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SUPERIORITY IN VALUE

1. INTRODUCTION

Let's say that A and B are two types of goods such that more of A or B is better than less. I'm going to discuss the following two ideas:

Strong Superiority (roughly): Any amount of A is better than any amount of B.

Weak Superiority (roughly): Some amount of A is better than any amount of B.

It is easy to find examples of these ideas in the literature. For example, early in the 20th century Franz Brentano claimed that "[i]t is quite possible for there to be a class of goods which could be increased *ad indefinitum* but without exceeding a given finite good".[1] Likewise, W. D. Ross asserted that "[w]ith respect to pleasure and virtue, it seems to me much more likely to be the truth that *no* amount of pleasure is equal to any amount of virtue, that in fact virtue belongs to a higher order of value, beginning at a point higher on the scale of value than pleasure ever reaches..."[2] Similar views have been proposed by, among others, Roger Crisp, Jonathan Glover, James Griffin, Rem Edwards, Noah Lemos, Derek Parfit, and John Skorupski.[3] Its lineage goes back to at least Francis Hutcheson in the early 18th century and of course John Stuart Mill in the mid 19th century.[4]

Superiority in value can be compared to

The Archimedean Property of Value (roughly): For any amount of A there is some amount of B which is better.

This is like the Archimedean property of the real numbers: For any positive numbers x and y, there is a natural number n such that nx is greater than y. The Archimedean property seems

to capture the way we usually think about the aggregation of goods. Let's say that you are considering two holiday packages. The first is a week in Stockholm, the other a week in Copenhagen. They both give the opportunity for more or less the same activities: going to museums, city-walks in pleasant surroundings, interesting culinary experiences, and the like. You have a slight preference for Stockholm. It is possible, however, to better the Copenhagen-package by adding some extra days. It seems plausible that there is such a bettering, other things being equal, that would reverse your preference in such a way that you would prefer the Copenhagen holiday. One might think that this feature is a general property of goods, that all types of goods satisfy the Archimedean Property of Value. Strong and Weak Superiority is a denial of this claim, they are both versions of what I call *non-Archimedeanism*.

Superiority in value and non-Archimedeanism are structural features that can be true of any kind of good. I shall discuss some different ways in which these ideas can be applied to the aggregation of welfare. It is important to separate these different applications of the superiority idea, since they will yield quite distinctive views with varying intuitive support. I shall then try to give an exact and generalised statement of Strong and Weak Superiority. Using these formulations, I shall prove a general result that can be used as an argument against the existence of superiority in value in certain contexts: Roughly, if one holds that some type of good A is strongly or weakly superior to another type of good B, then one is committed to holding that there are two types of goods C and D such that C is weakly superior to D although goods of type C are only marginally better than goods of type D. First, however, I shall describe the kind of problems that have motivated the recent interest in non-Archimedeanism.

2. INTRAPERSONAL AND INTERPERSONAL REPUGNANT CONCLUSIONS

During the last 20 years or so, non-Archimedeanism has again become popular in connection with theories of welfare and population ethics, especially among Oxford philosophers. What

is the reason behind this return to non-Archimedeanism? Derek Parfit has brought attention to a problem for maximising theories of beneficence, such as Total Utilitarianism, which tells us to maximise the welfare in the world. They imply what he calls the Repugnant Conclusion:

The Repugnant Conclusion: For any perfectly equal population with very high positive welfare, there is a population with very low positive welfare which is better, other things being equal.[5]
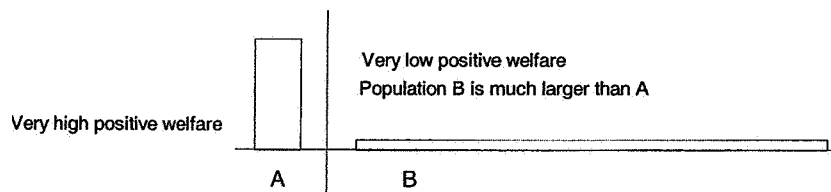

Diagram 1.

