

Constitution, Vague Objects, and Persistence

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ABSTRACT: In this paper, I assess the analysis of vagueness of objects in terms of the theory of constitution with respect to the notion of vague identity. Some proponents of the constitution theory see it as an advantage of their account that analysing the spatial and temporal vagueness of objects in terms of the relation of vague constitution avoids commitment to vague identity, which is seen as a controversial notion. I argue that even though the constitution theory may plausibly be applied to the phenomenon of vague boundaries, it fails to account fully for other cases of spatial and temporal vagueness. There are what I call ‘mid-extension’ vagueness cases, in which the tools of the constitution theory applied in the analysis of boundary vagueness are insufficient to avoid commitment to vague identity.

KEY WORDS: Constitution, persistence, vague objects, vague identity.

According to the constitution theory, there is a unique relation of constitution which relates persisting composite objects to the pieces of material that they are made from. The relation is typically invoked to account for the possibility of objects’ changing by losing and gaining parts and to explain some puzzles of material constitution. But several philosophers have also utilized the relation to account for certain kinds of vagueness. In particular, it has been used to provide a metaphysical, as opposed to linguistic, account of vague objects, that is, objects with vague boundaries and vague parts. Vague objects, metaphysically conceived, are controversial postulates, because, it has been argued, their existence would entail the possibility of vague identity, an allegedly incoherent concept. Some proponents of the constitution theory claim, however, that locating the vagueness of objects in the constitution relation can make sense of the idea of vague boundaries and parts without the troubling entailment of vague identity. In this paper I argue that the claims of the proponents of the constitution theory are only plausible with respect to

vague boundaries. But objects are also affected by what I call ‘mid-extension’ vagueness and it seems that the constitution relation cannot account for this phenomenon. The proponents either have to deny vagueness in these cases, account for it in an unsystematic way, or accept vague identity and defend its coherence.

The relation of constitution

Constitution is a relation that, according to its proponents, holds between an object and the piece of material from which it is made.¹ Typically, the *constituted object* is taken to be a macro-object persisting over time, such as a bronze statue, clay pot, plastic cup or animal (with the latter category including human beings). The constituted objects need not, however, be limited to macro-objects. As long as the object is composite and persists, as a result of which it can gain and lose its parts, it will be constituted by some material.² The *constituting object* is usually considered to be the piece of material from which the macro-object is made – a piece of bronze, a lump of clay, a piece of plastic or organic tissue. To avoid referring to specific kinds of material and instead refer to the ultimate constituents, philosophers often speak generally of aggregates of matter. The *constitution relation* is an irreflexive, asymmetrical relation, whereby the constituting object shares matter with the constituted object without being identical to it.

A number of philosophers have appealed to or defended the relation of constitution.³ One of the most recent and elaborate accounts of constitution is provided by Baker:

Let “F*x” stand for “x has F as its primary kind property” and likewise for other predicate variables.

(C*) x constitutes y at t = df. There are distinct primary-kind properties F and G and G-favorable circumstances such that:

- (1) F*x & G*y &
- (2) x and y are spatially coincident at t, and $\forall z(z \text{ is spatially coincident with } x \text{ at } t \text{ and } G^*z \rightarrow z = y)$;
- (3) x is in G-favorable circumstances at t; &
- (4) It is necessary that: $\forall z[(F^*zt \text{ \& } z \text{ is in G-favorable circumstances at } t) \rightarrow \exists w(G^*wt \text{ \& } z \text{ is spatially coincident with } w \text{ at } t)]$.

¹ Although constitution has also been claimed to hold between other entities, such as events or properties, I will only focus on the relation with respect to objects. See Wasserman (2018).

² Fine (2003) suggests that it would make sense to distinguish between the constituted object and the constituting matter even in cases of necessary coincidence, that is, in situations where an object is necessarily composed of the same matter.

³ See, for instance, Baker (2000), Johnston (1992), Lowe (1983, 1995a, 1995b) or Shoemaker (1999, 2003).

- (5) It is possible that: $\exists t\{(x \text{ exists at } t \ \& \ \sim\exists w[G^*wt \ \& \ w \text{ is spatially coincident with } x \text{ at } t])\}$; &
- (6) If x is of one basic kind of stuff, then y is of the same basic kind of stuff. (Baker 2007: 161)

A number of points require explanation. I will use the example of the statue of David and the piece of marble from which it is made to illustrate the individual points.

A primary kind is the most fundamental kind that a thing is. For instance, David is most fundamentally a statue and not a piece of marble, and the piece of marble is most fundamentally a piece of marble, not a statue. A thing's primary kind determines its persistence conditions. For example, if something is most fundamentally a statue, it can survive the replacement of one of its parts, but if something is most fundamentally a piece of marble, then it cannot lose a part, as is standardly believed.

G-favourable circumstances are circumstances that enable an object of a certain primary kind to constitute an object of the primary kind G . For instance, if G is a statue, then the G -favourable circumstances will include conditions such as the existence of art, displaying the object in the artistic community, etc. If these circumstances did not obtain, the piece of marble could not constitute David.

Suppose that 'F' stands for the primary kind 'piece of marble' and 'G' for the primary kind 'statue'. Then:

- (1) states that x is most fundamentally a piece of marble and y is most fundamentally a statue.
- (2) states that a constituter cannot constitute two distinct things of the same kind at once; x and y spatially coincide and if there is another object that spatially coincides with x and is of primary kind G , then it is identical to y . So the piece of marble that constitutes David could not at the same time constitute another statue.
- (3) states that the conditions required for a piece of marble to constitute a statue are in place.
- (4) states that it is necessary that for any piece of marble placed in statue-favourable circumstances there will be a statue spatially coincident with that piece of marble.
- (5) states that it is possible that the piece of marble does not always spatially coincide with a statue. There are times when the piece of marble does not constitute a statue.
- (6) ensures that the constituting and the constituted things are of the same stuff. In particular, if one is material, the other is material, too.

