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The vagueness argument against abstract artifacts

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Creationism is the thesis there are abstract artifacts, that is, objects that have no spatial location and that are deliberately brought into existence as a result of creative acts. One plausible example of an abstract artifact is a musical work. Musical works would seem to lack any spatial location and yet are evidently created by their composers. Other plausible examples include stories and fictional characters, languages and words, concepts, games, recipes, roles, software, electronic documents, and data sets.[1] There is certainly room for disagreement in each of these cases. But it is extremely plausible that at least some of these are abstract artifacts, neither eternal nor concrete.

Universalism is the thesis that composition is unrestricted: for every plurality of material objects, there is a material object that is the sum of those objects. One might naturally assume that the question of whether composition is unrestricted is entirely independent from the question of whether stories and symphonies are abstract artifacts. But this would be a mistake. A minor variant of an influential and widely discussed argument for universalism—*the vagueness argument*—threatens to undermine creationism. I will show that these arguments stand or fall together. Those who accept universalism on the basis of the vagueness argument cannot accept creationism.

[1] For representative defenses of creationism, see Levinson (1980) on musical works, Bealer (1993, §7) on modes of presentation, Thomasson (1999) and Kripke (2013) on fictional characters and literary works, Sainsbury and Tye (2012) on words and concepts, Irmak (forthcoming) on software, and Rohrbaugh (2003) and Walters (forthcoming) on various kinds of repeatable artworks.

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It is not my aim here to defend creationism. In particular, I do not argue against views on which symphonies, stories, and the like are eternal objects, objects which are discovered (not made) by their alleged creators. Advocates of such views may even try to pay lip service to creationist intuitions by emphasizing the creativity involved in selecting a beautiful sound structure or an entertaining string of words from among the countless existing options.[2] My aim is only to show that friends of the vagueness argument *cannot* accept that such things are literally created, even if they wanted to.

1 The vagueness argument against creationism

Here is the vagueness argument against creationism:

(A1) If creationism is true, then it is possible for there to be a sorites series for the creation of an abstract artifact.
(A2) Any such sorites series must contain either an exact cut-off or borderline cases of creating abstract artifacts.
(A3) There cannot be exact cut-offs in such sorites series.[3]
(A4) There cannot be borderline cases of creating abstract artifacts.
(A5) So creationism is false.

Premise A1 is unassailable. A sorites series for the creation of an abstract artifact is a series of cases running from a case in which a given abstract artifact does not exist to a case in which it does exist, where adjacent cases in the series are extremely similar in all respects that would seem to be relevant to whether an abstract artifact has been created. As an illustration, consider Richard Dawkins' introduction of the word 'meme'.[4] Assuming that words are abstract artifacts, the nanosecond-by-nanosecond series of moments leading from the beginning to the end of the day on which Dawkins came up with the word would then be a sorites series for its creation. Premise A2 is trivial. Any such series must contain *some* transition from the artifact not existing to the artifact existing, and in any given series there either will or will not be an exact point at which that transition occurs.

The controversial premises are A3 and A4, and I turn now to the reasoning behind these premises. I do not attempt to defend the reasoning against all objections. Indeed, I don't think that it *can* be successfully defended against all objections. I myself accept creationism, and I deny A4. My aim in the paper is only to show that advocates of the vagueness argument for universalism are in no position to object to the vagueness argument against creationism (hereafter: the A-argument).

[2] Thanks to Ned Markosian for helpful discussion here. See Parsons (1980, p. 188) for an alternative account of our creationist intuitions.

[3] To say that there is an exact cut-off is to say that there are a pair of adjacent cases in the series such that some given abstract artifact exists in one but not the other.

[4] See Dawkins (1976).

1.1 In defense of A3

Any cut-off in our sorites series for the creation of the word 'meme' is bound to be arbitrary. This is so even if the word came to Dawkins in a sudden flash of inspiration, for even a flash takes time, and there could evidently be no explanation for why 'meme' would begin to exist at some particular moment rather than at some nearly indiscernible moment one nanosecond earlier. Some may respond that there is nevertheless independent reason to suppose that a sorites series can contain exact cut-offs.[5] And they would be right. However, there are two respects in which cut-offs in a sorites series for creation would be importantly different from cut-offs in more typical sorites series, like the ones for baldness.