In diagram 1, the width of each block represents the number of people, whereas the height represents their lifetime welfare. All the lives in the diagram have positive welfare, or, as we also could put it, all the people have lives worth living. People's welfare is much lower in B than in A since the A-people have very high welfare, whereas the B-people have very low positive welfare. The reason for the very low positive welfare in the B-lives could be, to paraphrase Parfit, that there are only enough ecstasies to just outweigh the agonies or that the good things in life are of uniformly poor quality, e.g., working at an assembly line, eating potatoes and listening to Muzak.[6] However, since there are many more people in B, the total sum of welfare in B is greater than in A. Hence, Total Utilitarianism ranks B as better than A – an example of the Repugnant Conclusion.[7]

One way of avoiding this implication but retaining the idea of maximisation is to invoke a form of non-Archimedeanism and claim that there is a number of lives with very high welfare, which is better, or that has greater aggregate of welfare, than any number of lives with very low positive welfare, although the

addition of more lives with very low positive welfare always makes a population better, or always increases the aggregate welfare.

Diagram 1 could also be taken to represent an intrapersonal version of the Repugnant Conclusion. The width of each block would then represent the length of a life, and the height would represent the well-being at a certain time. For example, block A could represent a life of a 100 years in which every year is of very high quality, and block B could represent a very long life but in which every year is of very low quality.[8] If the B-life is just long enough, then the total welfare of that life will be greater than the A-life and thus considered better by a maximising theory of welfare. Again, this implication could be blocked by invoking some form of non-Archimedeanism. This is what Parfit suggests:

> I could live for another 100 years, all of an extremely high quality. Call this *the Century of Ecstasy*. I could instead live for ever, with a life that would always be barely worth living ... the only good things would be muzak and potatoes. Call this *the Drab Eternity*. – I claim that, though each day of the Drab Eternity would be worth living, the Century of Ecstasy would give me a better life. – Though each day of the Drab Eternity would have some value for me, *no* amount of this value could be as good for me as the Century of Ecstasy.[9]

Likewise, in his influential discussion of intrapersonal aggregation of welfare, James Griffin has proposed that there can be what he calls "discontinuity" among prudential values (welfare) of the form "enough of A outranks any amount of B". Discontinuity entails, he explains:

> ... the suspension of addition; ... we have a positive value that, no matter how often a certain amount is added to itself, cannot become greater than another positive value, and cannot, not because with piling up we get diminishing value or even disvalue ..., but because they are the sort of value that, even remaining constant, cannot add up to some other value. - - - ...
> [I]t is more plausible that, say, fifty years at a very high level of well-being – say, the level which makes possible satisfying personal relations, some understanding of what makes life worth while, appreciation of great beauty, the chance to accomplish something with one's life – outranks any number of years at the level just barely living – say, the level at which none of the former values are possible and one is left with just enough surplus of simple pleasure over pain to go on with it.[10]

I take it that most people, like me, find Griffin's and Parfit's examples convincing. To establish whether the non-Archimedean idea involved in the examples is plausible, however, we need to spell it out in more detail and distinguish among different varieties of it.

3. AGGREGATION OF WELFARE AND NON-ARCHIMEDEANISM

Let's call those things that are good or bad for people for welfare components. Here are some components that have been proposed in the literature: pleasure or pain; taking pleasure or displeasure in worthy or unworthy states of affairs; satisfied or frustrated desires; being more or less autonomous; achieving greater or lesser accomplishments; true or false beliefs; having satisfying or dissatisfying personal relationships; experiences of beautiful or ugly objects, and so forth.

The kind of non-Archimedeanism expressed in the passages above from Griffin and Parfit is about the relationship between ordering of welfare components and the ordering of lives in respect to their welfare. However, the route from welfare components to the welfare of lives can take different paths and, which is important, some form of non-Archimedean property can appear along different stops of this path. For example, we could order experiences of pleasure, including collections of pleasurable experiences, in terms of how pleasurable they are (how much pleasure these experiences contain taken as a whole), i.e., by the relation "is at least as pleasurable (painful) as". We could then ask how such an ordering relates to the welfare of a life. We could, for example, ask whether it is always *better for* a person to experience more happiness rather than less, other things being equal, and thus whether for any amount of intense pleasure, there is always some amount of minor pleasure which is better for a person. Here we are asking whether some kind of non-Archimedean property appears in the contributive value of pleasure to the welfare of a life. On this view, it is possible that the ordering of pleasures by the relation "is at least as pleasurable" fulfils the Archimedean property.