The distinction between objects and aggregates of matter has been invoked to account for a number of puzzles that arise regarding the material constitution of objects. For instance, in the case of a statue carved from marble it seems that there is just one object. We would not weigh the statue and the piece of marble separately and then add the two measurements together to determine whether the pedestal can support ‘their’ weight. On the other hand, the statue and the marble may differ in a number of properties – the statue is a work of art, the marble is not; the statue may be of high quality even though the marble is not, or vice versa; the marble may come from a particular quarry while the statue does not. The friend of constitution will claim that the statue and the piece of marble are two distinct things (as evidenced by the distinct properties) which materially and spatially coincide.

Another puzzle arises when we want to explain how objects can change and yet survive the change. A statue is made from a particular piece of marble. If it loses a part, it will be made from a different piece of marble. So if objects are nothing but the pieces of material they are made from, a statue cannot lose a part without ceasing to exist and being replaced by a new statue. That is counterintuitive. The friends of constitution can claim that statues are not pieces of marble and that losing or gaining parts is possible in virtue of the statue being constituted by one piece of marble prior to the loss and another piece of marble after the loss.

Philosophers have struggled with these and some other puzzles of material constitution for a long time. However, the constitution theory has also been offered as a remedy to some more recent issues that arise in relation to the phenomenon of vague objects.

The vagueness of objects

A number of philosophers have pointed out that the distinction between objects and aggregates of matter can provide a plausible account of vague objects. In what follows, I will describe the problem and show how the distinction is supposed to help.

It is a well-known fact that there are sentences in ordinary language that seem to have a somewhat indeterminate status between truth and falsity. For example, ‘A man with a height of 185 cm is tall’ or ‘France is hexagonal’ seem to be neither definitely true nor definitely false. Importantly, sentences describing the constitution and persistence of objects also belong to the class of indeterminate sentences. For instance, it may be argued that it is indeterminate whether Crimea was part of Ukraine in November 2018, whether conception is the beginning of human life or whether a neocortically dead person is dead.

The traditional account considers this indeterminacy⁴ to be the result of the imprecision of our descriptions of the world. The *semantic* theory argues that the reason why these sentences have an indeterminate truth value is that the concepts used in them are not precisely defined.⁵ It is a typical and often welcome feature of ordinary language that it enables us to express ourselves in a somewhat vague manner, since absolute precision is sometimes unnecessary and hinders efficient communication. That is why we have not come up with precise definitions of the expressions ‘tall’, ‘the shape of France’, etc. But, the theory claims, we could, if we wished to, provide precise definitions, or *precisify* the concepts, and eliminate the vagueness in our language. We could, for instance, stipulate that a certain geographical area is ‘part of’ a country only if it has been internationally recognized as one, or alternatively if it is *de facto* under the control of the country’s administration. In any case, the semantic theory of indeterminacy presupposes that the world is precise, and that all vagueness is of linguistic origin and consists in the availability of many candidates to be the referents of our expressions. One version of the linguistic account of vagueness, the *epistemic* theory, claims that we are in principle incapable of knowing where the seams in nature lie, but that these seams do exist and, as a result, all of the sentences of our language are definitely true or definitely false; we just cannot determine which is the case.⁶

Some other philosophers find the linguistic account of vagueness dissatisfactory and have proposed alternative accounts committed to the idea that the world itself is also vague and that some of the vagueness in our language is the result of worldly vagueness. One source of dissatisfaction with the traditional account is the idea that we could make our language more precise. Some philosophers have challenged that idea. For example, Baker suggests that if we want to precisify a vague term, we will ultimately have to use other terms that will turn out to be in need of precisification. ‘Vagueness may be pushed around, but not eliminated, by our decisions’ (Baker 2007: 125). Noonan does not believe in the possibility of ultimate precisifications, either: ‘The proponent of semantic indecision supposes that there are precisifications, i.e., ways in which we could, in principle, sharpen up our general terms

⁴ A terminological note: Some authors distinguish between vagueness and indeterminacy. In this paper, I do not make a semantic distinction between these two notions. However, I find it more natural to speak of indeterminate, rather than vague, sentences and states of affairs on the one hand, and vague, rather than indeterminate, spatial and temporal boundaries of objects on the other.

⁵ The modern history of *semanticism* dates back at least to Russell (1923). Some of the more recent defenders of the general idea behind semanticism include Fine (1975), Keefe (2000), Lewis (1983) and Noonan (2013).

⁶ The most notable account and defence of epistemicism is presented in Williamson (1994).

in order to secure a determinate reference. But it is plausible that this is mere fantasy' (Noonan 2013: 243). Van Inwagen, discussing various principles of composition,⁷ argues that if one wants to avoid extreme principles of composition such as *universalism* or *nihilism*, one must face up to the fact that there are no sharp boundaries in reality: 'If we remember that actual material objects are composed of molecules and attend to the fact that interaction among molecules is, at bottom, a matter of the interaction of continuous electromagnetic fields, we must concede that contact is as much a relation with vague boundaries as are friendship and mutual admiration. What goes for *Contact* goes for *Fastening*, *Cohesion*, and *Fusion*' (van Inwagen 1995: 236).