First, the arbitrariness associated with cut-offs in a typical sorites series is merely linguistic or representational, while cut-offs in a sorites series for creating an object give rise to *metaphysical* arbitrariness. Suppose that 'bald' denotes the property of having fewer than 9,147 hairs. There is nothing arbitrary about there existing such a property, with a cut-off between 9,146 and 9,147. After all, there is also the property of having fewer than 9,146 hairs, the property of having fewer than 9,148 hairs, and so forth. What is arbitrary is only that 'bald' picks out the one rather than one of the others. The arbitrariness is linguistic; there is no arbitrariness in the associated metaphysics. By contrast, if there is a cut-off in the sorites series for creating the word 'meme', then at some exact and seemingly unremarkable point in the series, a new object comes into existence. The arbitrariness is thus rooted in what exists at the different times. This is a metaphysical arbitrariness.

Second, in more typical sorites series, one can at least begin to see what could ground the location of the cut-off. Although our actual use of 'bald' does not suffice to determine an exact cut-off, we have a wealth of tacit dispositions to apply the term in this or that way in different conditions, which arguably suffice to determine precise application conditions for the word. But even if the envisaged explanation were satisfactory, such dispositions would seem to have no role to play in explaining why 'meme' comes into existence just when it does rather than a moment earlier. Nor does any alternative explanation seem to be forthcoming.

Thus, even those who already accept that there are cut-offs in typical sorites series would still have good reason to resist postulating cut-offs in a sorites series for the creation of abstract artifacts.

1.2 In defense of A4

The argument against borderline cases of creating abstract artifacts turns on the observation that if there were such borderline cases, then some *numerical sentence* for abstract artifacts would evidently have to contain vague expressions. A numerical sentence for abstract artifacts is a sentence of the following form which says that there are exactly n abstract artifacts, for some number n (in this case,

[5] See, e.g., Williamson (1994), Fara (2000), Sorensen (2001), and Kearns and Magidor (2008).

n = 2): '$\exists x \exists y(x \neq y \ \& \ Ax \ \& \ Ay \ \& \ \forall z(Az \rightarrow (x = z \ v \ y = z)))$'. Here, then, is the argument for A4:

(A6) If there could be borderline cases of creating abstract artifacts, then it could be indeterminate how many abstract artifacts exist.
(A7) If it could be indeterminate how many abstract artifacts exist, then some expression in some numerical sentence for abstract artifacts must be vague.
(A8) An expression is vague only if it has multiple admissible precisifications.
(A9) No expression in any numerical sentence for abstract artifacts has multiple admissible precisifications.
(A4) So, there cannot be borderline cases of creating abstract artifacts.

The motivation for A6 is straightforward. Suppose that at time t it is indeterminate whether the word 'meme' has been created, and suppose that exactly one million abstract artifacts have been created prior to t. In that case, it is indeterminate at t whether there are a million abstract artifacts or a million and one.

The reasoning behind A7 runs as follows. If it is indeterminate how many abstract artifacts there are, then some numerical sentence would have to lack a determinate truth value. For instance, in the case just described, the numerical sentence that says that there are exactly one million abstract artifacts is neither determinately true nor determinately false. Since vagueness is evidently the source of the indeterminacy (as opposed to, say, reference failure or the open future), there must be some vague expression in the sentence that is responsible for the vagueness.

Premise A8 is a central plank of many of the leading theories of vagueness, including the orthodox linguistic account of vagueness. According to this linguistic account, vagueness is the result of semantic indecision. A term is vague when there are a plurality of candidate meanings (precisifications) for the term, none of which definitely has been selected as the meaning of the term and none of which definitely hasn't.

How about A9? The logical vocabulary in the numerical sentences seems already to be maximally precise. Might the nonlogical predicate 'A' have multiple precisifications? This would seem to require, at the very least, that 'A' have different candidate extensions at some world at some time. What might those extensions be? One might suggest that, at t, one candidate extension contains only the one million abstract artifacts created before t, while a second candidate extension contains all of these and the word 'meme'. Since that second extension exists at t, its members must likewise determinately exist at t, including 'meme'. But then, *contra hypothesis*, it isn't indeterminate whether 'meme' exists at t. So 'A' evidently cannot have multiple precisifications.