We could also start by looking at *atomic* experiences of plea-
sures, understood as the shortest possible experiences of pleasure
that are the building blocks of all other experiences of pleasure.
We could then investigate how the ordering of the atomic expe-
riences of pleasure relates to the ordering of all experiences of
pleasures, including collections of pleasurable experiences, in
terms of the relation "is at least as pleasurable as". We could then
ask whether for any number of intense pleasures, there is always
some number of minor pleasures which, taken together, are *more
pleasurable*. Here we are asking whether the non-Archimedean
property appears in the aggregation of single pleasures to the
overall pleasure in a life. How pleasure contributes to well-being
would then be a further question.

If the second approach is combined with the view "the more
happiness, the better a life", then it might be extensionally
equivalent to the first. Still, these two versions of non-Archi-
medeanism are different in an important way: If we hold that
the non-Archimedean property appears in the ordering of
pleasurable experiences by the relation "is at least as pleasur-
able as", then it's still possible for us to claim that "the more
happiness, the better a life". However, if we hold that the non-
Archimedean property appears only in the ordering of lives by
the relation "has at least as high welfare as", i.e., in the con-
tributive value of pleasure to the welfare of a life, then we
cannot claim that "the more happiness, the better a life". This
might be of importance for a hedonist who thinks that this
credo is an integral part of hedonism as a theory of welfare.
Perhaps Mill had something like this in mind when he wrote:

It is quite compatible with the principle of utility to recognise the fact, that
some *kinds* of pleasure are more desirable and valuable than others. – Of
two pleasures, if .... one of the two is, by those who are competently
acquainted with both, placed so far above the other that they ... would not
resign it for any quantity of the other pleasure which their nature is capable
of, we are justified in ascribing to the preferred enjoyment a superiority in
quality, so far outweighing quantity as to render it, in comparison, of small
account.[11]

The non-Archimedean property can also appear on a third
level. We can order populations of lives, which can be outcomes

of action, in terms of how morally good they are, that is, by the relation "is at least as good as". We can ask how pleasure or welfare contributes to this value. Assume that we have an ordering of pleasurable experiences in terms of "is at least as pleasurable as". We could then ask whether for any number of lives experiencing intense pleasure, there are a number of lives experiencing only slight pleasures, which is better. We could also ask whether for any number of lives with very high welfare, there are a number of lives with slight welfare which is better. Here we are asking whether the non-Archimedean property appears in the contributive value of pleasure or welfare to the value of populations.

Of course, the non-Archimedean property could also apply to the other kinds of welfare components mentioned above. Notably, it could hold between welfare components of different kinds. For example, one could believe that no amount of slight pleasure can outweigh the loss of one's autonomy. This could be a view about how pleasure and autonomy contribute to well-being or to the intrinsic value of a life. Moreover, the non-Archimedean property might appear in the aggregation of welfarist and non-welfarist goods into a measure of the intrinsic value of actions and people. This seems to be what Ross had in mind in the quotation in the introduction and what Hutcheson had in mind when he wrote:

As to pleasures of the same kind, 'tis manifest their values are in joint proportion of their intenseness and duration. – In comparing pleasures of different kinds, the value is as the duration and dignity of the kind jointly. – No intenseness or duration of any external sensation gives it a dignity or worth equal to that of the improvement of the soul by knowledge, or the ingenious arts; and much less is it equal to that of virtuous affections and actions. – By this intimate feeling of dignity, enjoyment and exercises of some kind, tho' not of the highest degree of those kinds, are incomparably more excellent and beatifick than the most intense and lasting enjoyment of the lower kinds. – The exercise of virtue for a short period ... is of incomparably greater value than the most lasting sensual pleasure.[12]

