The Argument from Determinate Vagueness

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Introduction

The argument from vagueness (Lewis 1986; Sider 1997, 2001) has had a tremendous influence in discussions about the metaphysics of material objects.[1] If successful, it serves as a refutation of the intuitive claim that composition is restricted (some pluralities of objects have a fusion and some don't) and forces us to endorse one of two radical views: compositional nihilism (no plurality of objects has a fusion) or compositional universalism (every plurality of objects has a fusion). The argument from vagueness goes, very roughly, as follows:

P1	If composition is restricted, then composition is vague.
P2	If composition is vague, then existence is vague.
P3	Existence is not vague.
C	Composition is not restricted.

The most popular way of resisting this argument consists in rejecting its third premise and maintaining that existence can indeed be vague (van Inwagen 1990: ch 19, Hawley 2002, Smith 2005, Koslicki 2008: ch 2, Båve 2011, Barnes 2013, Korman 2015: ch 9, Torza 2017, Russell ms). Let's call this approach *indeterminism*. In this paper, I argue that indeterminism is ineffective as a response to vagueness-based objections against restricted composition. To that end, I formulate a new objection of that sort, the argument from *determinate* vagueness, and show that indeterminists lack the resources to respond to it. The argument from determinate vagueness goes, very roughly, as follows:

P1-det	If composition is restricted, then composition is *determinately* vague.
P2-det	If composition is *determinately* vague, then existence is *openly negatively* vague.
P3-det	Existence is not *openly negatively* vague.
C	Composition is not restricted.

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[1] For an overview of discussions about the argument from vagueness, see Korman 2010 and Korman & Carmichael 2016: sections 3 and 4.

The paper is structured as follows. In section 1, I present the standard version of the argument from vagueness as well as the indeterminist response. In section 2, I introduce a new way of understanding vague existence and distinguish between two varieties: positive and negative. In section 3, I use this conception of vague existence to formulate and defend the argument from determinate vagueness. In doing so, I show that the rejection of what I call *openly negatively vague existence* follows from premises most indeterminists should be happy to accept. I conclude by discussing the implications of the failure of indeterminism for ontological debates.

Section 1: Indeterminism and the Argument from Vagueness

This section presents Sider's version of the argument from vagueness (1997: 214-222, 2001: 120-132) and the indeterminist response (van Inwagen 1990: ch 19, Hawley 2002, Smith 2005, Koslicki 2008: ch 2, Båve 2011, Barnes 2013, Korman 2015: ch 9, Torza 2017, Russell ms).

1.1. Preliminaries

Let me start by clarifying what is meant by 'vague composition' and 'vague existence' in the argument.

Vague Composition

Consider the following case:

> *Vague Composition*
>
> A few minutes ago, you took some pieces of wood aa and started building a chair. The current arrangement of aa is such that it is not determinate that there is something that is a fusion of aa and it is not determinate that nothing is a fusion of aa. In other words, it is vague whether aa have a fusion.[2]

Two features of aa make them a case of vague composition in the intended sense. I have already stated the first: it is vague whether aa have a fusion. To understand the second, it is helpful to consider a different case:

> *Vague Composition**
>
> Yesterday you built a table from some pieces of wood bb. A few minutes ago, you started separating one of bb from the table. Call that piece b_1. The current arrangement of bb is such that it is vague whether b_1 is a part of the table. So, since b_1 is one of bb, it is vague whether the table is a fusion of bb (for short, the table is a *borderline fusion* of bb). This results in it being vague whether bb have a fusion.

[2] As usual, I assume that 'it is vague whether p' is equivalent to 'it is not determinate that p and it is not determinate that not p'.

What is the difference between aa in *Vague Composition* and bb in *Vague Composition**? According to Sider, whereas there is a determinate connection between there being a fusion of aa and the number of concrete objects, the same is not true about bb. Thus, by a case of vague composition Sider means some xx such that (i) it is vague whether xx have a fusion and (ii) for some number n, it is determinate that [xx have a fusion iff there are exactly n concrete objects] (xx are *numerically relevant*, for short). As we will see, the notion of numerical relevance will play an important role in Sider's argument when it comes to establishing the link between vague composition and vague existence.[3]

Vague Existence

On Sider's original presentation of the argument as well as in most of the subsequent literature, the phrase "existence is vague" is interpreted as expressing the claim that the unrestricted existential quantifier ('$\exists$' or '*something*', from now on) has multiple precisifications.