Exactly similar reasoning can be used to show that the quantifiers in the numerical sentence do not have multiple precisifications. '$\forall$' has multiple precisifications only if it has multiple candidate domains at some world at some time. This in turn would seem to require that a putative indeterminate existent be in

one candidate domain but not the other. But if it is a member of any domain at that time, then it determinately exists at that time, *contra hypothesis*.[6]

2 The vagueness argument for universalism

There are numerous objections one might raise to this argument, and I will mention several of them in Sect. 3. But my aim here is not to defend the argument. Rather, my aim is to show that the argument stands or falls together with the vagueness argument for universalism (hereafter: the B-argument):

(B1) If composition is restricted, then it is possible for there to be a sorites series for composition.
(B2) Any such sorites series must contain either an exact cut-off or borderline cases of composition.
(B3) There cannot be exact cut-offs in such sorites series.
(B4) There cannot be borderline cases of composition.
(B5) So composition is not restricted.[7]

The reasoning behind B1 is much the same as the reasoning behind A1: if some things compose an object and others do not, then there could be a sorites series leading from one case to the other, for instance, a moment by moment series leading from the beginning to the end of the assembly of a hammer from a handle and head. The reasoning behind B2 is the same as the reasoning behind A2: the transition in any such series either does or does not occur at an exact point. The reasoning behind B3 is the same as the reasoning behind A3: if there were an exact point at which the composite comes into existence, then it would be metaphysically arbitrary that the point is where it is. Finally, the reasoning behind B4 is structurally identical to the reasoning behind A4:[8]

(B6) If there could be borderline cases of composition, then it could be indeterminate how many concrete objects exist.
(B7) If it could be indeterminate how many concrete objects exist, then some expression in some numerical sentence for concreta (e.g., '$\exists x \exists y(x \neq y \ \& \ Cx \ \& \ Cy \ \& \ \forall z(Cz \rightarrow (x = z \vee y = z)))$') must be vague.
(B8) An expression is vague only if it has multiple admissible precisifications.
(B9) No expression in any numerical sentence for concreta has multiple admissible precisifications.
(B4) So, there cannot be borderline cases of composition.

[6] Moreover, whichever precisification of '∀' is associated with the smaller domain arguably is not an *admissible* precisification of '∀', since any candidate for being a precisification of '∀' would have to range over absolutely everything. See Sider (2001, pp. 128–129).

[7] See Lewis (1986, pp. 212–213) and Sider (2001, §4.9.1).

[8] See Sider (2001, pp. 126–130).

3 Resisting the vagueness argument against creationism

We are now in a position to see why various strategies for resisting the A-argument are unavailable to advocates of the B-argument. One might embrace metaphysical arbitrariness and deny A3, but this would undermine the case for B3, which rests on a prohibition on metaphysical arbitrariness.[9] One might deny A7 on the grounds that a sentence need not contain any vague expressions in order to lack a determinate truth value as a result of vagueness, but this would undermine the case for B7, which rests on the claim that vagueness is responsible for the indeterminacy of a sentence only if one of its subsentential parts is vague. One might instead deny A7 on the grounds that the numerical sentences are indeterminate, not as a result of vagueness, but rather as a result of the meaninglessness of "bare quantifiers", but this would likewise undermine the case for B7.[10] One might deny A8 by rejecting the precisificational account of vagueness, but this would undermine the case for B8. One might deny A9 by supplying precisifications for the quantifiers, but this would undermine the case for B9.[11]

Is there *any* way to resist the A-argument without undermining the B-argument? I will consider five possible strategies.

The first turns on the observation that there are infinitely many abstract artifacts.[12] Sentences, the reasoning goes, are abstract artifacts, and there are infinitely many of them in the English language. Yet if there are infinitely many abstract artifacts, then even if at some time t it is indeterminate whether the word 'meme' exists, it is not indeterminate how many objects there are at t, for the addition of one object to an infinitude does not affect the number of objects. So A6 is false. Assuming that there are finitely many concreta, no analogous objection can be raised against B6: the addition of a concrete object always makes a difference to the number of concreta.