Let me summarise this section. The non-Archimedean property can appear at different stages in the path from goods to welfare and the value of people, populations, worlds, and

actions. It can appear in the contributive value of atomic experiences of pleasure to the pleasantness of aggregates of such experiences. It can appear in the contributive value of pleasure to the welfare of a life. It can appear in the contributive value of the welfare of lives to the value of populations and worlds. It can appear in the aggregation of welfarist and non-welfarist goods into a measure of the value of actions and people. This list doesn't exhaust all the possibilities but represents the most interesting ones. Notice that these views are logically independent. For example, one could hold that slight pleasures can always outweigh intense pleasures when it comes to the welfare of a life but not when it comes to the contributive value of a life to the value of a population. For example, one might think that one life with some amount of high quality pleasures has higher contributive value to a population than any number of lives with any amount of low quality pleasures, although the latter lives may enjoy higher welfare than the former life.

4. THE GENERAL STRUCTURE OF SUPERIORITY IN VALUE

Assume that goods can be partitioned into different *kinds* defined by some predicate, e.g., pleasurable experiences, knowledge, autonomy, accomplishments, personal relationships, bodily pleasures, intellectual pleasures, being of a virtuous character, the exercise of virtue, and so forth. This gives us different domains of valuable objects. Assume that goods of the same kind are weakly ordered (reflexive, transitive, and complete) by some relation R. R could be the natural comparative relation "_ is at least as N as _" of the objects in question (e.g., "is at least as pleasurable as", "is at least as autonomous as", "is at least as much knowledge as" etc) or some value relation "_ is at least as V as _" (e.g., "is at least as good as", "is at least as good as for a person"). We shall suppose that for any object e in the domain and any number m, the domain contains a whole composed of m "e-objects", that is, a whole composed of m components equally as R as e. For example, let's say that we are considering a certain kind of pleasure and the relation "is at

least as pleasurable as". If some pleasure e is in the domain, so is the whole consisting of, say, ten e-pleasures, i.e., ten episodes of pleasures, each as pleasurable as pleasure e.

We shall also assume that all of the objects in domains we are discussing are positively valuable in the following sense:

Weak Positive Response: For any object e and any number n, $n + 1$ e-objects is at least as R as n e-objects.[13]

We shall say, somewhat contrary to common language use, that a *type* of good g is a representative of an equivalence class in a certain domain. For example, let's say that the kind of good in question is pleasure and this domain is ordered by the relation "is at least as pleasurable as", and that e is an episode of pleasure. Then the representative of the set of all pleasures equally as pleasurable as e is a type of good in this domain. The expression "n g-objects" is short for "a whole composed of n objects equally as R as g". We can now state Strong and Weak Superiority as follows:

Strong Superiority: A type of good g_1 is strongly superior to another type of good g_2 iff for any n, one g_1-object is more R than n g_2-objects.

Weak Superiority: A type of good g_1 is weakly superior to another type of good g_2 iff there is a number n such that for any number m, n g_1-objects are more R than m g_2-objects.

The statements above of Weak Positive Response, Strong and Weak Superiority, are generalised to cover any kinds and types of goods and relations, including the ones discussed in section 3. We could also use the above definitions to state relations between different kinds of valuable objects or other partitions of these objects. For example, a kind of good, say knowledge, is strongly superior to another kind of good, say, pleasurable experiences, iff all types of the first kind is strongly superior to all types of the second kind.

For Griffin and Parfit, as we pointed out above, Superiority is about the relationship between orderings of welfare components and the ordering of lives in respect to their welfare. Here's how we could adapt the definitions above for that context:

Weak Positive Response for Welfare Components: For any welfare component e and any number n, a life with $n+1$ e-components has at least as high welfare as a life with n e-components, given that these lives don't involve any other welfare components.