It seems, then, that vagueness is also a property of objects⁸ themselves and not just a property of the language that describes them. Let us now turn to the various aspects of the vagueness of objects that have drawn philosophers' attention. First, there is the problem of vague *spatial boundaries*. This concerns the delineation of the boundaries of large structures ranging from countries to galaxies as well as regular-sized objects such as books or apples, whose boundaries are just as vague when judged from a microscopic perspective. Next, there is the problem of *vague parts*, which is closely related to the problem of vague boundaries, because the question of an object's boundaries can be translated into the question of whether a problematic segment is part of the given object or not. Another closely related problem has been called *the Problem of the Many* (Unger 1980). Briefly explained: there is a large number of precise aggregates of matter in the vicinity of any vague object. Each of these aggregates is an equally suitable candidate to be the object. There are no rational criteria for preferring one of the aggregates over the others. As a result, we have to concede that where we thought there was a single object, such as a cloud or a mountain, there is, in fact, a great number of them. Then there is the problem of vague *temporal boundaries*, because we do not normally think that objects come into existence and cease to exist in an instant. Also, there is the problem of *vague composition*. This concerns the question of when some objects, the candidate parts, compose a larger object. This is related to the problem of the *vagueness of existence*, because some believe that if it is indeterminate whether the candidate parts compose a whole, then it must be indeterminate whether the whole exists. In what follows, I will be primarily concerned with questions of vague spatial and temporal bounda-

⁷ Principles of composition state under which circumstances two or more objects compose another. For example, the principle van Inwagen calls *Contact* states that objects compose another object if and only if they are in contact.

⁸ Worldly vagueness or indeterminacy need not concern only objects. Some argue, for instance, that the indeterminacy of the future is also metaphysical. In fact, it is quite difficult to imagine in what sense the indeterminacy of the future could be a matter of semantic indecision. See for instance Wilson (2013: 360).

ries, though I will touch upon the issue of vague existence when discussing Baker's theory.

Let me now briefly turn to the question of why someone might prefer to avoid any talk of metaphysical, as opposed to linguistic, vagueness. Opponents of the idea of 'worldly' vagueness consider the idea either unintelligible or incoherent. For instance, Lewis claims that the vagueness of an object's boundaries can be either understood as the presence of a multiplicity of precise boundaries, or as the ignorance of the object's precise boundaries, or in terms of the object's fading away, with the presence of the object being a matter of degree, diminishing as the distance from the region in which the object is most intensely present increases. Lewis, however, states: 'None of these three pictures is right. Each one in its own way replaces the alleged vagueness of the object by precision' (Lewis 1999: 170). Morreau, who is not opposed to the idea of vague objects, also mentions that the opposition to the idea has roots in its lack of intelligibility. He claims that allowing that objects may have questionable parts seems to entail that composition must be vague and, therefore, that it is sometimes indeterminate whether the would-be parts compose a further object and, as a result, whether this further object exists. Then he comments: 'Now *this* idea is genuinely mysterious. How can something neither quite be nor not be there? Must we imagine that the presence of vague objects is somehow a matter of degree, like the intensity of a beam of light?' (Morreau 2002: 336)

Many philosophers attack the concept of vague objects not for its unintelligibility, but for the fact that it allegedly entails the concept of vague identity, which has been shown to be incoherent. Why think that vague objects lead to vague identity?

Imagine an object that is such that it is indeterminate whether another object is part of it. Suppose, for instance, that at the foot of Mt. Everest there is a tower such that it is indeterminate whether the tower is part of Everest or whether it lies outside its boundary. Call the tower simply Tower. This is how such vagueness in parthood or spatial boundary is supposed to lead to vagueness of identity: The question of whether Everest includes Tower enables us to distinguish two aggregates of matter in the vicinity of Everest, one which consists of all the matter composing Everest plus the matter composing Tower, let us call this A_1 , and one which consists only of all the matter composing Everest, but does not include the matter composing Tower, let us call this A_2 . The reasoning goes as follows: If Everest includes Tower, then Everest is (identical to) A_1 ; if Everest does not include Tower, then Everest is (identical to) A_2 . But it is indeterminate whether Everest includes Tower. Thus, it is indeterminate whether Everest is (identical to) A_1 and it is indeterminate whether Everest is (identical to) A_2 .⁹

⁹ Examples of this sort can be found in, e.g., Morreau (2002: 338) and Noonan (2013: 246).

So it seems that the adherent of the possibility of objects with vague parts or boundaries is committed to the possibility of the vagueness of the identity relation. But the notion of vague identity is extremely controversial. Many follow Evans (1978) in claiming that the notion is incoherent, because supposing that objects might be vaguely identical leads via a few steps of logically sound reasoning to the conclusion that the supposed objects are definitely distinct. Evans claims that if we suppose that *a* and *b* are vaguely identical, then one of the objects will have a property the other one lacks. Namely, *a* will be such that it is indeterminate whether it is identical to *b*. But since it is not indeterminate whether *b* is identical to *b*, *b* is not such that it is indeterminate whether it is identical to *b*. So, *a* and *b* differ in their properties. By the contrapositive of Leibniz's Law, any objects differing in their properties must be determinately distinct. As a result, *a* and *b* are determinately distinct, contrary to the initial hypothesis that they are vaguely, or indeterminately, identical.

Of course, Evans' argument has been subject to criticism. Some critics point out that the argument relies on the contrapositive of Leibniz's Law, which is invalid in indeterminacy contexts (see Parsons 2000: 37). Another objection is that the argument illegitimately assumes that predicates such as *being such that it is indeterminate whether it is identical to b* express genuine properties that are quantified over by Leibniz's Law (see Keefe 1995: 187–188). Yet another objection is that indeterminate-identity-involving properties such as the one expressed by the above predicate (assuming there are such properties) cannot determinately differentiate *a* from *b* (see Lowe 1994: 113–114). Each of these arguments has, however, generated counterarguments, and the status of vague identity remains controversial.¹⁰ I will assume that, for this reason, it is preferable that a theory avoids any commitment to the notion of vague identity.

