



Taking values seriously

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Abstract

Recently, there has been a revival in taking empirical magnitudes seriously. Weights, heights, velocities and the like have been accepted as abstract entities in their own right rather than just equivalence classes of objects. The aim of my paper is to show that this revival should include *value* magnitudes. If we posit such magnitudes, important value comparisons (cross-world, cross-time, mind to world, cross-theory, cross-polarity, ratio) can be easily explained; it becomes easier to satisfy the axioms for measurement of value; goodness, badness, and neutrality can be given univocal definitions; value aggregation can be given a non-mathematical understanding which allows for Moorean organic unities. Of course, this does not come for free. One has to accept a rich ontology of abstract value magnitudes, but, to quote David Lewis, ‘The price is right; the benefits in theoretical unity and economy are well worth the entities.’

Keywords Magnitudes · Values · Realism · Measurement · Concatenation · Goodness · Badness · Neutrality

1 Introduction

Recently, there has been a revival in taking empirical magnitudes seriously.¹ Masses, lengths, time durations, and the like have been accepted as abstract entities in their own right rather than just equivalence classes of objects (defined by the relations as heavy as, as long as, and so on). This empirical magnitude realism has several virtues:

¹ See, for instance, Perry (2015), Kim (2016), Mundy (1987), Peacocke (2015), Swoyer (1987), Eddon (2013). For an early defence of magnitude realism, see Russell 2009 (1903), Part 3, chs. 19–23.

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- (a) it explains the equivalence between comparative-claims such as ‘x is taller than y’ and the corresponding magnitude-claim, ‘the height of x is greater than the height of y’;
- (b) it gives a straightforward explanation of mind-world, cross-world, and cross-time comparisons—e.g., the claim that I could have been taller than I am is identified with the claim that my length is less than a length I could have had;
- (c) it makes it easier to satisfy the axioms for measurement of empirical magnitudes, since one is not bound to quantify over a finite domain of physical objects and make controversial assumptions about how they are related to each other and how they can be combined.

The aim of my paper is to show something analogous for *value* magnitudes (where ‘value’ is a place-holder for a specific kind of value, such as moral value, aretaic value, prudential value, aesthetic value, perfectionist value, sentimental value, or functional value). More specifically, I am going to show that there are perfect analogues of (a)–(c) for value magnitudes. Furthermore, realism about value magnitudes has some further virtues not all of which have analogues in empirical magnitudes. More specifically, I will show that it enables us to provide

- (d) a straightforward understanding of intertheoretical comparisons of value;
- (e) univocal definitions of good, bad, and neutral in terms of value magnitudes, which avoids some of the pitfalls of existing definitions;
- (f) a natural, non-mathematical, understanding of value aggregation and judgements about ratios of value (e.g., ‘twice as good as’);
- (g) a plausible interpretation of Moorean organic unities;
- (h) an account that can easily acknowledge the existence of objects that are valuable in part because they are unique or rare;
- (i) a neat explanation of cross-polarity comparisons, such as ‘my pain is less bad than your pleasure is good’.

Some important objections to the account will then be canvassed, before I sketch how we can come to know values. Finally, I show some metaethical implications of this kind of value magnitude realism. It turns out that it creates some challenges for the so-called fitting attitude analysis of value.

Of course, realism about value magnitudes does not come for free. One has to accept a rich ontology of abstract value magnitudes (a bloated ontology some would say), and some primitive relations holding between them, but I am inclined to think that, to quote David Lewis, ‘It’s an offer you can’t refuse. The price is right; the benefits in theoretical unity and economy are well worth the entities’ (Lewis 1986, p. 4).

However, the aim of this paper is not to provide a full-blown defense of value magnitude realism. Rather, the paper is exploring a neglected—so far as I know, a completely neglected—but attractive option for value realists. The take home

message is that value realists have strong reasons to take value magnitudes seriously.²

2 What are magnitudes according to magnitude realists?

According to magnitude realism, one important mark of magnitudes of any kind, empirical or non-empirical, is that they are abstract in the sense that a determinate magnitude can exist in a world or at a time without being a magnitude of anyone or anything in that world or at that time.³ A specific mass or length can exist without anyone or anything having this mass or length. Since a (non-empty) set cannot exist without its members existing, magnitudes cannot be reduced to equivalence classes of actual objects, defined by the relation *equally as F as*, where F is the quantity in question. Another reason why they cannot be identified with equivalence classes is that sets are extensional whereas magnitudes are not. If the set of objects with a certain mass happens to be identical with the set of objects of a certain length, we do not want to conclude that a mass magnitude is identical to a length magnitude!⁴ Expressions such as ‘1 kg is identical to 50 cm’ do not even seem to make sense. Rather, what we want to say here is that all the objects in the set share the same mass and the same length.⁵

Another mark of magnitudes is that they are part of an ordered structure of magnitudes of the same kind. For example, lengths are ordered by the relation *being a greater length than*. This structure may also include combinations (concatenations) of magnitudes. The combination of the length that is picked out by the partially descriptive name ‘1 m’ and the one that is picked out by the name ‘2 m’ is identical to the length that is picked out by the name ‘3 m’. Note that the choice of unit (meter) in describing these magnitudes is purely conventional: ‘1 m’ is stipulated to pick out the magnitude of the object we want to treat as a ‘measuring rod’ for length,

² Quasi-realists can follow their lead if they find a way to ‘earn the right’ to make judgements about value magnitudes.

³ This does not have to mean that magnitudes are completely free-floating from magnitude-bearers. Perhaps there are no magnitudes of a certain kind if there are no magnitude-bearers of that kind; but if there is at least one magnitude-bearer of that kind, then all magnitudes of that kind exist, even those that are not exemplified by the magnitude-bearer in question.

⁴ Peacocke (2015) makes a similar point.

⁵ Is this problem solved by populating one’s ontology with merely possible physical objects? No, and the reason is not just that such an ontology is questionable. Merely possible physical objects are objects that are not physical but *could* have been physical (if we ignore David Lewis’ idiosyncratic understanding of merely possible physical objects as physical objects that do not exist around ‘here’ but in a different spatiotemporally isolated concrete world). But being physical is a prerequisite for having physical attributes and standing in physical relations. So, we cannot say of such an object that it is as long as, or as massive as some other object; we can only say that it *could* have been as long as, or as massive as, some other object. Hence, merely possible physical objects cannot be members of equivalence classes, defined by some physical relation *being as F as*. Of course, merely possible physical objects can be members of equivalence classes, defined by the relation expressed by ‘x would, if actual, have the same magnitude of Fness, as y would have, if actual’, but this relation is defined in terms of magnitudes, so of no use to foes of magnitudes.

a ‘standard meter’, which according to the current definition is the length of the path travelled by light in a vacuum in $1/299\,792\,458$ s.

It is important to note that the combinations (concatenations) magnitude realists talk about cannot always be identified with ordinary mereological sums, for they assume that self-concatenation can yield a *new* magnitude if the magnitude is extensive.⁶ For example, they hold that 1 m concatenated with 1 m yields a new length, 2 m, and that 1 kg concatenated with 1 kg yields new mass, 2 kg.⁷ Exactly what this concatenation amounts to is a delicate issue. One option is to say it is a non-standard mereological sum operation. Another option is to take the concatenation function to represent the three-place relation that holds between a triple of magnitudes just in case the combined magnitudes of any two *objects* (e.g., their combined length) exemplifying the first two is equal to that of any *object* exemplifying the third (Swyer 1991, p. 460).⁸ A third option is just to say that the concatenation function represents a primitive three-place relation on magnitudes which holds between three magnitudes just in case the combination of the first two magnitudes equals the third.