Strong Superiority between Welfare Components: A type of welfare component g_1 is strongly superior to another type g_2 iff for any n, a life with one g_1-component has higher welfare than a life with n g_2-components, given that these lives don't involve any other welfare components.

Weak Superiority between Welfare Components: A type of welfare component g_1 is weakly superior to another type g_2 iff there is a number n such that for any number m, a life with n g_1-components has higher welfare than a life with m g_2-components, given that these lives don't involve any other welfare components.

We have included the clause "given that these lives don't involve any other welfare components" to make clear that these definitions only cover lives that involve welfare components of type g_1 and g_2. Weak Superiority corresponds pretty well with the idea expressed in the quotations from Griffin and Parfit above and to Griffin's "discontinuity in value" (enough of A outranks any amount of B). Strong Superiority is similar to what Griffin calls "Trumping" which "... takes the form: any amount of A, no matter how small, is more valuable than any amount of B, no matter how large."[14]

5. THE SEQUENCE ARGUMENT

I take it that it is clear that Strong Superiority implies Weak Superiority, i.e., if g_1 is strongly superior to g_2, then g_1 is weakly superior to g_2. That the following relations hold might not be equally obvious:

C2: Any descending finite sequence $g_1, ..., g_n$ (i.e., a sequence such that g_1 is more R than g_2, which is more R than g_3, ..., which is more R than g_n) in which the first element is strongly superior to the last element, must contain an element that is weakly superior to the element that immediately follows.

C3. Any descending finite sequence $g_1, ..., g_n$ in which the first element is weakly superior to the last element, must contain an element that is weakly superior to the element that immediately follows.

What does this mean? Let's illustrate the implications of C3 using Parfit's example. Assume that there are days of different qualities and that these can be arranged in a descending sequence of goodness or how much they would contribute to the well-being of a life. It seems plausible that there can be such a sequence where the difference in quality of any two adjacent days in the sequence is marginal. For example, consider two days of a life that only differ in respect to one pin-prick in the left thumb. Assume now, as Parfit suggests, that there are days of such quality that some number of these are better than any number of days eating potatoes and listening to Muzak. Then there are, according to C3, two types of days, call them A-days and B-days, such that some number of A-days is better than any number of B-days although the difference in quality between these days is marginal.

Another way to put it is this. If the elements in a descending finite sequence are chosen in such a way that each consecutive element is only *marginally* worse than the immediately preceding one, then it would seem that no element will be weakly superior to the element that comes next. But then, according to C3, the first element will not be weakly superior to the last one either, however long such a sequence may be. One might find this counterintuitive, since one might think that in a sufficiently long series of small worsenings one should sooner or later reach an element that is radically worse than the point of departure.

Compare with C1:

C1: There could exist a finite descending sequence $g_1, ..., g_n$ in which the first element is strongly superior to the last element, but in which no element is strongly superior to the element that immediately follows.[15]

Here's a simple example to show that C1 is true. Let's say that we have a sequence that consists of three elements, g_1, g_2, and g_3. For each of these types of goods, there is a value limit l_i such that for any n, l_i is more R than ng_i, but for any other good x such that l_i is more R than x, there is an m such that mg_i is more R than x. Moreover, l_2 is more R than g_1, and l_3 is more R than g_2, but g_1 is more R than l_3. Since l_2 is more R than g_1, and l_3 is more R than g_2, it follows that there is an n such that ng_2 is

more R than g_1, and that there is an m such that mg_3 is more R than g_2. Consequently, g_1 is not strongly superior to g_2, and g_2 is not strongly superior to g_3. However, since g_1 is more R than l_3, it follows that for any n, g_1 is more R than ng_3. Thus, g_1 is strongly superior to g_3. In other words, the first element in the sequence is strongly superior to the last element, even though no element is strongly superior to the one that comes next. So C1 is true.[16]

I take C1 and C2 to be a quite powerful argument against the existence of superior goods in contexts where one can construct a sequence in which the value difference between adjacent goods are marginal. As I have indicated above, this is plausible in the context of well-being and I think it probably holds true for most, if not all, kinds of goods. This can only to be determined on a case-by-case basis, however, and I shall not undertake that investigation here. At any rate, in such cases I find it counterintuitive that a sufficient number of objects of one type can make a whole that is better (better for, more pleasurable, etc), than *any* whole, however large, that consists of just slightly worse objects and in spite of this whole getting better for each additional object.