The relation of constitution and the vagueness of objects

Let me now turn to the details of the constitution account of vagueness. Some proponents of the constitution relation provide detailed analyses of vague objects in terms of constitution without further claiming that such a strategy avoids commitment to vague identity. Lowe, for instance, provides such an account, but he is also one of the defenders of the possibility of vagueness of identity against Evans' argument (see Lowe 1994, 1997, 1999). Others, however, explicitly claim that their account avoids such commitment (see, for instance, Morreau 2002: 342). I shall take a closer look at the ac-

¹⁰ For an exposition and assessment of the most significant attempts to rebut Evans' argument, see Noonan (2003: 112–117) and Curtis and Noonan (2014: 306–315).

count developed by Baker (2007, chapter 6), because it shows in detail how constitution can handle several distinct types of vagueness of objects.

Baker believes that the semantic account is insufficient to provide a plausible explanation of the indeterminacy of the sentences of ordinary language. Moreover, she provides two arguments for the existence of worldly vagueness. One is based on the idea that it is impossible to precisify our language *ad infinitum*, because there will always be some residual vagueness in our concepts (Baker 2007: 124–125). The other is based on taking natural science at face value when it informs us that natural processes occur independently of our concepts and have no precise beginnings and endings (Baker 2007: 126–127). Baker states that the interest in linguistic solutions to vagueness stems from the interest in formal semantics, but doubts that formal semantics is an end in itself (Baker 2007: 123).

Baker distinguishes and attempts to explain several kinds of worldly vagueness.

First, there is the vagueness of objects' spatial and temporal boundaries. For instance, it may be indeterminate whether a particular hair that is coming out of a dog is a constituent of the dog or not. The hair is a vague part of the dog. Or consider a house. There are a great number of aggregates of matter in the vicinity of the house and each of the aggregates is an equally good candidate for being the house. As a result, the house has a vague spatial boundary (Baker 2007: 129).

Baker analyses vague parts and vague boundaries in terms of the place-indexed existential predicate '*exist at p*'. 'It is indeterminate whether the hair is a part of the dog' means that it is indeterminate whether the dog exists at *p*, where *p* is the region of space occupied by the hair. If it is indeterminate where the boundaries of the house lie, it is indeterminate at which places the house exists. The indeterminacy of existence at *p*, however, presupposes that there are other *ps* where the object determinately exists (Baker 2007: 128), so no object can have vague parts or boundaries unless it definitely exists *simpliciter*. This claim helps Baker avoid the implication of vague existence that has been found to be unintelligible. On her theory, there are no vaguely existing entities. At most, there are entities existing vaguely at a place.

The vagueness of temporal boundaries is explained in a similar manner (Baker 2007: 130–131). Baker considers the construction of a model house. There seems to be no precise moment at which the model house comes into existence. Consider the moment when the constructor has put all the blocks together, but has not attached the roof, which is placed next to the unfinished structure. Call the moment *t*. According to Baker, there are two possible scenarios, and their realization depends on what happens later. If the construction of the house is completed at a later point in time, then it is indeterminate

whether there exists a house at t . If the house is never finished, then it is false that there exists a house at t . Again, the idea is that an object cannot have an indeterminate boundary unless it exists. In the temporal case, an object must exist at some time or other in order for it to be meaningful to say that it exists indeterminately at a particular time.

Second, there is vagueness in the relation of constitution, which comes in two types. It may be indeterminate whether the constitution relation obtains between an aggregate of matter and an object, or it may be indeterminate which aggregate of matter constitutes a given object. Baker accepts mereological universalism, according to which an aggregate is a mereological sum or fusion, and considers aggregates to be precise objects whose identity is wholly determined by the objects they contain (Baker 2007: 133). In contrast, ordinary macro-objects are vague in the manner indicated above.

Importantly, the vagueness of the constitution relation is used by Baker to account for the vagueness of spatial and temporal boundaries in the following manner. The vagueness of spatial boundaries is explained in terms of the indeterminacy as to which precise aggregate constitutes a given macro-object. Baker considers the case of Mt. Everest and asks whether it is identical to Schmeverest, which is supposed to be a mountain-shaped object that largely overlaps Everest, but includes a bit more of the foothills (Baker 2007: 133). We have seen that examples of this kind generate the puzzle of indeterminate identity. Is Everest the less inclusive object or the more inclusive one? Baker claims that on the constitution theory there is no puzzle. There is only one mountain, not many overlapping ones, so we do not have to decide which one Everest is. If we use the names 'Everest' and 'Schmeverest' in an ordinary manner, they both refer to the same mountain (Baker 2007: 134). The mountain is a vague object, so it has vague boundaries, but both names refer to the very same vague object. So, there is no indeterminate reference to a number of precise objects, as the linguistic account would suggest. The indeterminacy is located in the constitution relation: It is indeterminate which precise aggregate of matter constitutes the vague mountain. Further, we *might* use the names non-standardly, according to Baker, to refer not to the vague mountain, but to the precise aggregates. In that case the names would not refer to the same object, but to two aggregates that are determinately distinct (Baker 2007: 134).

This account shows that there is no commitment to indeterminate identity. The question 'Is Everest identical to Schmeverest?' either gets an affirmative answer if the names are used standardly to refer to the same vague object, or a negative one if they are used non-standardly to refer to aggregates. The answer also comes out negative if 'Everest' refers to the vague mountain and 'Schmeverest' to a precise aggregate. A vague object cannot be identical to a precise aggregate. The puzzling question of which aggregate of matter Ever-

est is identical to is simply misplaced on Baker's account. Ordinary objects are vague and they are never identical to precise aggregates. The relation between ordinary objects and aggregates is not identity, but constitution (Baker 2007: 134).