Note that even if this relation is primitive, the fact that it holds between three magnitudes can *entail* (by metaphysical or conceptual necessity) that the combined magnitudes of any two objects exemplifying the first two is equal to that of any object exemplifying the third. Note also that, according to the second and third options, expressions such as ‘1 m combined with 1 m’ provides a *structured specification* of the length 2 m even though the length itself lacks structure. In this sense, they are similar to structured mathematical expressions such as ‘ 1×1 ’ which picks out number 1 even though the number itself does not have parts (Swyer 1998, p. 300). Thus it is important not to think that when we talk about the combination of two magnitudes they must be seen as parts of some whole.

Magnitude realists are also careful to distinguish magnitudes from the mathematical entities that can be used to represent them. The numbers 1, 2, and 3 are used above to represent facts about which length is greater than another, but should not be conflated with the magnitudes themselves. More generally, on this view, to measure length is to assign numbers (or other mathematical entities) to the *lengths* of objects, not to the lengthy *objects*, and to show a correspondence between two magnitudes’ standing in a certain relation (one being a greater length than the other) and the assigned numbers’ standing in a certain relation (2 being a greater number than 1).

To be a realist about *value* magnitudes thus means that one thinks that values can exist without being the value of anyone or anything, which means that they are

⁶ This means that the concatenation operation on magnitudes fails the axiom of *idempotence*, which states that x concatenated with x is identical to x . This axiom is part and parcel of standard mereology. However, there are various non-standard mereologies that do not accept this axiom.

⁷ In this respect, self-concatenation of value resembles set union for *multisets*, which are like (unordered) sets except that they allow for a member occurring more than once, e.g., the multiset $\{x, x, y\}$ is not identical to the multiset $\{x, y\}$. The union of multiset $\{x\}$ with itself is $\{x, x\}$, which is different from the multiset $\{x\}$.

⁸ Note that any function from ordered pairs to entities can be seen as a three-place relation that holds between the first element in the pair, second element of the pair, and the output. An example is the addition function.

not equivalence classes of valuable objects; that they can be ordered by the relation *being a greater value than*; and that they may form combinations of value, which need not be ordinary mereological sums. Value magnitude realists would also be careful to distinguish values from the mathematical entities that can be used to represent them.

It is true that value magnitudes differ from empirical ones, such as length, in that we do not have conventional names for them. But this does not seem to be a significant difference. That we can so easily think of measure phrases for empirical magnitudes has to do with the fact that we have widely accepted conventions about the standards for these magnitudes. For example, an object (according to the current definition, a certain path) is stipulated to be 1 m. But nothing prevents us, in principle, from doing something similar for value magnitudes. For example, we could use the value of a certain token pleasure, stipulated to be *1 hedonic value unit*, as the standard for value and meaningfully say things like ‘x is 1 hedonic value unit good’, which means that x has the same value magnitude as the token pleasure. Of course, this is just one possibility. There might be better ways to select a standard for value.

3 Theoretical benefits

3.1 Explains the equivalence between comparative-talk and value-talk

It seems obvious that there are these equivalences:

- x is better than y iff the value of x is greater than the value of y.
- x is (exactly) as good as y iff x’s value is (exactly) the same as y’s value.⁹

If we accept realism about value magnitudes and define betterness and equal goodness in terms of them, we can easily explain these equivalences.¹⁰ The first is captured by simply providing a reductive definition of betterness in terms of the relation *being a greater value than* and the property of having a certain value magnitude.¹¹ More exactly, the account puts forward the following definition of betterness:

- x is better than y =_{df} the value of x is greater than the value of y.

⁹ I use ‘exactly as good’ as covering not just cases where the two relata are good, but also when they are both neutral, or both bad.

¹⁰ We also need to make the very innocent assumption that ‘p =_{df} q’ entails ‘p iff q’.

¹¹ Here I skip over some metaphysical niceties. The way I formulate the account suggests that magnitudes are abstract particulars to which objects can stand in the relation of ‘having’. An alternative view, which is defended by Mundy (1987) and Swoyer (1987), is that magnitudes are first-order properties. On this view, a determinate magnitude, 2 m say, is identified with the first-order property *being 2 m (long)*. The relation *being a greater magnitude than* is then seen as second-order relation that holds between first-order magnitude properties. For example, the property *being 2 m* stands in the relation *being a greater length than* to the property *being 1 m*.

And this account of equal goodness:

x is (exactly) as good as $y =_{df}$ the value of x is identical to the value of y .

These definitions also validate the following truth-conditions for ‘better-than’ and ‘equally as good’ constructions.¹²

‘ x is better than y ’ is true iff the value of x is greater than the value of y .
 ‘ x is (exactly) as good as y ’ is true iff the value of x is identical to the value of y .

This is welcome, since one of the leading semantics for gradable adjectives, the *degree-theoretical* account, would provide these truth-conditions, assuming that ‘good’ is a gradable adjective, which seems very plausible.¹³ A perfectly analogous semantics is given for ‘taller than’ and ‘equally as tall as’ constructions:

‘ x is taller than y ’ is true iff x ’s height is greater than y ’s height.
 ‘ x is (exactly) as tall as y ’ is true iff x ’s height is identical to y ’s height.¹⁴

More generally, on the degree-theoretical account, the general schema for the semantics of all gradable adjectives is this:

‘ x is Fer (more F) than y ’ is true iff x ’s degree of Fness is greater than y ’s.
 ‘ x is (exactly) as F as y ’ is true iff x ’s degree of Fness is identical to y ’s.

3.2 Makes sense of comparisons across different ‘locations’

3.2.1 Mind-world comparisons

My parents thought I was better than I am. But they did not think I was better than myself. In this regard, they resemble Russell’s famous touchy yacht-owner, who in reply to ‘I thought your yacht was larger than it is’ answered ‘No, my yacht is not larger than it is’ (Russell 1905, p. 52). The correct understanding of my parents’

¹² We only need to assume the T-schema: ‘ p ’ is true iff p .

¹³ For more on degree-theoretical accounts, see von Stechow (1984), Klein (1991), Kennedy (1999), and Lassiter (2015). Note that ‘good’ passes the standard tests for a gradable adjective: participation in comparative and equative constructions, e.g., ‘This is better than that’, ‘They are equally good’; availability of complex constructions involving degree modifiers and measure phrases (such as ratio phrases), e.g., ‘You are very good’, ‘I am twice as good as you’; and possibility of using overt comparison classes, e.g., ‘You are good for a basketball player’. For more on these tests, see Lassiter (2015).

¹⁴ This is a simplified version of the account that omits the reference to a language, ‘true in language L ’, (L is English in this case). It also ignores the fact that we tend to use ‘ x is taller than y ’ when x is tall. Finally, it assumes that we are talking about being *exactly* as tall. In ordinary contexts, ‘is as tall as’ counts as true of two objects even though their heights are not identical (differences in an n th of a millimetre can often be accepted). It is enough that they are sufficiently close in height (for the purposes relevant in the context). The same points apply *mutatis mutandis* to the other relational predicates mentioned below in the main text, including ‘better than’ and ‘equally as good as’.

thought can easily be given if we allow for a mind-world comparison of value magnitudes in the following way (roughly):

The value my parents thought that I had is greater than the value I have.

3.2.2 Cross-time comparisons

I am better now than I used to be (I hope). But it would be a Russellian joke to identify this claim with the claim that at some point of time in the past, I was worse than myself, or the claim that I am now better than myself. If we are allowed to quantify over value magnitudes, it is easy to make sense of this as a cross *time* comparison of values (roughly):

The value I have now is greater than the value I used to have.

3.2.3 Cross-world comparisons

I could have been better than I am. But, again, it would be a Russellian joke to identify this claim with the claim that it could have been true (is true in some world), that I am better than myself. It is easy to make sense of this as cross-*world* comparison of values (roughly):

There is a value I could have had that is greater than the value I have.