One could, however, also argue that the lesson we should draw is that there is an important difference between Strong and Weak superiority.[17] The former is a rather dramatic form of superiority in value, but the latter is not. If an object g_1 is only marginally worse than another object g_2, then g_1 will not be strongly superior to g_2. But, contrary to what one might have expected, it may still be the case that g_1 is weakly superior to g_2, even though the value difference between the two objects is marginal.

Although I grant that this is a possible interpretation of the result, I'm not sure how it would eliminate the counterintuitive result of Weak Superiority pointed out above. Moreover, Strong and Weak Superiority share a number of problem that occur when we consider mixed outcomes, that is, outcomes that involve both superior and inferior goods. Here's an example involving intrapersonal aggregation of welfare. Consider three welfare components g_1, g_2, and g_3 such that g_2 is only

marginally worse than g_1, whereas g_3 is clearly worse than g_2 but still good. Assume further that g_1 is strongly or weakly superior to g_2. Consider a life a with a sufficient number n of g_1-components as compared to a life b with the same number of g_1-components and a much greater number m of g_3-components. Since the only difference between these lives is that life b has an additional great number of the things that makes a life better, it seems reasonable to say that life b has higher welfare than life a. Consider now a life c with $n + m$ g_2-components. Which one of life b and c has the highest welfare? There is a marginal loss for each g_1-component that has been exchanged for a g_2 component since g_2 is marginally worse than g_1. However, there is a bigger gain for each g_3-component that has been exchanged for a g_2-component. It is hard to deny that there is some m such that the smaller number of smaller losses is compensated for by the greater number of greater gains, and that in such cases, life c has higher welfare than life b. What about a and c? Since g_1 is superior to g_2, it follows that life a has higher welfare than life c. Since c has higher welfare than b, and b has higher welfare than a, it follows by transitivity that c has higher welfare than a. Hence, we now have a contradiction: a has higher welfare than c and c has higher welfare than a. Consequently, a believer in Strong or Weak Superiority must deny one of the two compelling intuitions invoked in the reasoning above.[18]

6. PROOF OF C2 AND C3

Since Strong Superiority implies Weak Superiority, if we prove that C3 is true, then we have also proven that C2 is true.[19]

Proof: Assume that we have a finite descending sequence g_1, ..., g_n. Assume further that

(1) g_1 is weakly superior to g_n.

Since the sequence is finite, there must exist some element g_i which is the first element in the sequence such that g_1 is weakly superior to g_i Let

(2) g_i be the first element in the sequence such that g_1 is weakly superior to g_i (i.e., there is no element g_j, $j < i$, such that g_1 is weakly superior to g_j).

It follows from the definition of Weak Superiority that

(3) there is a number m such that for any number n, m g_1-objects are more R than n g_i-objects.

Since g_i is the first element like this, it follows that g_i is not weakly superior to g_{i-1}. Consequently,

(4) for some k, m g_i-objects are not more R than k g_{i-1}-objects.

Since we have assumed that the ordering R is complete, it follows that

(5) for some k, k g_{i-1}-objects are at least as R as m g_1-objects.

By the transitivity of the relation R, (5) and (3) imply that

(6) for some k, k g_{i-1}-objects are more R than n g_i-objects.