As for the vagueness of temporal boundaries, that is explained by the fact that sometimes it may be indeterminate whether an aggregate constitutes an object at all. Here Baker considers the construction of a house and focuses again on a moment at which a certain structure is built but the structure is not yet a definite house – call the moment t . It will be recalled that if the structure is never finished and turned into a complete house, then it is not true that at t it is indeterminate whether the house exists. It is only if the house is finished at a later moment t' that it may be indeterminate whether there exists a house at t . In that case there exists an aggregate of matter at t such that it is indeterminate whether the aggregate constitutes a house. If the house is not finished, the aggregate of matter still exists at t , but it definitely does not constitute a house, because it is not in the house-favourable circumstances (Baker 2007: 134). Baker emphasizes again that there is no problem of vague identity in this case: 'The house such that it is indeterminate that it exists at t is identical to the house such that it is determinate that it exists at t' '. Thus we do not need indeterminate identity statements that, as Gareth Evans showed, lead to contradiction when coupled with the thesis that there are vague objects' (Baker 2007: 131n).

This completes my exposition of Baker's constitution theory as applied to the phenomenon of vagueness of objects. Other constitution theorists propose similar solutions to the phenomenon. For example, Morreau writes:

Suppose there is a special relation of *constitution*, distinct from identity, in which, say, a statue stands to a quantity of bronze, or a cat to a quantity of animal tissue. Then material objects can be vague if they are indefinitely constituted by quantities of matter without being indefinitely identical to them. (Morreau 2002: 342)

Lowe, commenting on his solution to the Problem of the Many, cast in terms of the cat Tibbles and aggregates of feline tissue $c-c_n$, states:

... we can no longer insist that c [...] is indisputably the one and only constituter of Tibbles. But we needn't be driven to saying that Tibbles has *many* constituters: we can say that she has just *one* constituter, but that it is *indeterminate* whether this is c or a certain c_n . That is, we can say that it is neither determinately true nor determinately false that it is c , as opposed to c_1 or c_{153} or some other c_n , that constitutes Tibbles at present – though it *is* determinately true that just one of them does, because *whichever* candidate were chosen as occupying the role of constituter of Tibbles would exclude all others from that role. (Lowe 1995a: 180)

We can see that the general strategy of the constitution theorist is to change the perspective from which we assess the problematic cases. Instead of seeing the relationship between Everest and Schmeverest or Tibbles and an aggregate of feline tissue as a ‘horizontal’ relationship between objects of the same kind, and asking whether the relationship between them is identity or difference, we are advised to see the relationship as a ‘vertical’ one – between a ‘higher-level’ object and its ‘lower-level’ constituter – and ask whether the higher-level object is constituted by the lower-level one. We might be driven to the answer that the constitution relation is vague, but unlike the identity case, this is not a problem. Why not? It will be remembered that Evans’ argument shows that if we assume that *a* and *b* are indeterminately identical, then, paradoxically, they are distinct. But indeterminate constitution does not generate a similar paradox. One cannot construe an analogous argument from the assumption that *a* is indeterminately constituted by *b* to the conclusion that *a* is not constituted by *b* at all. Evans’ argument assumes that the indeterminately identical objects *a* and *b* will have distinct properties and then uses the contrapositive of Leibniz’s Law (the Non-Identity of the Dissimilar) to argue for the distinctness of their possessors. The indeterminately constituted object and the indeterminately constituting object will, undoubtedly, have different properties too. But this fact does not entail they cannot stand in the indeterminate constitution relation, because there is nothing like a law of the ‘Non-Constitution of the Dissimilar’ that would be analogous to the contrapositive of Leibniz’s Law to which Evans’ argument appeals.

In the next part I shall look more closely at whether the constitution theory can really meet the expectations that Baker claims it can. Is it really the case that analysing vagueness of objects in terms of the vagueness of constitution provides a plausible explanation that does not rely on the notion of vague identity? In particular, can the analysis that Baker offers be applied to all puzzling cases of indeterminate spatial and temporal boundaries that have been formulated in the relevant literature?

Constitution theory and the diachronic vagueness of objects

The claim I wish to defend in this section is that the success of the constitution theory in avoiding vague identity is only partial and results from the selection of relatively simple cases of vagueness. The constitution theory may account elegantly for the phenomenon of ‘fuzzy’ boundaries, but there are other cases of vagueness of objects’ boundaries that seem to pose a challenge to the constitution account. The most obvious examples come from some diachronic puzzle cases, real or fictional.

Let’s start with a real one, introduced to philosophical literature by Shoemaker (1963, reference adopted from Noonan (2003: 17)). The Santa

Trinita bridge in Florence was completed in 1569. In 1944 it was almost entirely destroyed by the German army. Photographs from the period show the remnants of the bridge piers buried in piles of debris. In 1958 the bridge was reconstructed. The builders used the original stones retrieved from the Arno River and new stones that were acquired from the same quarry as the original ones. The reconstructed bridge stands in Florence to this day. Is the new bridge the same as the old one? There are reasons we may cite in favour of the identity and there are reasons against. It seems that the identity of the old bridge and the new bridge is indeterminate.

Other philosophers provide fictional examples of the same phenomenon. Van Inwagen (1995: 241–242) imagines a person, Alpha, who enters a philosophical cabinet which induces dramatic changes in the person's composition. Van Inwagen, who believes that the criterion of personal persistence is the continuity of life, stipulates that the changes are so extensive that for some time there is no fact of the matter about whether life continues in the cabinet. Some time later a person, Omega, steps out of the cabinet. The question is whether Alpha is the same person as Omega. Since at one stage it is indeterminate whether there is a person in the cabinet at all, it seems that the identity is indeterminate.

Still other examples might be cited, such as the Brown–Brownson case from Shoemaker (1963, reference adopted from Noonan (2003: 4)) or the Methuselah case from Lewis (1983: 65). These differ slightly from the above examples in that throughout the changes that the given person undergoes there is always a person determinately present. But any of these examples will serve equally well to illustrate my point against the constitution theory. For convenience, I will work with the Alpha–Omega case.