3.2.4 Cross-theory comparisons

Suppose I have read Peter Singer's work on animal ethics and I am now convinced that the value animals have, according to Singer, is greater than our common-sense morality admits. To make sense of this claim we need to somehow make comparisons between Singer's own theory and the common-sense theory. Such comparisons are crucial if we want to make decisions under evaluative uncertainty on the basis of value-comparison between theories, for instance, by hedging and avoiding taking great evaluative risks (MacAskill et al. 2020; Lockhart 2000). Realism about value magnitudes may help us to make sense of such comparisons. To see this, note that an intertheoretical comparison of value is not of the form 'x is better than y', or 'x has the same value as y', for these are comparisons you find *within* theories. Rather, it is of the form 'the value of x, *according to one theory or hypothesis*, is greater than (less than, equal to) the value of y, *according to another theory or hypothesis*'. This kind of statement would be easy to spell out if we took literally the talk about *value* according to a theory: to say that x has a value, according to a theory, is to say that the theory assigns a certain value magnitude to x. An intertheoretical comparison of value thus reduces to a comparison of value magnitudes: the value magnitude one theory assigns to x is compared to the value magnitude another theory assigns to y. If we could not talk about value magnitudes, it is difficult to see how we would be able to make any intertheoretical comparisons at all. Exactly how to establish a

specific comparisons between theories goes beyond the scope of this paper.¹⁵ My point is just that value magnitudes seem crucial for any such account.

3.3 Definitions of goodness, badness, and neutrality

There have been many attempts to define goodness, badness, and neutrality in terms of betterness and equal goodness but they are often committed to specific views about the nature of value bearers, e.g., that they are proposition-like so we can talk about negations and conjunctions of value bearers, or to specific views about what has value, e.g., that contradictions have neutral value, or that tautologies have neutral value.¹⁶ Other things equal, it would be preferable to define goodness, badness, and neutrality without making such controversial assumptions about the value bearers. After all, we want to talk about the value of concrete value bearers, such as people, sunsets, tools, experiences, and events, but these entities cannot be negated or related by conjunctions. We also do not want to make substantive assumptions about what states of affairs have value when we define good, bad, and neutral states of affairs. Finally, it would be good to have *uniform* definitions of goodness, badness, and neutrality, across all kinds of value bearers, and not one set for states of affairs, another for events, a third for people, a fourth for artworks, and so on.

These demands can easily be met if we define goodness, badness, and neutrality in terms of values, a primitive concatenation operation \oplus defined on values (not value bearers), and a unique neutral value n :

- v is a positive value =_{df} v is greater than the neutral value n .
- v is a negative value =_{df} v is less than the neutral value n .¹⁷
- x is good =_{df} x has a positive value.
- x is bad =_{df} x has a negative value.
- x is neutral =_{df} x has the neutral value n .

These simple definitions can be used to prove some very attractive general claims about betterness, goodness, badness, and neutrality, if we assume a few very plausible assumptions about value. (See Appendix for proofs.) The claims are:

- Good things are better than bad things.
- Good things are better than neutral things.
- Neutral things are better than bad things.
- Whatever is better than something good is itself good.
- Whatever is worse than something bad is itself bad.
- Whatever is better than something neutral is good.

¹⁵ One option is to see them as reducible to *cross-world comparisons*: we are comparing the value x would have, if T were true, with the value y would have, if T' were true.

¹⁶ For a recent informative discussion about these issues, see Carlson (2016), Gustafsson (2014), Gustafsson (2016).

¹⁷ These definitions are analogous to the definitions of good and bad *value bearers* presented in Carlson (2016, p. 216).

Whatever is worse than something neutral is bad.

Nothing can be both good and bad, both good and neutral, both bad and neutral.

All neutral things have the same value.

As you can see, these claims are all good candidates for being essential (perhaps even conceptual) truths about betterness, goodness, badness, and neutrality. Hence it speaks in favour of my account that it validates these claims.

Now, one may want to avoid being straddled with a primitive unique neutral value. To avoid this, one option is to define neutral value in terms of \oplus and identity:

v is a neutral value $=_{df}$ for all v' , $v \oplus v' = v'$.

A neutral value would then be an *identity element* (in group-theoretical lingo) with respect to value concatenation, just as 0 is an identity element for addition, 1 is for multiplication, and the empty set is for set union. Note also that there must be a *unique* neutral value given that we assume, very plausibly, that \oplus is commutative:

Commutativity

For all v_1 and v_2 , $v_1 \oplus v_2 = v_2 \oplus v_1$.

For suppose v_1 and v_2 are neutral values; then by the definition of a neutral value $v_1 \oplus v_2 = v_2$ and $v_2 \oplus v_1 = v_1$. By *Commutativity*, we have $v_1 \oplus v_2 = v_1$, and thus $v_2 = v_1$, by symmetry and transitivity of identity.

It should be noted that this account does not entail that if something has neutral value, then it must be a universally neutral value bearer, something that combined with *any* other value bearer results in value bearer that has the same value as the value bearer we started with.¹⁸ It all depends on which bridge principles between value-magnitudes and value bearers we assume (for more on bridge principles, see Sect. 4.1). For example, *averageism*, which states that the value of a whole equals the average of the values of its parts, is ruled out if we assume this unqualified bridge principle:

If v is neutral, then whatever has v is *universally* neutral.

But averageism is compatible with the definition of neutrality, if we allow that the assignment of value to objects can be a highly contextual matter. Suppose that the value of an object can depend on which objects it is combined with.¹⁹ Then averageism will satisfy this contextualized bridge principle:

If v is neutral, then, for all x and y , if x has value v on its own, then the combination of x and y is equally as good as y , *when x and y are combined*.

¹⁸ Thanks to an anonymous referee for this journal for bringing this issue to my attention.

¹⁹ This idea applied to the final value of states of affairs is called ‘the principle of conditionality’ in Lemos (1994, p. 33). For a defence of this principle, see Carlson (2001).

This is because averageism will represent the value of a neutral object in a whole with n parts as $1/n \times 0$, ($n = 1$ when the object is considered on its own). This means that averageism will accept that if something has neutral value on its own, it is universally neutral *in a contextual sense*: it is something that combined with *any* other value bearer y results in a value bearer that is equally as good as y *when it is combined with y* .

A final point here is that these definitions provide *plenitude principles* (comprehension principles) for value:

If something is good, then *there is* a positive value.

If something is bad, then *there is* a negative value.

If something is neutral, then *there is* a neutral value.

If we assume that values (of a certain kind of value) are *closed* under \oplus , which seems plausible for all kinds of values, and that the axiom of idempotence is false, we get an *infinite* number of values, both positive and negative, assuming that there are some good and bad things to begin with.

3.4 Measurement of value

It is well-known that many of the axioms that are crucial for measurement of empirical quantities are very difficult to satisfy, if they are supposed to apply to magnitude-bearers. I am going to focus on extensive measurement here. But analogous points can be made about difference measurement, since this requires some way of combining differences into greater differences and then comparing the combined differences.²⁰ One worry is simply that we do not have sufficiently many magnitude-bearers of the right kind. As an illustration of this problem, take the Archimedean axiom for extensive measurement of length, which is crucial for showing that length can be represented by real numbers on a ratio scale. This axiom states (roughly) that for any objects x and y , if x is longer than y , then we can always find a sufficient number of exactly equally long objects, such that the combination of these ‘perfect length copies’ of y is at least as long as x .²¹ Since lengthy objects must be concrete, there is no guarantee that we have sufficiently many perfect length copies of each object so that the condition is satisfied.

Another worry is that even if there is a sufficiently big supply of ‘perfect copies’, it might not always be possible to combine them. The standard assumption in the measurement-theoretical tradition is to identify concatenation with a certain measurement practice, but such practices have clear practical limitations. For example, if concatenation for massy objects is identified with the result of putting them in the same pan in an equal arm balance, the problem is that some massy objects *could not*

²⁰ For more on difference measurement, see Krantz et al. (1971), ch. 4.