Notice, however, that A6 does not say that borderline cases of creating abstract artifacts always give rise to indeterminacy in the number of abstract artifacts. It says only that they *can* give rise to such indeterminacy. If there can ever be borderline cases of creating abstract artifacts, then surely such cases can arise in worlds in which there are finitely many abstract artifacts. For instance, if there can ever be borderline cases of creating a word, then there would seem to be no grounds for denying that this can happen in worlds in which the only existing languages are too impoverished to generate infinitely many sentences. In these other worlds, in which there are finitely many abstract artifacts, borderline cases of word creation will give rise to indeterminacy in the number of abstract artifacts. Thus, even if the above line of reasoning is otherwise sound, it simply fails to engage A6.

[9] Put another way, one would then have no grounds for resisting Markosian's (1998, §5) "brutal" response to the argument for universalism.

[10] Cf. Thomasson (2007, Chap. 6) on the B-argument.

[11] Cf. Hirsch (1999) and Barnes (forthcoming) on the B-argument.

[12] Thanks to Bryan Pickel and Richard Woodward for helpful discussion of this strategy.

A second strategy is to deny A6 by maintaining that abstract artifacts exist outside of time. They owe their existence to creative activity that occurs at specific times, but this is not to say that they *come into existence* when those activities occur. Rather, they exist timelessly, and the creative activity makes it the case that they exist timelessly.[13]

Setting aside whether there is any plausibility to the idea that timeless entities can be dependent on temporary events in this way, let us see how this is supposed to help. Take one of the moments in the grey area of our sorites for the creation of 'meme', at which it is indeterminate whether Dawkins has yet done enough to count as having created a word. This is a borderline case of creating an abstract artifact. But is it indeterminate at that point which abstract artifacts exist? No, because he eventually does enough to create an abstract artifact, thus making it definitely and timelessly true that the word 'meme' exists. All that is indeterminate is which events it owes its timeless existence to. So the antecedent of A6 is satisfied, but the consequent on this view would be false. And since concrete artifacts obviously exist in time, no similar strategy is available for resisting B6.

The problem with this strategy is similar to the problem with the first strategy. A6 does not say that borderline cases of creating abstract artifacts always give rise to indeterminacy in the number of abstract artifacts, only that is can. To see that such cases can arise even on the view under consideration, consider a world in which Dawkins aborts the creative process right at one of the borderline cases, at which it is indeterminate whether he has done enough to create a word. In that case, it will be indeterminate whether there are just the million other previously existing abstract artifacts, or those million plus one that he has just created. Thus, it would be indeterminate how many abstract artifacts there are. So even supposing that abstract artifacts exist outside of time, it remains the case that borderline creation of abstract artifacts *can* give rise to count indeterminacy.[14]

The third strategy involves maintaining that the nonlogical predicate in the numerical sentences, 'A', has multiple admissible precisifications. One might maintain that certain impure sets are borderline cases of being abstract artifacts. For instance, {Eiffel Tower}, while definitely abstract, is arguably a borderline case of being an artifact. Like paradigmatic artifacts, it comes into existence as a result of creative acts, but, unlike paradigmatic artifacts, it is not itself the *intended* product of those creative acts. Thus, 'A' will have multiple admissible precisifications, some but not all of which have {Eiffel Tower} in their extension. Since no analogous problem arises for the concreteness predicate, 'C', one may deny A9 without jeopardizing the case for B9.

Even granting that 'C' is precise, the objection can be circumvented. 'A' is ours to define as we please, so let us redefine it to mean *is an abstract artifact that is not a set*. Or, for good measure, let us define it to mean *is an abstract artifact that is not a set*, *fact*, *singular proposition*, *or event*, in anticipation of the objection that the

[13] Thanks to Michaela McSweeney, Rohan Sud, and Ryan Wasserman for helpful discussion. See Fiocco (forthcoming) for discussion of this sort of "atemporal becoming".

