, Y will be better than X while on others X will be better than Y. Moreover, Rabinowicz's solution requires us to reject the Simple View, a view Parfit did not want to reject, while the parity solution allows us to maintain the Simple View.

large increase in quantity. Moreover, parity gives theoretical expression to a common, untutored response to continua arguments: as we move along the continuum, there is a qualitative shift that halts the slide to the false or repugnant conclusion. The parity solution offers an attractive way to explain that shift.

Accepting the parity solution requires rejecting a 'trichotomous' view of value according to which two items that are comparable with respect to some value must be related by 'better than', 'worse than' or 'equally good'. We explored some features of an alternative 'tetrachotomous' view and noted that values have *significances* or 'neighbourhoods', akin to categories or levels or leagues of value, that can be on a par. These neighbourhoods of value help to support the parity solution by explaining how parity might hold between adjacent items on a continuum.

In this way, thinking about what might seem to be a 'mere puzzle' in ethics opens up an alternative way of understanding the very structure of values and of normativity more generally.

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