²¹ More exactly, where $1x = x$, $(n + 1)x = nx \circ x$:

For all x, y, z, v , if $x > y$, there is a positive integer n such that $nx \circ z \succcurlyeq ny \circ v$, where, the variables range over lengthy objects, and ‘>’, ‘ \succcurlyeq ’, ‘ \circ ’ express the longer than relation, the at least as long as relation, and some suitable concatenation operation on objects, respectively.

be put in a pan, because they are too big. How are we then to assign a determinate mass to these objects? Not by asking what *would* have happened, if they had been put in a pan, because then the objects can be assigned any arbitrary concatenation result, since the antecedent of the counterfactual is impossible, and hence the whole counterfactual vacuously true, no matter the content of the consequent.

These problems vanish if we reinterpret the axioms as conditions on abstract magnitudes rather than magnitude-bearers, and again assume a primitive concatenation operation on magnitudes.²²

The move from conditions on magnitude-bearers to conditions on magnitudes seems crucial for the measurement of value as well, since many kinds of value bearer do not seem to satisfy the essential axioms either, and for analogous reasons. Consider first the problem of having too few magnitude-bearers of the right kind. In the value context, the Archimedean axiom states (roughly) that for any objects x and y , if x is better than y , then we can always find a sufficient number of exactly equally good objects, such that the combination of these ‘perfect value copies’ of y is at least as good as x . If value bearers are concrete (persons, animals, artworks, tools, experiences, events, processes), then there is no guarantee that we will have sufficiently many ‘perfect value copies’.²³ This is also a problem if value bearers are proposition-like entities, such as states of affairs, for some of them seem object-dependent in the sense that their existence requires the existence of some concrete being. For example, the state of affairs that I am happy seems to presuppose the existence of me. If I had not existed, the state of affairs that I am happy would not have existed either.

The concatenation problem has also analogues in the measurement of value, especially if we consider concrete value bearers. How do we concatenate people, animals, artworks, tools, events, and processes? There is no person (or animal) constituted by me and you, no event constituted by your birthday party and mine, no experience that is constituted by my experience of pleasure and your experience of pleasure, but if there is no suitable concatenation operation that preserves the relevant kind of value bearer we are interested in—people, events, or experiences—then there is no chance for the value bearers to satisfy the Archimedean axiom.

Even if we could somehow cook-up some suitable concatenation operation on concrete value bearers (perhaps by using unrestricted mereology, according to which

²² As is also pointed out in Swoyer (1987), Mundy (1987), and Peacocke (2015).

²³ Some would argue that invoking merely possible concrete value-bearers would solve this problem. That is doubtful. Since merely possible concrete objects are only merely possibly concrete, they cannot stand in any standard concatenation relations suitable for concrete objects. For instance, the combination of my actual pleasure experience and my merely possible pleasure experience is not an experience. So we must then redefine the axioms in terms of what *would* be the result, if an actual or merely possible concrete object and another actual or merely possible object were both concrete and combined in some suitable way. I am not sure we gain much by invoking merely possible concrete beings. It is not like we have a better metaphysical handle on merely possible concrete objects than on abstract magnitudes. If anything, merely possible concrete objects seem more problematic. If you accept such objects, you have to deny that concreteness is essential to concrete beings. We have to accept that I could have been non-concrete (not a human, not an animal, not an organism and so on), for example. But concreteness does not seem to be a contingent property of things.

any two objects form an object, or by talking about pluralities of concrete value bearers), it is sometimes unclear what the concatenation of value bearers has to do with the measurement of the relevant value. For example, why think that the measurement of the moral value of individual persons (how virtuous a certain person is) is determined by looking at what happens when we somehow combine different people?

The problem is not just about satisfying the Archimedean axiom. In the extensive measurement context, to say that x is at least twice as good as y entails that x is at least as good as two perfect copies of y combined. This means that if there is no suitable concatenation operation for concrete value bearers, then we can't say that one concrete value bearer is at least twice as good as another. But this is something we may want to say at least for certain kinds of values. For example, we may want to say that you are at least twice as morally good as I am, that one event is at least twice as good as another, and that one experience is at least twice as good as another.

Even if we can imagine a suitable concatenation operation for the value bearers in question, this does not help when we make *cross-world* ratio-comparisons concerning the *same* object. For example, we want to be able to say that I could have been at least as twice as good. Obviously, this would mean that I could have been at least as twice as good as myself.

The concatenation problem is not so serious if we consider proposition-like value bearers such as states of affairs, since here we seem to have some idea that it makes sense to think about 'conjunctive' states of affairs: my being happy and your being unhappy, for instance, which obtains iff my being happy obtains and your being happy obtains. However, even if we concede that states of affairs have value, we surely want to talk about and measure the value of other things than states of affairs, for instance, the value of people, animals, artworks, tools, events, processes, and experiences.

The concatenation problem for concrete objects would be more manageable, if we could always reduce the value of a concrete object to the value of an abstract proposition-like state of affairs that somehow involves the concrete object. The value of a concrete object x is identified with the value of the states of affairs of x having F , for some suitable F . Now, this might be tempting option for some concrete value bearers, but it seems to put the cart before the horse in many cases. For example, the value of *Mona Lisa* seems not to be reducible to the value of the states of affairs that *Mona Lisa* exists; rather it is the other way around, the states of affairs that *Mona Lisa* exists is valuable because *Mona Lisa* is valuable. For another example, consider the value of my most recent birthday party. The value of this event seems not be reducible to the value of the state of affairs that this event occurred. Rather, it is the other way around.²⁴

²⁴ Also, recently it has become popular to argue that the value a state of affairs has *for* an individual – e.g., the value for her of her being happy—depends on the value (worth) of the individual. See, for instance, Darwall (2004). If the individual does not have value, the state of affairs will lack value for the individual. Admittedly, this is a controversial view, but an advantage of the account I defend is that the satisfaction of the axioms of measurement does not hinge on whether reductionism of object-value to state-value is true.

The concatenation problems concerning value bearers would simply vanish, if the axioms of measurement are seen as constraints on *value* aggregation, not value bearer aggregation, and we assume a primitive concatenation operation on values. That we have a limited supply of concrete value bearers is not a problem, since the Archimedean axiom is a condition on abstract values, not concrete value bearers. That there might not be a sufficient number of exact value copies is not a problem either, if we assume, as with lengths and masses, that a value can be concatenated non-vacuously with itself, (for example, 1 m concatenated with 1 m is 2 m, 1 kg concatenated with 1 kg is 2 kg, 1 hedonic value unit \oplus 1 hedonic value unit is 2 hedonic value units, where a hedonic value unit is identified with the value of a certain pleasant experience, as pointed out in the introduction).

We can also easily make sense of ratio-judgement of value without assuming some concatenation operation on concrete-value bearers:

x is twice as good as $y =_{df}$ there are positive values v, v' , such that x has v , y has v' , and $v = v' \oplus v'$.²⁵

More generally,

x is n times as good as $y =_{df}$ there are positive values v, v' , such that x has v and y has v' , and $v = v' \oplus v' \oplus v' \oplus \dots$ (n times).

For cross-world ratio comparisons we use this definition:

x could have been n times as good as x is $=_{df}$ there are positive values v, v' , such that the value of x is v , but it is possible that x has value v' , where $v' = v \oplus v \oplus v \oplus \dots$ (n times).

3.5 Value aggregation

If we allow for values and the operation \oplus , we can define value aggregation quite generally for value bearers whose overall value is determined by their *parts* (such as states of affairs, events, processes, experiences):

The overall value of x is the concatenation of the basic values of all the parts (proper and improper) of x .

More exactly, suppose that the parts (proper and improper) of x that have basic value are x_1, x_2, \dots, x_n , and x_1 has basic value v_1, x_2 basic value v_2, \dots, x_n basic value v_n . Then.

²⁵ Here and in the following two definitions it is important that value concatenation is not idempotent. More specifically, we need to assume, as is done in extensive measurement, that for any positive value v , $v \oplus v$ is greater than v .

x 's overall value is $v = v_1 \oplus v_2 \oplus \dots \oplus v_n$.