The idea of a precisification is now mainstream in discussions about vagueness. Though I will have more to say about precisifications in 1.3, it is enough for our current purposes to say that something is a precisification of a linguistic expression E just in case it is vague whether it is the meaning of E. Consider, for instance, the predicate 'tall'. For multiple numbers n, it is vague whether 'tall' means *being at least n cm tall*. So, for each of those numbers n, the property *being at least n cm tall* is a precisification of 'tall'.[4]

This thought can be extended to linguistic expressions from other syntactic categories. Relevant to our purposes are the case of vague quantifiers and that of vague sentences. Consider the quantifier 'many dogs'. We can think of its precisifications as second-order properties. More specifically, as second-order properties of the form *at least n dogs*.[5] Some sentences also have multiple precisifications, which can be identified with propositions. For instance, the sentence 'Bob is tall' has as precisifications propositions of the form *Bob is at least n cm tall*.

[3] Two clarifications are in order. First, Sider stipulates that, for the purposes of the argument, to be concrete is to not belong to such categories as sets, classes, numbers, properties, etc. (2001: 127) Thus, the notion of concreteness deployed in the argument from vagueness is closer to Williamson's notion of non-abstractness (2013: ch 1) than to common-sense concreteness. Second, what Sider actually assumes is that there are possible worlds that contain numerically relevant pluralities. This is required in order to avoid the worry that the number of concrete objects in the actual world might be infinite, in which case there would be no numerically relevant pluralities (2001: 127). Taking this into account would make my presentation of Sider's argument even more convoluted, so I will skip it. As we will see in section 2, my preferred way of understanding vague composition doesn't appeal to the notion of numerical relevance and hence, makes the appeal to possible worlds unnecessary.

[4] Notice that this way of understanding precisifications is neutral with respect to the question whether vague expressions have a privileged precisification that is its meaning. Moreover, we can modify it slightly in order to make it compatible with ontic accounts of vagueness on which, for instance, vague predicates determinately express vague properties. We start with a precisification relation between precise properties and vague properties (e.g. P_1 is a precisification of P_2 iff it is vague whether P_1 and P_2 are necessarily coextensional). Then, one defines a precisification* of a vague predicate as a precisification of the vague property it expresses.

[5] This is strictly inconsistent with the claim that a precisification of a quantifier is a domain, but not with the claim that it is *associated* with one, which is what Sider need for his argument. See 1.4.

Now that we have specified what Sider means by 'vague composition' and 'vague existence', we can reformulate the argument from vagueness as follows:

P1 If composition is restricted, then, for some xx, (i) it is vague whether xx have a fusion and (ii) xx are numerically relevant.
P2 For any xx, if (i) it is vague whether xx have a fusion and (ii) xx are numerically relevant, then '∃' has multiple precisifications.
P3 '∃' doesn't have multiple precisifications.
C Therefore, composition is not restricted.

The argument is clearly valid. Let's now consider Sider's defense of each of its premises.

1.2. Sider on Restricted Composition and Vague Composition

Sider assumes that it is intuitive that there are many numerically relevant pluralities. Indeed, he assumes that, given restricted composition, there are enough numerically relevant pluralities to form a series xx_1-xx_n satisfying the following conditions:

(1) It is determinate that xx_1 don't have a fusion.
(2) It is determinate that xx_n have a fusion.
(3) For any i, xx_i differ from xx_{i+1} very slightly with respect to the features intuitively relevant for determining whether some objects have a fusion (e.g., qualitative homogeneity, spatial proximity, unity of action, etc.).[6]

Sider calls this a *continuous series*. Here is an example of such a series. Take the pieces of wood aa we introduced before and suppose that the process whereby they are assembled into a chair goes from t_1 to t_n. Now consider a series of pluralities cc_1-cc_n such that, for any i, cc_i resemble aa at t_i with respect to the features intuitively relevant for composition. cc_1-cc_n is an example of a continuous series.[7]