[14] Similar problems arise for structurally similar strategies for resisting B6. See Korman (2010, p. 895) in response to Baker (2007, pp. 130–132) and Donnelly (2009, pp. 73–76).

fact that the Eiffel Tower exists, the proposition that the Eiffel Tower exists, or the event of creating the Eiffel Tower are borderline abstract artifacts as well. Other categories may be added as needed. This modification makes no difference to the substance of the argument, beyond securing A9 against the envisaged objection, by ensuring that 'A' has a precise extension.[15]

The fourth strategy involves maintaining that the different arguments, and in particular the different numerical sentences, involve different kinds of quantifiers.[16] Insofar as it concerns material objects—objects whose existence we affirm with ontological seriousness—the quantifiers in the B-argument should be understood to be the precise, fundamental quantifiers of "Ontologese". The A-argument, by contrast, concerns items about which we are not ontologically serious (fictional characters, musical works, etc.) and so is best understood as involving the vague, nonfundamental quantifier associated with ordinary English uses of 'there is'. Thus, one can deny A9 and maintain that the quantifiers in a numerical sentence for abstract artifacts are vague and have multiple precisifications without thereby undermining B9.

I have serious doubts about the conjecture that ontologists have all along been using something other than the ordinary existential quantifier when discussing the B-argument, and I likewise have serious concerns about *stipulating* that the B-argument is to be understood to involve a fundamental quantifier. I present these doubts in detail elsewhere,[17] so let me set them aside here, and focus instead on a certain trilemma that arises for this strategy. To avoid confusion, I will use 'there oxists' for the putative fundamental quantifier—the oxistential quantifier—reserving 'there exists' for the ordinary existential quantifier.

The horns of the trilemma are three different accounts of what is in the domain of the oxistential quantifier. Horn #1: It contains only fundamental objects.[18] But no one (universalists included) thinks that the universalist's gerrymandered fusions are themselves fundamental.[19] So those who go for the first horn had better not endorse the oxistential understanding of the argument for universalism, whose conclusion is that there oxists a fusion of any arbitrary plurality of objects. Horn #2: It contains everything, including all nonfundamental objects. But in that case, it includes abstract artifacts as well. So we can run the A-argument using the oxistential quantifier, and the envisaged universalists won't be able to resist this fortified argument by pinning the vagueness on the quantifiers. Horn #3: it contains all

[15] In fact, this is simply an adaptation of a strategy for securing B9 against the complaint that there are borderline cases of concreteness; see Sider (2001, p. 127) and Korman (2010, p. 893). One might worry that this introduces an equivocation into the argument, insofar as 'A' in the numerical sentences no longer means *abstract artifact*. But this is cause for concern only if understanding 'A' in this new way weakens or undermines the support for one of the premises, and as far as I can tell it does not. Thanks to Meghan Sullivan for helpful discussion.

[16] Thanks to Ted Sider, Raúl Saucedo, and Ryan Wasserman for helpful discussion of this strategy. See Sider (2011) for more on fundamental quantifiers.

[17] See Korman (forthcoming).

[18] Cf. Dorr (2005), Cameron (2010), and Rettler (ms).

[19] Cf. Lewis (1983, p. 372) on their unnaturalness.

fundamental objects, all nonfundamental material objects, but no nonfundamental abstract objects. But such a quantifier, which ranges over some nonfundamental objects but not others, hardly has a claim to carving reality at its joints. So it is doubtful that this can be the domain of the oxistential quantifier.

The fifth strategy involves saying that Dawkins creates more than one abstract object when he introduces the word 'meme'. Indeed, he creates *countless* objects. To see how this is supposed to help, it will be useful to digress and address a somewhat different (but ultimately related) concern that may be on the minds of some readers.

4 On the very possibility of generation

What drives both vagueness arguments is a stringent constraint on the conditions under which something can come into existence: nothing can come into existence at an arbitrary exact point, on pain of metaphysical arbitrariness, and nothing can come into existence at an indeterminate point, since this runs afoul of the precisificational account of vagueness. So one might wonder whether the reasoning behind the vagueness arguments underwrites an even more radical conclusion, namely, that it is impossible for *anything* to come into existence. After all, for any non-eternal object, there can be a sorites series leading from a moment sometime before its generation to a moment sometime after its generation. Yet if objects cannot come into existence at arbitrary exact points, as the reasoning behind A3 seems to demand, and if it also cannot be indeterminate when an object comes into existence, as the reasoning behind A4 seems to demand, then how could anything ever come into existence? In other words:

(C1) If something can come into existence, then it is possible for there to be a sorites series for generation.
(C2) Any such sorites series must contain either an exact cut-off or borderline cases of generation.
(C3) There cannot be exact cut-offs in such sorites series.
(C4) There cannot be borderline cases of generation.
(C5) So nothing can come into existence.