For this to work we need to rely on the distinction between overall and basic value, which is not easy to define precisely. Intuitively, the basic value of something is the value it has that is not derived from the values of any of its proper parts. For a hedonist, the combination of you and me feeling pleasure does not have basic value for its value is derived from the value of my feeling happy and the value of your feeling happy. We need something like this distinction to avoid 'double-counting'. For example, as hedonists (or pluralists with room for hedonist values), we do not want to say that the value of a combination of pleasures, p1-and-p2-and-p3 is a combination of values, which includes the value of p1, the value of p1-and-p2, and the value of p1-and-p3, since that would be to 'count' p1 more than once. It is not sufficient to say that the value of a whole is the combination of the values of the parts that themselves do not have any valuable parts, since the value bearers might 'overlap'. For example, both my pleasure and my knowledge that I feel this pleasure can be good.

It is less straightforward to define value aggregation for value bearers whose value is determined by the features they exemplify. Examples are people who are morally good in virtue of exemplifying virtues, artworks that are good in virtue of exemplifying aesthetic qualities, and tools that are good in virtue of exemplifying functional features. Here is a very tentative account of value aggregation for these value bearers. Start with a definition of a value-making feature: F is a value-making feature iff F is a v-making feature, for some value magnitude v. Then define a v-making feature: F is a v-making feature iff, necessarily, if an object exemplifies F, then it is *in that respect* valuable (good, bad, neutral) to degree v in virtue of exemplifying F. Finally, we define value aggregation thus: if x has a v_1 -making feature, a v_2 -making feature, ..., a v_n -making feature and no other value-making features, then x's overall value is $v = v_1 \oplus v_2 \oplus \dots \oplus v_n$. This definition is tentative, for a number reasons. First, it relies on notions in need of clarification, such as being valuable *in a respect* and being good *in virtue* of exemplifying a feature. Second, to please particularists the definition has to be tweaked to allow for one feature being a v_1 -making feature in one situation but a v_2 -making feature in another, $v_1 \neq v_2$, (or not a value-making feature at all in the other situation). Perhaps this can be done by qualifying all statements about value-making and value in the definitions with 'in situation S'. Third, to avoid double counting of features (good to some extent in virtue of exemplifying P-and-Q, but also good to some extent in virtue of exemplifying P), we might need to resort to *basic* v-making features in these definitions.

A final, general point. It is important to distinguish between the claim that the overall value of a whole is the combination of the basic values of its parts and the claim that the overall value of a whole can be *represented* as the *arithmetic sum* of the *numerical* values that represent the basic values of its parts. Whether value aggregation can be represented by the relation of summation defined on real numbers depends on exactly which axioms value and the operation \oplus satisfy. If they satisfy all the axioms for extensive structure, then value aggregation can be represented

as a summation of reals.²⁶ But if they satisfy a different set of axioms, value aggregation can instead be represented as an averaging of reals. Caution is thus recommended when using phrases such as ‘the value of a whole is the sum of the values of its parts’, since ‘value’ can either mean ‘value magnitude’ or ‘numerical value’, and ‘sum’ can either mean \oplus or $+$.

3.6 Moorean organic unities

One of the necessary axioms for an additive representation of any quantity is Monotonicity, which abstractly states:

If $x > y$, then the concatenation of x and $z >$ the concatenation of y and z , for any z .

If $x = y$, then the concatenation of x and $z =$ the concatenation of y and z , for any z .

If Monotonicity is applied to value bearers and $>$ is the relations of betterness, we get a condition that has often been seen as stumbling block for anyone who wants to accept both organic unities and an additive representation of value. The reason is that organic unities seem to violate Monotonicity for value bearers. To see this, take Moore’s famous example about the value of retribution (Moore 1903, p. 215). He argues that punishment is bad, because it involves suffering, and so the absence of punishment is better than punishment. But the combination of crime and the absence of punishment (of the criminal after the crime) is *not* better than the combination of crime and the punishment, for the combination of crime and punishment is better than the combination of crime and the absence of punishment. But these evaluations constitute a violation of Monotonicity for value bearers.

For a more plausible example of organic unities, consider examples of the principle *bonum variationis*: ‘other things being equal, it is better to combine two dissimilar goods than to combine two similar goods’ (Chisholm 1986, pp. 70–71). Suppose x and z are two similar and equally beautiful paintings, and that y is a beautiful piece of music. Suppose further that contemplating x is as good as contemplating y . If *bonum variationis* is true, then the combination of contemplating y and z is better than the combination of contemplating x and z , since the former combination offers more variation. But these evaluations violate Monotonicity for value bearers.²⁷

However, Monotonicity is a not a great problem for organic unities fans, if we interpret it as a condition on values, not value bearers:

Monotonicity for values

If x is a greater value than y , then $x \oplus z$ is a greater value than $y \oplus z$, for any value z .

²⁶ For proof, see for instance, Kranz et al. (1971), ch. 3.

²⁷ For more on the relationship between Monotonicity and organic unities, see Carlson (2015).

Monotonicity for values does not entail Monotonicity for value bearers, since it is one thing to say that values satisfy a certain structural condition and another to say that value bearers do. If this is right, then we could vindicate Moore's idea that you can accept organic unities and still say that the overall value ('value on the whole') of x is the sum of the basic values of all parts (proper and improper) of x , including the basic value of x itself (x 's 'value as a whole'), if it has any. Notoriously, he argued that the overall value of crime followed by punishment is the sum of not just the basic value of the crime, which is negative, and the basic value of punishment, which is also negative, but also the basic value ('value as a whole') of crime followed by punishment, which is positive (Moore 1903, p. 215). If the overall value of x is the concatenation of the basic values of all parts of x , and value satisfies the axioms of extensive measurement, then we can represent the overall value of x as the mathematical sum of the basic values of its parts.

As an illustration of this, go back to the example of *bonum variationis*. Let 'C(P1)' stand for the contemplation of painting 1, 'C(P2)' stands for the contemplation of a painting 2, (which is identical to painting 1 in all aesthetically relevant respects), and 'C(M)' stands for the contemplation of the beautiful piece of music. Assume (in line with the example) that

- (1) C(P1), C(M), and C(P2) have the same basic value v_1 .
- (2) The basic value of the combination C(P1)-and-C(P2) is v_2 .
- (3) The basic value of the combination C(M)-and-C(P2) is v_3 .
- (4) $v_2 < v_3$ (since C(M)-and-C(P2) offers more variation than C(P1)-and-C(P2)).

Then my account says that

- (5) the overall value of C(P1)-and-C(P2) is $v_2 \oplus v_1 \oplus v_1$.
- (6) the overall value of C(M)-and-C(P2) is $v_3 \oplus v_1 \oplus v_1$.

Since v_3 is greater than v_2 , *Monotonicity* (applied to values) implies that

- (7) $v_2 \oplus v_1 \oplus v_1$ is less than $v_3 \oplus v_1 \oplus v_1$.

Given that values and \oplus satisfy the other axioms of extensive measurement, the first concatenation of values can be represented as a sum of reals that is smaller than the sum of reals that represents the second.

Of course, this reasoning again assumes that we can rely on the distinction between overall and basic value. So, the claim should be conditional: if we can rely on this distinction, then we can make sense of Moorean organic unities.

Another virtue of replacing Monotonicity for value bearers with Monotonicity for value is that we do not need to worry about whether there exists a suitable concatenation operation for value bearers. We can meaningfully talk about the total value of your and my experiences even if the combination of our experiences is not itself an experience. It is enough that the *values* of the experiences can be concatenated and be shown to satisfy Monotonicity.

3.7 Uniqueness value

Another virtue of my account is that it does not rule out that objects can be valuable in part because of their *uniqueness* and *rarity*, such as a rare stamp or the only remaining statue of a lost civilization. This is not true if the concatenation operation is interpreted as a relation between co-existing physical objects. For then we immediately run into problem with satisfying the Archimedean axiom and Monotonicity, seen as conditions on value bearers. Here is why.