Since, from (3), n can be any number, (6) means that g_{i-1} is weakly superior to g_i. Q.E.D.[20]

NOTES

[1] Brentano (1907).
[2] Ross (1930), p. 150.
[3] See Crisp (1988), p. 188; Crisp (1992), p. 151; Glover (1977), p. 71; Griffin (1986), pp. 85–86; Edwards (1979), pp. 69–72; Lemos (1993), Parfit (1986), pp. 161–164; Skorupski (1999), pp. 94–101. See also Klint Jensen (1996), pp. 90–91; Portmore (1999); Riley (1993, 1999).
[4] Hutcheson (1755), pp. 117–118 (Hutcheson completed his treatise in 1738 but it was published posthumously in 1755 - Cf. Edwards (1979), p. 71.); Mill (1998), p. 56. For another early source with a racist twist, see Rashdall (1907), pp. 238–239. Newman (1885), vol. I, p. 204, makes a similar claim about pain and sin.
[5] See Parfit (1984), p. 388. My formulation is more general than Parfit's apart from that he doesn't demand that the people with very high welfare are equally well off. Although it is through Parfit's writings that this implication of Total Utilitarianism has become widely discussed, it was already noted by Henry Sidgwick (1907), p. 415, before the turn of the

century. For other early sources of the Repugnant Conclusion, see Broad (1930), pp. 249–250, McTaggart (1927), pp. 452–453, and Narveson (1967).

[6] See Parfit (1984), p. 388 and Parfit (1986), p. 148. In Arrhenius (2000), I discuss different interpretations of the Repugnant Conclusion in some detail.

[7] Notice that problems like this are not just problems for utilitarians or those committed to welfarism, the view that welfare is the only value that matters from the moral point of view, since we can assume that the other things are roughly equal. We can assume that other values and considerations are not decisive for the choice between population A and B in diagram. This is a problem for all moral theories which holds that welfare at least matters when all other things are equal, which arguably is a minimal adequacy condition for any moral theory.

[8] There are other versions of the interpersonal case in which the compared lives may be equally long but one life contains some amount of A and the other an arbitrarily large amount of B, where some of the B-goods come more or less simultaneously. An example of the latter case, which I owe to Wlodek Rabinowicz, is appreciation from enthusiastic readers.

[9] Parfit, (1986), pp. 161–164, emphasis in original.

[10] Griffin (1986), pp. 85–86.

[11] Mill (1998), p. 56.

[12] Hutcheson (1755), pp. 117–118.

[13] As Howard Sobel pointed out to me, this condition rules out a number of goods, for example, the goods of eating potatoes and listening to Muzak, since it is plausible that for many goods and most people, there can be too much of a good thing – just consider eating 10 kilos of potatoes in a day. Notice, however, that in Parfit's example above, the goods considered were not that of eating potatoes and listening to Muzak, but days with very low but positive well-being ("... each day of the Drab Eternity would have some value for me..."). The consumption of potatoes and Muzak is just the source of the well-being.

[14] Griffin (1986), pp. 83, 85.

[15] Ryberg (2002), p. 418, claims that "[if] there is a discontinuity between the values ... at each end of the continuum, then at some point discontinuity must set in". Rabinowicz (2003) denies this claim. As can be seen from C1–C3 above, it all depends on what one means with "discontinuity" and Ryberg isn't very clear on this point. If we with "discontinuity" mean "strong superiority" then Ryberg's claim is false as C1 shows. If we mean "strong or weak superiority", then Ryberg's claim is true, as C2 and C3 show. Rabinowicz is right, however, in pointing out that Ryberg's reasoning is based on the fallacy of identifying superiority with "infinite betterness". For a detailed discussion of Ryberg's argument, see Rabinowicz (2003) and Arrhenius and Rabinowicz (2003).

[16] Here's a numerical version of the same example which I owe to Wlodek Rabinowicz. Let's say that the numerical representation of the values of g_1, g_2, and g_3, as measured on a ratio scale, are 5, 3, and 2. Suppose that the contributive value of an extra object is half of the contributive value of the preceding object of the same type. Thus, the value of one g_3-object equals 2, the value of two such objects equals $2 + 1$, the value of three such objects equals $2 + 1 + \frac{1}{2}$, and so forth. It follows that there is a value limit that cannot be exceeded by a whole that consists of the objects of the same type. The value of the first element is 5 which is higher than the limit for the last element which is 4. Consequently, the first element is strongly superior to the last one. However, for each element in the sequence, its value is lower than the limit for the next object in the sequence. Consequently, no element in the sequence is strongly superior to the one that comes next.