How can an advocate of the B-argument avoid the conclusion that everything that exists is eternal?

There is a way: one can deny C3 by maintaining that objects come into existence at *non*-arbitrary exact points. The key to securing non-arbitrary cut-offs in a gradual world like ours is to postulate a generational cut-off at every point in every such sorites series.[20] In other words, a plenitude of objects comes into existence, a new one being generated at each point in the series.

We have already seen (in Sect. 1.1) how postulating a plenitude can sometimes help defuse charges of metaphysical arbitrariness. Consider the property of having

[20] The usual four-dimensionalist picture on which there is an object corresponding to every filled region of spacetime delivers just such a plenitude, so four-dimensionalists like Lewis and Sider are already well-positioned to adopt this plenitudinous account of generation. But it is equally open to three-dimensionalists to embrace the plenitude; see Miller (2005, §3), Lowe (2005), and Kurtsal Steen (2010).

fewer than 9,147 hairs. Is there anything arbitrary about there being such a property, with an exact cut-off between 9,146 and 9,147? It depends. If this were the only property of its kind—if there were no property of having fewer than 9,146 hairs, no property of having fewer than 9,148 hairs, only the property of having fewer than 9,147 hairs—then that would indeed be metaphysically arbitrary. But if all these other properties exist, one for every number of hairs, then there is nothing arbitrary about there being a property with a cut-off at 9,147 in particular. That said, there had better be one for *every* number of hairs. If there were such a property for all $n < 15{,}000$, but no others (e.g., no such property of having fewer than 15,001 hairs), that would be metaphysically arbitrary as well. So if there is to be no metaphysical arbitrariness, there needs to be a plenitude of properties, and the plenitude cannot start or stop at some arbitrary point.

Now let us see what sort of plenitude is needed to yield generational cut-offs without arbitrariness. Imagine assembling a hammer by affixing a hammer head to a hammer handle. By the end of the assembly process, there is an object, O, composed of the handle and head. Would it be arbitrary to suppose that there is some precise moment, t, at which O came into existence? Not necessarily. For suppose that O is not the only object that the handle and head compose at the end of the process. Rather, suppose that at each moment preceding t and each moment following t (at which the handle and head themselves exist), a new object comes into existence that is composed of the two. In that case, by the end of the assembly process, there will be countless objects composed of the handle and head: N, which they began to compose at $t - 1$; O, which they began to compose at t; P, which they began to compose at $t + 1$; and so forth. The fact that *an* object begins to exist at t does not make t in any way privileged in comparison to other times, and consequently there is nothing arbitrary about supposing that an object comes into existence precisely at t.

It is open to those who opt for this line of response to say that it is indeterminate when exactly *the hammer* came into existence. For this can be explained in terms of a linguistic indeterminacy that is not ruled out by the vagueness argument. Suppose we want to say that it is indeterminate whether the hammer began to exist at t or at $t + 1$. What makes that so is that it is indeterminate whether 'the hammer' refers to O or to P. 'The hammer came into existence at t' would then lack a determinate truth value because it is indeterminate which of those objects—each of which has a determinate temporal extent—is the referent of 'the hammer'. This sort of indeterminacy will not give rise to indeterminacy with respect to how many things there are at any given time, and it is only that latter sort of indeterminacy that is prohibited by the reasoning behind C4 (and A4 and B4).

Advocates of the B-argument need not accept that all objects are eternal. But if they wish to permit any generation at all, and resist the C-argument, they must be willing to embrace the envisioned generational plenitude, since this evidently is the only way to secure non-arbitrary generational cut-offs.[21]

[21] Fundamental particles may be an exception here. Assuming that their generation is governed by physical laws that do not admit of vagueness, one can account for how they are generated at exact points in a principled (non-arbitrary) way without postulating a generational plenitude. Thanks to Matti Eklund for helpful discussion here.

5 Plenitudinous creationism?

Perhaps advocates of the B-argument can make use of the same sort of plenitudinist strategy in order to block the A-argument.[22] To help anchor our discussion of this (fifth) strategy, I will focus on a fairly specific version of plenitudinous creationism, but the objections I raise will apply to any reasonable form of plenitudinous creationism.