Archimedean axiom: x , a certain rare stamp, can be better than y , another rare stamp. But there might not be a sufficient number of perfect copies of y such that the concatenation of those are better than x , for the simple reason that when we start concatenating copies of y , the value of the copies decreases because the stamps become less and less rare.

Monotonicity: if x is better than y , then the combination of x and z must be better than the combination of y and z , even when z is a perfect copy of x . But this might not be true, if x is better than y , because x is unique and y is not (Carlson 2011).

All these problems disappear when the conditions listed above are seen as conditions on value magnitudes, not value bearers.

3.8 Cross-polarity comparisons

By invoking value magnitudes we also get a neat explanations of *cross-polarity comparisons*, such as ‘My minor pain is less bad than your blissful joy is good’ and ‘Schindler was less good (virtuous) than Hitler was bad (vicious)’. The account is this (for those values that admit of cross-polarity comparisons):

x is less bad than y is good =_{df} x has a negative value v_1 , y has a positive value v_2 , and $v_1 \oplus v_2 = v_3$, where v_3 is a positive value.

x is less good than y is bad =_{df} x has a positive value v_1 , y has a positive value v_2 , and $v_1 \oplus v_2 = v_3$, where v_3 is a negative value.

x is (exactly) as bad as y is good =_{df} x has a positive value v_1 , y has a negative value v_2 , and $v_1 \oplus v_2 = v_3$, where v_3 is the neutral value.

4 Theoretical costs?

4.1 Mysterious primitive entities and relations

As I have said repeatedly throughout the paper, crucial axiological notions can easily be defined, *if* we just help ourselves to values, the relation of being a greater value, and a concatenation operation defined on values. Many would think this is a big ‘if’, since the entities and operations I invoke are abstract primitives and thus might look mysterious. But I think their theoretical fruitfulness makes up for their alleged mysteriousness, since they can be used to clarify so many crucial notions: cross-world comparisons, cross-time comparisons, goodness, badness, neutrality,

measurability of value, judgements about ratios of value, value aggregation, Moorean organic unities, uniqueness value, intertheoretical comparisons of value, and cross-polarity comparisons. This is just an instance of the well-known fact that you can clarify the nature of an entity or relation without analysing it further. You can instead point out which role it plays in the explanation of other notions. If the entity or relation is indispensable in the best explanations of the target notions, we have good grounds to allow them into our ontology even if they are primitives. This is why we allow sets (including the empty set) into our ontology, for instance. I do not pretend to have shown that positing values provides a better explanation than all alternatives, since that would require me to compare my account to all accounts that do not invoke value magnitudes. (I invite others to try to provide better explanations.) What I have shown is that value magnitudes are worth taking seriously, since they have the potential to neatly explain a lot of crucial notions.

Another way to make the primitive relation of being a greater value than and the concatenation operation more intelligible is to point out that there are certain *bridge principles* that take us from claims about the structure of values to claims about value bearers. These bridge principles do not provide analyses of magnitudes and relations on magnitudes, but show necessary links (perhaps even conceptual) to notions that we have already some independent grasp of (betterness, equality in value, and hopefully, basic value, overall value).

For example, we have the following bridge principle for *being a greater value than* and *being the same value as*, which are supposed to hold with necessity:

If v_1 is a greater value than v_2 , then, necessarily, for all x, y , if x has v_1 and y has v_2 , then x is better than y .

If v_1 is identical to v_2 , then, necessarily, for all x, y , if x has v_1 and y has v_2 , then x is (exactly) as good as y .

As suggested in Sect. 2, there are also a bridge principle that links claims about the aggregation of value magnitudes to claims about the aggregation of values of value bearers:

If $v_1 \oplus v_2 = v_3$, then, necessarily, for all x, y, z , if x has value v_1 , y has v_2 , and z has v_3 , then the value of z is $v_1 \oplus v_2$.

Finally, there are links between value magnitude concatenations and value bearer concatenations (when there are suitable concatenation operations on the value bearers). Here is one example (for value bearers whose value is determined by their parts), which is supposed to hold with necessity:

If $v_1 \oplus v_2 = v_3$, then, necessarily, for all x, y, z , if x has basic value v_1 and y has basic value v_2 , and x and y are the only parts (proper and improper) of z that have basic value, then v_3 is the overall value of z .²⁸

²⁸ A corresponding bridge principle for value bearers whose value is determined by the features they exemplify would be something like this: if $v_1 \oplus v_2 = v_3$, then, necessarily, for all x , if x has a v_1 -making

Note that this principle also holds when $v_1 = v_2$, so it helps us to grasp self-concatenation of value magnitudes. Here is another principle, which also does this, this time by linking self-concatenations of value to ratio judgements about goodness (for those kinds of values that admit of such comparisons):

For all positive values v' , v ,

if $v' = v \oplus v \oplus v \oplus \dots$ (n times), then, necessarily, for all x , y , if x has v' and y has v , then x is n times as good as y .²⁹

A final worry about the ontological status of value magnitudes is that they, unlike sets, seem to lack clear *identity criteria*. This worry is unfounded because value magnitudes have the following identity criterion:

v_1 is identical to v_2 iff, necessarily, for all x , x has basic value v_1 iff x has basic value v_2 , and, necessarily, for all x , x has overall value v_1 iff x has overall value v_2 .³⁰

4.2 Proliferation of values

Even if one can swallow the existence of abstract magnitudes in general, one might have problems with the sheer number of different kinds of value magnitudes I am committed to. Since there are many different kinds of values—final, moral, prudential, perfectionist, aesthetic, functional—I seem committed to one set of value magnitudes for each kind of value (except for the values that can be reduced to others). This is true, but I am not sure this is a serious problem. If you think that each kind of value listed above comes with its own distinct evaluative properties and relations, you are already committed to a large number of distinct evaluative properties and relations. What I add is that for each kind of evaluative property and relation there is a corresponding set of value magnitudes—final values for final betterness, prudential values for prudential betterness, aesthetic values for aesthetic betterness and so on. If one is fine with the notion of an abstract magnitude in general, I do not think one should complain about there being different sets of them for different kinds of evaluative properties and relations. After all, Occam's razor does not ask us to resist increasing the number of objects of a certain kind; it asks us not to add new *categories* or *kinds* unnecessarily.

Footnote 28 (continued)

feature (in situation S) and a v_2 -making feature (in S) and no other value-making features (in S), then the overall value of x (in S) is v_3 .

²⁹ Here it is important that the value in question is not idempotent. More specifically, we have to assume that for any positive value v , $v \oplus v$ is greater than v .

³⁰ See Kim (2016) for analogous identity criteria for empirical magnitudes. Note that this identity criterion only works well for *exemplifiable* value magnitudes, for the criterion entails that all unexemplifiable value magnitudes are identical (since the right-hand side is then vacuously true). But this is not such a problematic restriction, since it is doubtful that there are any unexemplifiable value magnitudes.

4.3 Knowledge of value magnitudes

How do we know facts about value magnitudes? I do not have time (or the ability) to provide a full account, but I can make a few suggestions. If we are talking about facts about the values of objects, we can make use of the equivalence between betterness and having a greater value than and the equivalence between equally as good as and having the same value as. If we know these equivalences, and also know that x is better than (equally as good as) y , then we are in a position to know that the value of x is greater than (identical to) the value of y . Of course, this assumes that we somehow can know that x is better than (equally as good as) y , but this is problem for all value realists, no matter whether they accept value magnitudes or not.

How do we know facts about *determinate* values? One way is to use one valuable object as a value standard, as we did with the pleasant experience earlier, name the value it has ‘ v ’, and then compare other objects to it. If we know that some other object is equally as good as the standard, we know that the object also has value v .

How do we know the axioms about value? Some axioms seem essential to the very notion of a magnitude, for example, transitivity. It is hard to see how being a greater length, being a greater mass, and so on could fail to be transitive. Monotonicity, no matter how it is classified, seems plausible, especially since it does not rule out organic unities and is compatible with the lack of suitable concatenation operations on value bearers.