Now we can state Sider's argument for P1 as a reductio. Suppose P1 is false. So, (A) composition is restricted and (B) for any xx, either (i) it is not vague whether xx have a fusion or (ii) xx are not numerically relevant. As we said before, (A) entails that there is at least one continuous series of numerically relevant pluralities. Given (B), any xx in a continuous series of numerically relevant pluralities must be such that it is not vague whether xx have a fusion. However, in order for that to be the case, there would have to be a determinate cut-off point in every continuous series of numerically relevant pluralities. That is, some xx_i such that, it

[6] Notice that accepting the existence of continuous series of numerically relevant pluralities doesn't require accepting that such factors as qualitative homogeneity or spatial proximity are indeed relevant for composition. This is because condition (3) only requires that each member of a continuous series resemble the adjacent member with respect to features that are *intuitively* relevant for composition. Thus, this shouldn't alarm defenders of restricted composition who endorse non-conservative theories of composition (e.g., van Inwagen 1990, Merricks 2001).
[7] The non-conservative defenders of restricted composition who deny that objects arranged chair-wise have a fusion should feel free to adopt a different example. For instance, one involving objects arranged person-wise.

is determinate that xx_i don't have a fusion and it is determinate that xx_{i+1} have a fusion.[8] Sider argues that such a determinate cut-off point would be metaphysically arbitrary, a result which he believes should be avoided. Therefore, we should accept P1.

Philosophers have challenged this line of reasoning in two different ways. On the one hand, Chad Carmichael (2001) and Timothy Williamson (2013: ch. 1, note 9) have argued that when it is vague whether xx have a fusion, xx are not numerically relevant. This is because, when it is vague whether xx have a fusion, there is a concrete object that is a borderline fusion of xx. In that sense, all the alleged cases of vague composition are indeed like bb in *Vague Composition** and hence, not numerically relevant. Therefore, composition can be restricted without there being cases of vague composition in the intended sense.[9]

On the other hand, Ned Markosian (1998), Trenton Merricks (2005) and John Hawthorne (2006: ch. 6) have explored pictures on which continuous series contain determinate cut-off points that are not metaphysically arbitrary. For instance, on Merricks' view, having a fusion is determinately correlated with having non-redundant causal powers. Since *having non-redundant causal powers* determines a determinate cut-off point that is not metaphysically arbitrary, so does *having a fusion*.

Since the goal of this paper is not to defend the argument from vagueness as a whole, but to argue that accepting that existence is vague is not a good way to resist it, I will set aside these challenges and assume that the argument above succeeds in establishing the truth of P1. I will make a similar move in my defense of P1-det in 3.1.

1.3. Sider on Vague Composition and Vague Existence

Sider's argument for P2 proceeds in two steps. Here is the first one. Take some arbitrary xx and assume they are a case of vague composition. That is, (i) it is vague whether xx have a fusion and (ii) for some number n, it is determinate that [xx have a fusion iff there are exactly n concrete objects]. From (ii), it follows that, for some number n, if it is vague whether xx have a fusion, then it is vague whether there are exactly n concrete objects.[10] From this claim

[8] Here is why. Suppose that, for any xx in xx_1-xx_n, it is not vague whether xx have a fusion. This entails that either (i) it is determinate that xx_2 have a fusion or (ii) it is determinate that xx_2 don't have a fusion. If (i) is true, then xx_1 is a determinate cut-off point. That means we already have the result we wanted. Assume then that (ii) is true. Since it is never vague whether xx_i have a fusion, either (iii) it is determinate xx_3 have a fusion or (iv) it is determinate that xx_3 have a fusion. As before, if (iii) is true, then xx_2 is a determinate cut-off point. Assume then that (iv) is true. We keep applying this reasoning until we find a determinate cut-off point. We are guaranteed to find one since the last element of the series, xx_n, determinately has a fusion. Thus, we conclude that, if a continuous series doesn't contain any xx such that it is vague whether xx have a fusion, then it contains a determinate cut-off point.

[9] Williamson's view is more general. For him, even if it is not vague whether xx have a fusion, xx are not numerically relevant. This is because, on his neccesitist picture, if there could have been a fusion of xx, then there is an object that could have been a fusion of xx.

[10] This reasoning relies on the following principle:

Det-Vag If it is determinate that [p iff q], then [if it is vague whether p, then it is vague whether q].