For the sake of concreteness, then, let us suppose that the creationist fills in the details of the plenitudinous account as follows. When Dawkins introduces the word 'meme', he actually brings into existence many word-like objects, each of which is a concatenation of the letters 'm'-'e'-'m'-'e'. The creative process takes time—at least as much as it takes to think to himself *I'll call them* '*memes*'—and one such concatenation comes into existence at each moment during that process. As with the hammer, it may well be indeterminate when exactly the word 'meme' begins to exist, but this is because it is linguistically indeterminate which of these many (definitely existing) concatenations is picked out by the vague term 'the word 'meme''. It is not the result of there being any one object that, at some time, neither determinately did nor determinately did not exist.

Thus, the plenitudinous creationist avoids both indeterminate existence and arbitrariness. She denies A3, maintaining that such sorites series contain a great many exact cut-offs at which an abstract concatenation made by Dawkins comes into existence. Yet the cut-offs are not arbitrary, because there are concatenations coming into existence at each point in the series.

I will present a dilemma for plenitudinous creationists who endorse the B-argument, turning on the question of whether concatenations of 'm'-'e'-'m'-'e' have been coming into existence for as long as the letters 'm' and 'e' have themselves existed. In short: If the plenitudinous creationist says *no*, then she cannot accept the B-argument. If she says *yes*, then she must deny that words are abstract artifacts.

To see this, let us begin with the horn on which she maintains that there were times at which 'm' and 'e' did not generate 'm'-'e'-'m'-'e' concatenations. A natural view along these lines is that 'm' and 'e' begin forming such concatenations sometime during Dawkins's introduction of the word 'meme', that is, sometime between his beginning the thought *this process is sort of like mimesis* and his finishing the thought *I'll call them* '*memes*'. The problem is that there surely isn't going to be some one special nanosecond in this time span at which his mental or neural states undergo some remarkable change that could underwrite a non-arbitrary first point of generation. So, assuming (as we are on this horn) that the plenitude of concatenations gets started somewhere in this time span, either it is indeterminate when it gets started or it gets started at some unremarkable exact point.

But neither option is open to advocates of the B-argument. If on the one hand the plenitude gets started at some unremarkable exact point in that time span, then there

[22] Thanks to Dave Liebesman, Meghan Sullivan, Raúl Saucedo, Mary Beth Willard, Jonathan Schaffer, Lina Jansson, and Jason Turner for helpful discussion here.

will be metaphysical arbitrariness: arbitrariness with respect to why a concatenation first comes into existence at that point, and yet no concatenation comes into existence at the nearly indistinguishable point one nanosecond earlier. This would undermine the support for B3, which rests on a prohibition on metaphysical arbitrariness. If on the other hand it is indeterminate when the plenitude gets started, then that means that there are times at which it is indeterminate whether there exists something in addition to 'm' and 'e' (namely, a concatenation). But this would undermine the support for B4, which rests on a prohibition on this sort of count indeterminacy.

On the other horn, the creationist holds that the concatenations have been coming into existence for as long as 'm' and 'e' have existed.[23] The problem now is that the existence of the concatenations seems to have nothing at all to do with Dawkins or his creative activity. Concatenations of 'm'-'e'-'m'-'e' were being generated long before Dawkins came along, and each necessitates the existence of the next, on pain of a metaphysically arbitrary *stopping* point to the plenitude. The plenitude is self-perpetuating, with each concatenation ensuring the existence of its successor. There does not seem to be any sense in which the ones coming into existence contemporaneously with Dawkins's creative intentions depend on him either for their generation or for their being the way that they are. So they are not something he *makes*; they are not artifacts. But if none of them are artifacts, then it is definitely false that the word 'meme' is an artifact. For all of the candidate referents for 'the word 'meme''—the concatenations coming into existence during his introduction of the word—are non-artifacts, utterly independent of Dawkins's or anyone else's creative activities. Thus, this account is not available to creationists.

To be sure, a similar dilemma arises for the plenitudinous account of the generation of a hammer sketched in Sect. 4. But here the plenitudinist has no problem occupying the second horn. For it is easy to see how the hammer-like objects being generated when the handle is being affixed to the head could count as artifacts. Those parts come to be arranged hammerwise as a result of someone's creative activities. Moreover, had these parts never come to be arranged hammerwise, they plausibly would not have composed *these very objects*, the ones that are generated while the handle is being affixed to the head. Thus we can see how someone can count as making the hammer-like objects (N, O, P, etc.), how they depend on their creators, and how it is that they might count as artifacts.