Other axioms, such as the Archimedean axiom, do not seem to be essential to the notion of a magnitude. Here we have to rely, to some extent, on a priori judgements about value aggregation, but this is analogous to how we deal with the axioms of abstract mereology or set theory.

5 Metaethical implications

If *betterness* is identified with *having a greater value than*, then we have a clear constraint on any realist theory. It has to either reduce values to some non-evaluative magnitude or treat them as primitive (which I have been doing so far). If it reduces value magnitudes to some non-evaluative magnitude M , it has to show that x is better than y iff x has a greater M than y . This can be a difficult task for many choices of M , especially if M is some actually instantiated physical or psychological magnitude. But this constraint will also rule out all fitting attitude accounts of value that say that betterness is to be identified with *appropriate preference* (preference one ought to have, or it is correct to have), if preference is not analyzable in terms of degrees of any attitude (for example, if preference is seen as an actual choice or a choice disposition).³¹ Such an account was put forward by Brentano (1902), and has some modern followers (eg., Chisholm 1981; Lemos 1994; Scanlon 1998).

³¹ More generally, value magnitude realism rules out all accounts that identify betterness with a relation R that cannot further be reduced to *having a greater M* , for some magnitude M .

What is not ruled out is a fitting attitude account that says that betterness is identified with the relation of having a greater degree of an appropriate attitude. But this account will face the challenge that value degrees are hostage to the nature of attitude degrees. If value degrees and appropriate attitude degrees are identified, they need to share the same structure, but it is not clear that they do. For example, Brentano worried that it seems possible to have objects with infinite value—his example was God—but it does not seem possible to have an infinite degree of attitude, an infinite intensity of love, for example. It was partly this worry that made Brentano opt for an account of ‘better’ in terms of preference (seen some kind of mental choice) rather than felt intensities of love (Brentano 1902, section 29). But, as pointed out, this account is not compatible with value magnitude realism.

Some might think that value magnitude realism has too much metaethical bite here. But it should be noted that even if there is no acceptable form of fitting attitude analysis of value and we have to accept a primitivist view about values, there can be necessary (even conceptual) links to appropriate preferences and degrees of attitudes, such as these ones:

Necessarily, if x is better than y and thus has a greater value than y , then one ought to prefer x to y .

Necessarily, if x and y are both good, but x is better than y and thus has a greater value than y , then the degree to which one ought to favour x is greater than the degree to which one ought to favour y .

6 Concluding remarks

I am sure that much more needs to be said about value magnitudes before the incredulous stare disappears from your faces. For example, we need to decide exactly which axioms a certain kind of value magnitudes satisfy. Asymmetry and transitivity for a *greater value than* seem plausible, no matter which kind of value we have in mind (at least when all objects are fully comparable). Indeed, it seems plausible to assume that for all kinds of fully comparable values, the value magnitudes satisfy the axioms of a *concatenation structure* (where \oplus is a closed on the set of values, see Sect. 3.3): asymmetry (for all values v_1, v_2 , if $v_1 > v_2$, then not $v_2 > v_1$), irreflexivity (see Appendix), transitivity (see Appendix), comparability, commutativity (see Sect. 3.3), and monotonicity (see Sect. 3.6).³² This can be seen as a *minimal* theory for value magnitudes (of fully comparable value kinds), since it does not take a stand on whether value can be represented additively or not, and, as shown in Sect. 3.6, monotonicity does not rule out organic unities.³³

What about comparability more generally? Is it always true that two value magnitudes of the same kind are comparable—one is greater, less, or equal to the other? Is it always true that a value is positive, negative, or neutral, or can there be

³² See, Luce et al (1990), pp. 25–37, for more on concatenation structures.

³³ See *ibid.* ch. 19, for additive and non-additive representations of different concatenation structures.

indeterminate values? These questions are of utmost importance but in order to sort them out properly one needs to tackle the difficult question about the nature of indeterminacy (Is it ontological, semantic, or epistemic?). Here I can only hint at some ways to take indeterminacy into account (see Appendix).³⁴

There are also questions about axioms that go beyond those of the minimal theory. For example, do all kinds of value satisfy the Archimedean axiom? Finally, we need to know exactly which bridge principles are true.³⁵ These questions and others have to be answered, for each kind of value, before we have a complete account of value magnitudes. Since the potential gains are great, we have strong reasons to search for these answers.

Appendix

In this appendix, I shall show that my account validates some extremely plausible claims about betterness, goodness, badness, and neutrality.³⁶ I assume that we have one specific kind of value in mind (e.g., overall moral/prudential/perfectionist value, or basic moral/prudential/perfectionist value). The principles and definitions needed for this validation are the following:

Transitivity ('>' stands for *being a greater value than*)

For all values v_1, v_2, v_3 , if $v_1 > v_2, v_2 > v_3$, then $v_1 > v_3$.

Irreflexivity

For all values v , it is not the case that $v > v$.

Definitions of positive, negative, neutral value

(*Positive value*) v is a positive value =_{df} v is greater than n , the neutral value.

(*Negative value*) v is a negative value =_{df} v is less than n .

(*Neutral value*) v is a neutral value =_{df} for all values v' , $v \oplus v' = v'$.

(This definition is not needed for the proofs below.)

Definitions of goodness, badness, and neutrality

(*Goodness*) x is good =_{df} x has a positive value.

(*Badness*) x is bad =_{df} x has a negative value.

(*Neutrality*) x is neutral =_{df} x has a neutral value.

³⁴ See Carlson (2011) and Gustafsson (2018) for a discussion of indeterminate value.

³⁵ One particularly difficult challenge is to identify the bridge principles that take you from concatenations of value magnitudes to concatenations of value bearers. Since there can be alternative ways of concatenating the same kind of value bearers (for example, by probabilistic mixtures or by time mixtures), it is not clear how we can establish that one way is the right one, or the most 'natural' one. However, this is a problem for magnitude realists of all stripes. For example, there is an analogous problem for realism about length magnitudes. Lengthy objects can either be concatenated by joining them end-to-end in a straight line or by joining them at right angles. Which of these two possible concatenations of lengthy objects should be linked to the concatenation of lengths? Only the former concatenation seems 'correct' or 'natural', but how can we establish this? For an interesting but controversial solution, which could be generalized to value magnitudes, see, Eddon (2014). Thanks to an anonymous referee for alerting me to this important problem.

³⁶ My proofs follow the suggestion in Carlson (2016), pp. 221–222, but, unlike him I interpret the relevant concatenation as a concatenation of value magnitudes, not value-bearers.

Single-valuedness

Any item can at most have one value of a certain specific kind (e.g., overall moral/prudential/perfectionist value, or basic moral/prudential/perfectionist value).

Definitions of betterness and equality

(*Betterness*) x is better than $y =_{df}$ there are values v, v' , such that x has v and y has v' , and $v > v'$.

(*Equality*) x is (exactly) equally as good as $y =_{df}$ there is a value v , such that both x and y have v .

Claim 1: Good things are better than bad things.

Proof Suppose x is good, and y is bad. Then by *Goodness* and *Badness*, x has a positive value v , and y has a negative value v' , which by *Positive value* and *Negative value* means that $v > n$ (the neutral value) and $n > v'$. By *Transitivity* we get $v > v'$, and by *Betterness*, we get x is better than y . \square

Claim 2: Good things are better than neutral things.

Proof Suppose x is good, and y is neutral. Then by *Goodness* and *Neutrality*, x has a positive value v , and y has n , which by *Positive value* means that $v > n$. By *Betterness*, we get x is better than y . \square

Claim 3: Neutral things are better than bad things.

Proof Suppose x is neutral and y is bad. Then by *Neutrality* and *Badness*, x has n , and y has a negative value v , which by *Negative value* means that $n > v$. By *Betterness*, we get x is better than y . \square

Claim 4: Whatever is better than something good is itself good.