[17] This was suggested by Wlodek Rabinowicz.

[18] Although the view that life b has higher welfare than life a is compelling in this context, the analogous view might not be convincing in other contexts, such as in population axiology. This step in the argument can be replaced, however, with weaker and more compelling conditions. For a discussion of this in connection with population axiology, see Arrhenius (2000), ch. 10.

[19] The proof here assumes completeness of the relation R. For a variant of this proof without completeness see Arrhenius and Rabinowicz (2003) and Arrhenius (2000), section 3.2 and 10.3–4.

REFERENCES

Arrhenius, G. (2000): *Future Generations: A Challenge for Moral Theory*, F.D.-Diss., Uppsala: University Printers.

Arrhenius, G. and Rabinowicz, W. (2003): 'On Millian Discontinuities', mimeo.

Brentano, F. (1969 [1907]): 'Loving and Hating' in R.M. Chisholm, (ed.) *The Origin of Our Knowledge of Right and Wrong*, New York: Routledge and Kegan Paul [1907].

Broad, C.D. (1979 [1930]): *Five Types of Ethical Theory*, London: Routledge and Kegan Paul.

Crisp, R. (1988): *Ideal Utilitarianism: Theory and Practice*, D.Phil. Diss., University of Oxford.

Crisp, R. (1992): 'Utilitarianism and the Life of Virtue', *The Philosophical Quarterly* 42(167), 139–160.

Edwards, R.B. (1979): *Pleasures and Pains: A Theory of Qualitative Hedonism*, New York: Cornell UP.

Glover, J. (1977): *Causing Death and Saving Lives*, Penguin Books.

Griffin, J. (1986): *Well-Being: Its Meaning, Measurement, and Moral Importance*, Oxford: Clarendon Press.

Hutcheson, F. (1968 [1755]): *A System of Moral Philosophy*, Vol. 1, New York: Augustus M Kelley.

Klint Jensen, K. (1996): *Om afvejning af værdier*, Ph.D. Diss., University of Copenhagen.

Lemos, N.M. (1993): 'Higher Goods and the Myth of Tithonus', *The Journal of Philosophy* 90(9).

McTaggart, J.M.E. (1927): *The Nature of Existence*, Cambridge: Cambridge University Press.

Mill, J.S. (1998): *Utilitarianism*, ed. Roger Crisp, Oxford UP.

Narveson, J. (1967): 'Utilitarianism and New Generations', *Mind* 76, 62–72.

Newman, J.H. (1885): *Certain Difficulties Felt by Anglicans in Catholic Teaching*, Vol. I, London: Longmans and Green.

Parfit, D. (1984): *Reasons and Persons*, Oxford: Clarendon Press.

Parfit, D. (1986): Overpopulation and the Quality of Life, in P. Singer (ed.), *Applied Ethics* pp. 145–164 Oxford: Oxford UP.

Portmore, D.W. (1999): 'Does the Total Principle Have Any Repugnant Implications?', *Ratio* xii.

Rabinowicz, W. (2003): 'Ryberg's Doubts About Higher and Lower Pleasures – Put to Rest?', *Ethical Theory and Moral Practice* 6, 231–237.

Rashdall, H. (1907): *The Theory of Good and Evil: A Treatise on Moral Philosophy*, Vol. 1., 2nd edn.

Riley, J. (1993): 'On Quantities and Qualities of Pleasure', *Utilitas* 5, pp. 291–300.

Riley, J. (1999): , 'Is Qualitative Hedonism Incoherent?', *Utilitas* 11, pp. 347–358.

Ross, W.D. (1930): *The Right and the Good*, Oxford UP.

Ryberg, J. (2000): 'Higher and Lower Pleasures – Doubts on Justification', *Ethical Theory and Moral Practice* 5, 415–429.

Sidgwick, H. (1967 [1907]): *The Methods of Ethics*, 7th edn., London: Macmillan.

Skorupski, J. (1999): *Ethical Explorations*, Oxford UP.

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