As stated, the dilemma targets a fairly specific version of the plenitudinous creationist strategy. I leave it as a challenge to advocates of the B-argument to find a version of plenitudinous creationism that fares better. But I suspect that any reasonable plenitudinous creationist strategy will be impaled on the horns of this dilemma. Any such view will involve postulating a plenitude of abstract objects being generated over the course of the creative act. If the relevant plenitude gets started sometime during the creative act, then it is bound to lead to arbitrary cut-offs

[23] How long is that? Here the plenitudinous creationist faces another problem. She can say that they have *always* existed, but it would certainly be odd to treat the words of a language but not the letters of its alphabet as artifacts. And yet she will be hard pressed to identify a remarkable, non-arbitrary exact point at which the letters begin to exist. Thus, the problems raised in the text for words are going to arise for letters as well.

or indeterminate existence. If it gets started sometime before the creative act takes place, then no members of that plenitude are artifacts.

6 Conclusion

Universalism entails that there is an object composed of my nose and the Eiffel Tower (assuming those two themselves exist). Such counterintuitive implications, to my mind, are as clear an indication as any that there must be some defect in the reasoning behind the vagueness argument for universalism.[24] Others, however, are untroubled by these implications, perhaps because they take the strange fusions to be "ontologically innocent," or perhaps because they do not put much stock in our intuitions about composition.[25]

I have shown that the reasoning behind the vagueness argument for universalism has other ramifications that have hitherto gone unnoticed. In particular, it closes off the most natural account of entities like stories, fictional characters, languages, words, symphonies, melodies, songs, concepts, games, recipes, roles, software, documents, and data sets, according to which these are non-concrete, non-eternal artifacts. This leaves open the possibility that such entities are eternal abstracta, that they are non-eternal concreta, or that they do not exist at all. And these options are not without defenders.[26] But it is noteworthy and at least somewhat troubling (even to those unfazed by strange fusions, I hope) that these are the only options available to universalists who endorse the vagueness argument.

In closing, I should note that, in addition to creationism, there are a variety of other views in metaphysics that are evidently closed off to advocates of the B-argument. For instance, they evidently cannot accept that minds or persons are immaterial and come into existence only once matter comes to be organized in such a way as to support certain kinds of mental states.[27] For any given person P, either P comes into existence at some indeterminate point (which is prohibited), or she comes into existence at some arbitrary point (which is prohibited), or her generation is accompanied by the generation of a plenitude of other persons at the surrounding times (which is absurd). Nor can they accept an Armstrongian view of universals, on which (i) universals exist only if they have instances and (ii) there are universals answering only to some small range of predicates for natural properties and natural kinds.[28] Suppose that *being an Einsteinium atom* is one such universal, and consider

[24] Cf. Sider himself on vagueness-based arguments against ordinary objects (2001, p. 188): "At present, the theory of vagueness is in flux, with none of the prominent theories being perfectly acceptable. If paradoxical conclusions emerge in the area, it is hard to justify attributing them to the postulation of ordinary objects … rather than to an inadequate understanding of vagueness." Mutatis mutandis, I say, for postulating restrictions on composition.

[25] See, e.g., Lewis (1991, §3.6) and Hudson (2001, pp. 107–108) respectively.

[26] See, e.g., Kaplan (1990) and Wetzel (2009) on words, Yagisawa (2001), Everett (2005) and Hayaki (2009) on fictional characters, Renear and Wickett (2009) on documents, Wickett et al. (2012) on data sets, and Caplan and Matheson (2006), Dodd (2007), Cameron (2008), and Tillman (2011) on musical works.

[27] Thanks to Laurie Paul for the example.

[28] See Barnes (2007).

some time at which some subatomic particles are a borderline case of being arranged Einsteiniumwise (and, if you wish, a world in which this is the closest anything ever comes to composing an Einsteinium atom). Either it is indeterminate at that time whether the universal exists (which is prohibited), or there is some arbitrary exact point at which it begins to exist (which is prohibited), or its generation is accompanied by the generation of a plenitude of other universals at surrounding times (which looks to be ruled out by condition (ii)).

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