Proof Suppose x is better than y , and y is good. Then by *Goodness* and *Betterness*, y has a value v , x has a value v' , $v' > v$, and v is positive, which by *Positive value* means that $v > n$. By *Transitivity*, we get $v' > n$. By *Positive value* and *Goodness*, we get that x is good. \square

Claim 5: Whatever is worse than something bad is itself bad.

Proof Suppose x is worse than y , and y is bad. Then by *Badness* and *Betterness*, y has a negative value v , x has a value v' , and $v' < v$. By *Negative value*, we get $v < n$. By *Transitivity*, we get $v' < n$. By *Negative value* and *Badness*, we get that x is bad. \square

Claim 6: Whatever is better than something neutral is good.

Proof Suppose x is better than y , and y is neutral. Then by *Neutrality* and *Betterness*, y has n , x has a value v , $v > n$. By *Positive value* and *Goodness*, we get that x is good. \square

Claim 7: Whatever is worse than something neutral is bad.

Proof Suppose x is worse than y , and y is neutral. Then by *Neutrality* and *Betterness*, y has n , x has a value v , and $v < n$. By *Negative value* and *Badness*, we get that x is bad. \square

Claim 8: Nothing can be both good and bad, good and neutral, or bad and neutral.

Proof (a) Suppose for reductio that x is both good and bad. Then by *Goodness* and *Badness*, x has a positive value v and a negative value v' . By *Positive value*, $v > n$, and $v' < n$. Hence, by *Transitivity*, $v > v'$, which violates *Irreflexivity*, since by *Single-valuedness*, we also have $v = v'$. (b) Suppose for reductio that x is both good and neutral. Then by *Goodness* and *Neutrality*, x has a positive value v and a neutral value n . By *Positive value* and *Single-valuedness*, we have $v > n$ and $v = n$, which violates *Irreflexivity*. (c) Suppose for reductio that x is both bad and neutral. Then by *Badness* and *Neutrality*, x has a negative value v and a neutral value n . By *Negative value* and *Single-valuedness*, we have $v < n$ and $v = n$, which violates *Irreflexivity*. \square

Claim 9: All neutral things have the same value.

Proof Suppose x is neutral and y is neutral. Then by *Neutrality*, we get that x is n and y is n . By *Equality*, x is equally as good as y . \square

Even though this account validates claim 1 to 9, it may be unnecessarily restrictive, since it does not allow for an object having *indeterminate* value—being neither good, bad, nor neutral, but, possibly, still better or worse than some other object. But there seem to be examples of this: e.g., the disjunctive states of affairs that you are either happy to degree 10 or unhappy to degree -10 , which seems better than the states of affairs that you are unhappy to degree -100 . One way to allow for this kind of indeterminacy is to add indeterminate value magnitudes to our ontology, which we define thus:

v is an indeterminate value $=_{df}$ v is a value that is neither greater than, less than, nor identical to the neutral value n .

x is evaluatively indeterminate $=_{df}$ x has an indeterminate value.

An alternative approach would be to only accept determinate value magnitudes, but change the definition of indeterminately valuable objects (value bearers), perhaps by assigning sets or intervals of determinate value magnitudes to such objects. Details and assessments of these accounts have to wait until another occasion.

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References

- Brentano, F. (1902). *The origin of our knowledge of right and wrong*. Westminster: Archibald Constable & Co. (English translation by Cecil Hague).
- Carlson, E. (2001). Organic unities, non-trade off, and the additivity of intrinsic value. *The Journal of Ethics*, 5, 335–360.
- Carlson, E. (2011). Defining goodness and badness in terms of betterness without negation. In E. Dzhafarov & L. Perry (Eds.), *Descriptive and normative approaches to human behavior* (pp. 51–66). Singapore: World Scientific.
- Carlson, E. (2015). Organic unities. In J. Olson & H. Iwao (Eds.), *Oxford University handbook of value theory* (pp. 285–299). Oxford: Oxford University Press.
- Carlson, E. (2016). Good' in terms of 'better. *Noûs*, 50(1), 213–223.
- Chisholm, R. (1981). Defining intrinsic value. *Analysis*, 41(2), 99–100.
- Chisholm, R. (1986). *Brentano and intrinsic value*. Cambridge: Cambridge University Press.
- Darwall, S. (2004). *Welfare and rational care*. Princeton: Princeton University Press.
- Eddon, M. (2013). Quantitative properties. *Philosophy Compass*, 8(7), 633–645.
- Eddon, M. (2014). Intrinsic explanations and numerical representations. In R. Francescotti (Ed.), *Companion to intrinsic properties* (pp. 271–290). Berlin: de Gruyter.
- Gustafsson, J. E. (2014). Neither 'good' in terms of 'better' nor 'better' in terms of 'good.' *Noûs*, 48(3), 466–473.
- Gustafsson, J. E. (2016). Still not 'good' in terms of 'better.' *Noûs*, 50(4), 854–864.
- Gustafsson, J. E. (2018). Does the collapsing argument rule out borderline cases? *Utilitas*, 30(4), 483–492.
- Kennedy, C. (1999). *Projecting the adjective: The syntax and semantics of gradability and comparison*. New York: Garland.
- Kim, J. (2016). What are quantities? *Australasian Journal of Philosophy*, 94(5), 792–807.
- Klein, E. (1991). Comparatives. In A. von Stechow & D. Wunderlich (Eds.), *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*. Berlin: Walter de Gruyter.
- Krantz, D. H., Luce, R. D., Suppes, P., & Tversky, A. (1971). *Foundations of measurement* (Vol. 1). New York: Dover Publications.
- Lassiter, D. (2015). Adjectival modification and gradation. In S. Lappin & C. Fox (Eds.), *Handbook of contemporary semantic theory*. New York: Wiley.
- Lemos, N. M. (1994). *Intrinsic value*. Cambridge: Cambridge University Press.
- Lewis, D. (1986). *On the plurality of worlds*. Oxford: Blackwell.

- Lockhart, T. (2000). *Moral uncertainty and its consequences*. Oxford: Oxford University Press.
- Luce, R. D., Krantz, D. H., Suppes, P., & Tversky, A. (1990). *Foundations of measurement* (Vol. III). New York: Dover Publications.
- MacAskill, W., Bykvist, K., & Ord, T. (2020). *Moral uncertainty*. Oxford: Oxford University Press.
- Moore, G. E. (1903). *Principia Ethica*. Cambridge: Cambridge University Press.
- Mundy, B. (1987). The metaphysics of quantities. *Philosophical Studies*, 51, 29–54.
- Peacocke, C. (2015). Magnitudes: Metaphysics, explanation, and perception. In Coliva, A., Munz, V., & Moyal-Sharrock, D. (Eds.), *Mind, language and action: Proceedings of the 36th international Wittgenstein symposium* (pp. 357–388). De Gruyter.
- Perry, Z. R. (2015). Properly extensive quantities. *Philosophy of Science*, 82(5), 833–844.
- Russell, B. (1905). On denoting. *Mind*, 14, 479–483 (reprinted in Marsh, R. C. (Ed.) (1956). *Logic and knowledge* (pp. 41–56). London: George Allen and Unwin).
- Russell, Bertrand. (2009). Originally published 1903. *Principles of Mathematics*. Routledge.
- Scanlon, T. M. (1998). *What we owe to each other*. Cambridge, MA: Harvard University Press.
- Swoyer, C. (1987). The metaphysics of measurement. In J. Forge (Ed.), *Measurement, realism and objectivity: Essays on measurement in the social and physical sciences*. Dordrecht: Reidel.
- Swoyer, C. (1991). Structural representation and surrogative reasoning. *Synthese*, 87(3), 449–508.
- Swoyer, C. (1998). Complex predicates and logics for properties and relations. *Journal of Philosophical Logic*, 27(3), 295–325.
- von Stechow, A. (1984). Comparing semantic theories of comparison. *Journal of Semantics*, 3, 1–77.

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