Det-Vag is derivable from the principle *K-det*:

and (i), it follows that, for some number n, it is vague whether there are exactly n concrete objects.

Sider's next step relies on a principle connecting the vagueness of a claim with the vagueness of its constituents. Before introducing this principle, I should come back to precisifications and mention two features of theirs which will be relevant for our purposes. First, precisifications are compositional, in the sense that a precisification of a complex expression is constituted by precisifications of the constituents of that expression. For instance, a precisification of the sentence 'some cat is big' is constituted by precisifications of 'some', 'cat' and 'big'.[11] Second, there is an intimate connection between precisifications and vagueness operators. If is it vague whether Bob is tall, then the sentence 'Bob is tall' has at least one true precisification and at least one false precisification. On the other hand, if it is determinate that Jane is tall, then every precisification of 'Jane is tall' is true.

Sider's principle can be formulated as follows (where '$\{c^1, c^2, \ldots, c^n\}$' stands for a sentence that has only c^1, c^2, …, c^n as constituents):

Precisifications If the claim that $\{\exists, c^1, c^2, \ldots, c^n\}$ is vague and each of c^1, c^2, …, c^n lacks multiple precisifications, then '$\exists$' has multiple precisifications.

Sider doesn't say much in defense of *Precisifications*. Since this principle will play an important role in my defense of the argument from determinate vagueness, it would be helpful to fill that gap. We can argue for *Precisifications* as follows. Assume it is vague whether $\{\exists, c^1, c^2, \ldots, c^n\}$. As explained above, if a claim is vague, then it has a true precisification and a false one. So, $\{\exists, c^1, c^2, \ldots, c^n\}$ has a true precisification and a false one. We also know that each precisification of a claim is constituted by precisifications of the constituents of that claim. So, every precisification of $\{\exists, c^1, c^2, \ldots, c^n\}$ is constituted by a precisification of each of $\exists$, c^1, c^2, …, c^n. So, there are two propositions $\{\exists_1, c_1^1, c_1^2, \ldots, c_1^n\}$ and $\{\exists_2, c_2^1, c_2^2, \ldots, c_2^n\}$ such that one is true and the other is false. Since each of c^1, c^2, …, c^n lacks multiple precisifications, for any i, c_1^i and c_2^i are the same. Thus, $\{\exists_1, c_1^1, c_1^2, \ldots, c_1^n\}$ and $\{\exists_2, c_2^1, c_2^2, \ldots, c_2^n\}$ can only differ with respect to which precisification of '$\exists$' they contain. So, '$\exists$' must have multiple precisifications.

With *Precisifications* at his disposal, Sider argues for P2 as follows. Suppose that, for some number n, the claim that there are exactly n concrete objects is vague. Such a claim can be

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K-det If it is determinate that [if p, then q], then [if it is determinate that p, then it is determinate that q].

Throughout the paper, I'll be assuming *K-det* and also *T-det*:

T-det If it is determinate that p, then p.

I'll also assume that these principles are determinately true, determinately determinately true, …, etc. The same goes for all logical truths.

[11] This thought can be expressed without appealing to the ideology of constituents, which seems to presuppose a structured picture of propositions. One can say that every proposition that is a precisification of 'some cat is big' *results* from precisifications of 'some', 'cat' and 'big'. I will continue using the ideology of constituents for the sake of convenience.

expressed using only '$\exists$', the identity sign, logical connectives and the concreteness predicate.[12] Sider assumes that the identity sign, the logical connectives and the concreteness predicate lack multiple precisifications.[13] So, given *Precisifications*, the vagueness of the numerical claim entails that '$\exists$' has multiple precisifications.

1.4. Sider Against Vague Existence

Let's now consider Sider's argument for P3. Here is Sider:

> Imagine there are two second-order properties, $\exists_1$ and $\exists_2$, which allegedly are precisifications of '$\exists$'. $\exists_1$ and $\exists_2$ need to differ in their domain. Thus, there must be some thing x that is in the domain of one but not the other. But in that case, whichever lacks x in its domain will fail to be an acceptable precisification of the unrestricted quantifier. It quite clearly is restricted since there is something that fails to be in its domain. (adapted from 2001: 128-129)[14]

Sider's argument can be understood as relying on two principles, both of which impose restrictions on the kind of second-order properties that can be precisifications of '$\exists$':

Domains If '$\exists$' has two different precisifications, call them $\exists_1$ and $\exists_2$, then something is in $\exists_1$'s domain but not in $\exists_2$'s domain or vice versa.