So, how might we approach the case with the apparatus provided by Baker in the explanation of vague temporal boundaries? To make the case a bit more precise, let us stipulate that t_1 denotes the time when Alpha begins to exist, at t_2 Alpha is outside the cabinet, about to step in, at t_3 Alpha is dissolved inside the cabinet into a state of indeterminate existence, at t_4 Omega steps out of the cabinet and t_5 is a much later time when Omega has ceased to exist. Applying the constitution account to this case we obtain the following set of claims:

At t_1 , Alpha is constituted by the aggregate of matter A_1 .¹¹ At t_2 , Alpha is constituted by the aggregate A_2 (plausibly assuming that the matter that constitutes Alpha has changed since she began to exist, A_1 is distinct from A_2). At t_3 , it is indeterminate whether Alpha exists: Inside the cabinet, there

¹¹ For the sake of simplicity, I will assume that, at each t , the objects that definitely exist at t are spatially precise, that is, constituted by a single precise aggregate of matter.

are numerous aggregates of matter $A_{3,1}$ – $A_{3,n}$ such that it is indeterminate whether any constitutes Alpha (Baker is a universalist about composition, so any fusion of particles inside the cabinet will compose an aggregate). So far, this account does not substantially differ from Baker's own account of vague temporal boundaries. Since Alpha definitely exists at t_1 and t_2 , it is no problem to say that Alpha indeterminately exists at t_3 . We have seen that, on Baker's theory, indeterminate existence at a time presupposes determinate existence at another time. This state of affairs meets this condition; Alpha has a vague ending.

We can now construct a similar account of Omega's history. At t_4 Omega definitely exists and is constituted by A_4 . At t_5 Omega has ceased to exist, which means that, determinately, no aggregate constitutes Omega at t_5 . What about t_3 ? Well, at t_3 it is indeterminate whether Omega exists. There are numerous aggregates of matter in the cabinet, which we have already designated $A_{3,1}$ – $A_{3,n}$, such that it is indeterminate whether any constitutes Omega. Again, it is no problem to say that it is indeterminate whether Omega exists at t_3 , because Omega definitely exists at t_4 . So, Omega is an object with a vague beginning.

Now, we have already learned that questions such as whether Alpha is identical to or different from aggregate A_1 at t_1 are misplaced. Constitution is not identity and the constituted object is never identical to the constituting aggregate. But what about the relation between Alpha and Omega? The constitution theorist was able to avoid commitment to vague identity by replacing the 'horizontal' perspective on the relationship between objects and aggregates with the 'vertical' view of the relation of an object to its constitutor. But a similar move is not available in this scenario, because the relation between Alpha and Omega is clearly a horizontal, 'object–object' relationship and it would not make any sense to see it as a vertical, 'object–constitutor' relationship.

The problem can be described in a different manner, from the perspective inside the cabinet. Suppose that t_{3^*} is a moment after the dissolution into indeterminacy is over and a person definitely exists inside the cabinet again. Then there are two candidate states of affairs inside the cabinet at t_{3^*} such that it is indeterminate which of them obtains. In the first situation none of aggregates $A_{3,1}$ – $A_{3,n}$ constitute Alpha at t_{3^*} , but one of these aggregates constitutes Omega at t_{3^*} . This is the situation in which Alpha has ceased to exist and Omega has come into being. In the second situation the same aggregate constitutes both Alpha and Omega. In that case Alpha has not ceased to exist and persists with another name. Since we do not know which of these two states of affairs obtain at t_{3^*} , we cannot tell whether Alpha and Omega are the same person. And it is of no help to be told that in any of those situations the objects inside the cabinet are determinately distinct from the aggregates

inside the cabinet. The point is that it seems quite natural to say that if no aggregate constitutes Alpha, but one aggregate constitutes Omega at t_3^* , then Omega is not identical to Alpha, and if the same aggregate constitutes Alpha and Omega at t_3^* , then Omega is identical to Alpha. (Also note that this is perfectly in tune with clause (2) of Baker's definition of constitution, which excludes the possibility of a single aggregate constituting two numerically distinct objects.) But since it is indeterminate which state of affairs obtains, it is indeterminate whether Omega is identical to Alpha.

Or consider assessing the scenario from the perspective of t_4 , when Omega steps out of the cabinet. Since it is indeterminate whether Alpha survives the dissolution at t_3 , it is indeterminate whether any aggregate at t_4 constitutes Alpha. In particular, it is also indeterminate whether A_4 constitutes Alpha at t_4 . But A_4 determinately constitutes Omega at t_4 . If A_4 determinately constitutes Omega and it is indeterminate whether it constitutes Alpha, it seems inevitable to conclude that it is indeterminate whether Omega is Alpha.

In conclusion, the question of identity between Alpha and Omega remains unresolved in this scenario even if we recast the relationship between objects and aggregates in terms of constitution, because Alpha and Omega are two objects of the same kind that are clearly not related by constitution, and the indeterminacy regarding which aggregates constitute them throughout their careers only suggests that they stand in the relation of indeterminate identity.

Possible defensive strategies

What could the proponent of the constitution theory say in response? Let me immediately set aside one possible reply. The proponent might claim that the constitution theory is primarily a theory of synchronic relation between objects and matter and was not developed to deal with diachronic identity issues. So, it is inappropriate to demand that it deals with diachronic identity puzzles such as the Alpha–Omega case.

This response is insufficient for two reasons. First, Baker clearly used the constitution theory to deal with diachronic vagueness when she set out to explain vague beginnings and endings of ordinary objects. The problem is that vague beginnings and endings do not constitute the only cases of diachronic vagueness of objects. As we have seen, there are cases that we might call 'mid-extension' vagueness, in which there is a determinately existing object at the beginning and at the end, but 'its' temporal extension is disrupted by a period of vagueness. The constitution theory should be able to give us a verdict in this case and, it seems, the verdict must be that these are cases of vague identity.

The second reason is that ‘mid-extension’ vagueness can occur in synchronic, or spatial, cases as much as in diachronic ones. Consider Mount Ushba, one of the most remarkable peaks in the Caucasus Mountains. There is a deep saddle at the top of the mountain that divides two massive summits. The mountain actually bears a single name, but one might plausibly claim that if the saddle were a bit deeper, it would be indeterminate whether there was a single mountain or two distinct mountains (call them Beta and Gamma). In that case it would be indeterminate whether Beta extends through the saddle all the way to the exterior boundary of Gamma or whether it ceases to exist somewhere at the saddle, and *vice versa* for Gamma. Again, it would seem to be of no use to be told that the indeterminacy consists in it being indeterminate which aggregate constitutes Beta and which constitutes Gamma. If different aggregates constitute Beta and Gamma, the most natural description is that Beta is not (identical to) Gamma, and if the same aggregate constitutes both Beta and Gamma, the most natural description is that Beta is (identical to) Gamma. But since it is indeterminate which aggregates constitute Beta and Gamma, the most natural description is, again, that the identity of Beta and Gamma is indeterminate. So there are spatial ‘mid-extension’ vagueness cases as well as temporal ones and the constitution theorists cannot rebut the challenge by pointing out that the theory has been designed to deal with spatial vagueness only.

For simplicity, in what follows I will focus on the temporal cases only and continue assessing the Alpha-Omega case. To avoid the conclusion that the relationship between Alpha and Omega is that of vague identity, the constitution theorist would have to show convincingly that Alpha and Omega are either determinately distinct or determinately identical. Let us now consider these two possibilities.

Could it be claimed that Alpha and Omega are distinct objects? There is one strategy it seems the constitution theorist might adopt to justify this claim. Some commentators have pointed out that Evans’ argument falsely associates the notion of vague identity with the notion of vague objects. For instance, Tye (1990: 555–557) argues that there might be vague objects even if identity is always precise. Each vague object is determinately identical to itself and determinately distinct from any other vague object, because they differ in properties (such as the ones referred to in Evans’ argument). Morreau also objects to the association of vague identity with vague objects: ‘The main problem with the argument from definite identities is just that there is no reason to think that things with fuzzy boundaries must have indefinite identities. Strangely, Evans did not even try to show that they must; perhaps it did not occur to him that having a fuzzy boundary and having an indefinite identity might be different things’ (Morreau 2002: 338).

So perhaps the defender of the constitution account could claim that there are two distinct temporally vague objects in the Alpha–Omega case. After all, they differ in their properties. Alpha is such that it determinately exists from t_1 to t_3 and it is indeterminate whether it exists after t_3 . Omega, in contrast, is such that it determinately exists after t_3 , but it is indeterminate whether it exists before t_3 . So Alpha and Omega are distinct vague objects that differ with respect to the temporal location of their determinate and indeterminate existence.

The problem is that this supposition seems to be in tension with clause (2) of Baker’s account of constitution. The clause states that one aggregate of matter cannot simultaneously constitute two numerically distinct objects of the same kind. Consider A_4 at t_4 . We have supposed that this aggregate determinately constitutes Omega at t_4 , but we have also supposed that, since it is indeterminate whether Alpha exists at t_4 , it is indeterminate whether A_4 also constitutes Alpha at t_4 . Now add to this the supposition currently under consideration that Alpha and Omega are numerically distinct objects. This situation does not directly contradict clause (2), but it makes one wonder: How could a single aggregate of matter determinately constitute one object (Omega) and indeterminately constitute a numerically distinct object (Alpha) of the same type? If Alpha is an object distinct from Omega and if it is indeterminate whether it exists at t_4 , it seems that aggregate A_4 would have to do just that. And it would seem that someone who proposed that an aggregate cannot constitute two distinct things of the same kind at the same time should also hold to this principle even if the existence of one of the objects is indeterminate.

The other possible strategy is to claim that Alpha and Omega are identical. Here the proponent of this reply might attempt to model this case along the lines of the Everest–Schmeverest case and claim that ‘Alpha’ and ‘Omega’, when used standardly, determinately refer to the very same vague object, let us call it Almega, and that the vagueness consists in what constitutes the vague object. But this latter clause is where things get tricky for this sort of reply.

The reason is, of course, that now we are not talking about an object at a particular time, but an object spanning a period of time. So we cannot locate its temporal vagueness in the indeterminacy regarding which single aggregate of matter constitutes it at a particular time. Rather, the proponent of such a reply must begin to speak of precise *series of aggregates* and say that the vagueness of the object consists in its being indeterminate which such series of aggregates constitutes the object throughout its career.¹²

¹² See Lowe (2005) for an account of how one might construe such series.

The problem is that such an account would commit its proponents to truly bizarre objects. The ‘Everest–Schmeverest’ object may be strange, but not beyond comprehension. After all, the two aggregates denoted by the names ‘Everest’ and ‘Schmeverest’ (when used non-standardly, as Baker points out) massively overlap and only differ in the spatial boundary at the foot. As a result, it is not so difficult to imagine that there is just one object with a somewhat fuzzy lower boundary.

In contrast, *Almega*, if there were such an object, would really challenge our imagination. It would be an object whose temporal vagueness consists in the indeterminacy between three careers: the career of an object spanning from t_1 to t_3 (only the determinate career of *Alpha*), the career of an object spanning from t_3 to t_5 (only the determinate career of *Omega*) and the career of an object spanning all the way from t_1 to t_5 (the career of the whole *Almega*). To each of these careers there would correspond a precise series of aggregates, constituting the object throughout the given period of time. The bizarreness of the object may most clearly be seen from the perspective of t_3 . The temporal vagueness of *Almega* entails that it either a) ceases to exist at t_3 , or b) begins to exist at t_3 , or c) exists at t_3 . Now *that* is really mysterious.

Moreover, it could be shown that on this analysis *Almega* would only exist indeterminately throughout its career, because at each point of its career it would exist if constituted by some aggregates, but it would not exist if constituted by others. Take, for instance, t_2 and call the three series corresponding to the three careers listed above SA, SO and SA/O, respectively. If *Almega* is constituted by SA or SA/O, then it exists at t_2 , but if it is constituted by SO, then it does not. Since analogical results can be reached for each t , it follows that at no time *Almega* exists determinately. But we have seen that Baker insists that an object can only exist indeterminately at t if it determinately exists at some other time.¹³

There are further problems with this proposal. Explaining temporal vagueness by positing multiple series of aggregates such that it is indeterminate which series constitutes the vague object over time is reminiscent of the perdurantist analysis of temporal vagueness. According to perdurantism, or the doctrine of temporal parts, objects persist through time by having temporal parts at different times. Just as a statue exists in space by having different parts at different spatial points, according to perdurantists it exists in time by having different parts at different temporal points. So when you observe a statue at t^* , you are observing it by observing one temporal part of it. But the whole statue is not located at t^* ; it is an object located in a sequence of times. Perdurantism is commonly associated with mereological universalism. That

¹³ I am indebted to an anonymous reviewer for deriving this implication of the suggested solution.

means that any two temporal parts compose a temporally extended object. For instance, there is an object consisting of the Eiffel Tower at t_1 and the statue of David at t_2 . Most of these objects are utterly uninteresting and never acquire a name in language. But, nevertheless, their ontological status is the same as that of everyday persisting objects such as statues or towers. Applied to the problem of vague beginnings, for instance, the perdurantist would say that where we believe there is an object with a vague temporal boundary, there are, in fact, a great number of distinct perduring objects which differ only with respect to the precise moment when they begin to exist.

The similarity between the perdurantist analysis of temporal vagueness and the analysis in terms of series of aggregates lies in the following observation: It seems that the series of aggregates that constitute persisting objects, according to the version of constitution theory currently under consideration, serve the same function as the perduring objects of the perdurantist. If a perdurantist wished to provide a metaphysical account of Almega, she might say that the vagueness of the object consists in there being three distinct perduring objects (an object existing from t_1 to t_3 , an object existing from t_3 to t_5 and an object existing from t_1 to t_5), and it is metaphysically unsettled which of these objects Almega is. The key problem is that perdurantists posit the multitude of perduring objects precisely so that they can avoid recognizing genuinely vague objects. Positing a great number of precise perduring objects where we believe there is a single object with vague temporal boundaries enables the perdurantist to say that the term denoting such an object, e.g., 'David', is referentially indeterminate among the various perduring objects, without the need to postulate controversial vagueness in objects. So the multiplicity of precise perduring objects that the perdurantist posits can be regarded as the cost of being able to avoid genuinely vague objects and treat vagueness as a linguistic phenomenon only.

Now, if the constitution theorist needs to posit series of aggregates in order to explain the temporal vagueness of Almega, it would seem to be more reasonable for her to give up on a metaphysical analysis of vagueness and opt for a linguistic account, because she has already paid the ontological price. She could simply claim that the names 'Alpha' and 'Omega' are referentially indeterminate among distinct series of aggregates and that the indeterminacy of the identity statement 'Alpha = Omega' boils down to the fact that on some sharpenings of the meanings of the names they denote distinct series and on others they denote the same single series, so that the names are thus indeterminate in reference but there is no vagueness in the denoted objects. But, instead, the constitution theorist claims that the names denote the same vague object, Almega, and the vagueness of the object consists in its being unsettled which series of aggregates constitutes the object in its career. This is clearly the less parsimonious solution to the problem, because it postulates

vague objects as *sui generis* entities in addition to a multiplicity of precise series of aggregates.

It seems, then, that the constitution theorist cannot easily use any of the defensive strategies sketched above. She cannot say that Alpha and Omega are distinct vague objects unless she is prepared to accept that one aggregate can determinately constitute an object while indeterminately constituting a different object of the same kind. She cannot say that Alpha and Omega are the same vague object and that this object's vagueness resides in the vagueness of constitution. That answer would seem to require the postulation of truly bizarre objects and, in addition, a plurality of series of aggregates that seems to undermine the rationale for a metaphysical analysis of temporal vagueness in the first place. And, finally, she cannot say that the constitution theory was not designed to deal with temporal vagueness and should not be held accountable for failing to do so. The theory has actually been applied to temporal vagueness. Also, as I have attempted to show, the theory generally fails to account for 'mid-extension' vagueness, which can be found in spatial as well as temporal cases.

The constitution theorist is left with solutions that will all seem unsystematic. She can argue that there is, in fact, no 'mid-extension' vagueness. She could say that, in fact, there is always a single determinate answer as to whether an object with a seemingly indeterminately disrupted extension ceases to exist or persist, but that it may be beyond our abilities to ever discover this answer. Or she could opt for the perdurantist solution and claim that vagueness in these respects is merely linguistic. In any case, these solutions would be unsystematic, because they would analyse simple cases of spatial and temporal vagueness (such as vague beginnings and endings of objects) in terms of constitution theory, and utilize a different theory to account for 'mid-extension' vagueness.

One final solution might be adopted by the constitution theorist: To concede that it is not really the case that accepting the constitution theory means we can avoid the problematic concept of vague identity, and then to argue, as some have done, that vague identity is less problematic than we think. This is the solution that seems to have been endorsed by Lowe, and I believe it is a better one.¹⁴

¹⁴ I would like to thank the Czech Science Foundation (GAČR) for supporting this paper with grant no. 17-12551S.

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