Unrestricted If a second-order property is a precisification of '$\exists$', then everything is in its domain.

With these principles at hand, Sider's argument proceeds as follows. Suppose '$\exists$' has at least two precisifications. Given *Domains*, there are two second-order properties $\exists_1$ and $\exists_2$ such that something is in $\exists_1$'s domain but not in $\exists_2$'s domain or vice versa. Let's say, without loss of generality, that something is in $\exists_1$'s domain but not in $\exists_2$'s domain. So, something is not in $\exists_2$'s domain. However, since $\exists_2$ is a precisification of '$\exists$', *Unrestricted* tells us that everything is in $\exists_2$'s domain. We have reached a contradiction. So, we conclude that '$\exists$' doesn't have multiple precisifications. That is, P3 is true.

1.5. Indeterminism

It is now time to introduce the target of this paper: indeterminism. After some clarification about the scope of my project, I summarize the indeterminist response to Sider's argument against vague existence.

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[12] For instance, if the relevant number is 2, then the claim could be formulated as follows: $\exists x \exists y \left(Cx \wedge Cy \wedge x \neq y \wedge \forall z\left(Cz \rightarrow (z = x \vee z = y)\right)\right)$.

[13] Notice that Sider's assumption that *being concrete* is precise is plausible given his understanding of *concreteness* as *non-abstractness*. See note 3.

[14] Here I take Sider's argument as trying to establish that '$\exists$' can't have multiple precisifications. The argument is sometimes interpreted as trying to establish that we can't describe such precisifications.

Vague Existence

In the Introduction, I characterized indeterminism as the view that vagueness-based objections against restricted composition fail because existence is vague. Then, at the beginning of this section, I said that the phrase “existence is vague” in Sider’s argument is to be understood as expressing the claim that ‘∃’ has multiple precisifications. This suggests that to be an indeterminist, one must accept such a claim. However, whereas some indeterminists forcefully endorse it (e.g., Barnes, Båve, Russell), others don’t directly discuss it or remain neutral about it (e.g., van Inwagen, Hawley) and some even reject it (e.g., Korman). Thus, we seem to end up with a rather narrow conception of indeterminism and hence, of the scope of this paper.

I suggest we deal with this complication as follows. Indeterminism is more appropriately characterized as the view that the argument from vagueness fails because existence is vague *in whatever sense is entailed by restricted composition*. In addition to their core proposal, an indeterminist might have a view about what sense of vague existence is entailed by restricted composition. On Korman’s view, for instance, restricted composition entails that numerical sentences are vague, but doesn’t entail anything about the precisifications of ‘∃’.

Due to an extra commitment of that sort, I disagree with some indeterminists not only about their core proposal, but also about some of the consequences of restricted composition. For instance, unlike Korman, I do believe that restricted composition entails something about the precisifications of ‘∃’. This is because, on my view, the move from restricted composition to claims about the precisifications of ‘∃’ relies on independently plausible principles (e.g., *Precisifications*).[15] In light of this remarks, I take my criticism to apply to anyone who is an indeterminist and accepts independently plausible principles.

Indeterminism and Sider’s Argument

Sider’s argument against vague existence relies on two principles: *Domains* and *Unrestricted*, both of which have been challenged by indeterminists.

Barnes’ challenge against *Domains* starts with a scenario where a determinately exists and it is vague whether b exists. In such a scenario, we have two precisifications for ‘∃’, $\exists_1$ and $\exists_2$, such that $\exists_1$ quantifies over a and $\exists_2$ quantifies over a and b. She argues that *Domains* fails in this scenario. This is because, since it is vague whether b exists, it is also vague whether $\exists_2$ is even associated with a domain, since domains contain only existing things. This in turn results in it being vague whether $\exists_1$ and $\exists_2$ have different domains.

On the other hand, Russell argues that *Unrestricted* begs the question against the indeterminist. To see why, consider an analogous principle about ‘red’:

Redness — If a property is a precisification of ‘red’, then it is instantiated by every red thing.

[15] I say “something about the precisifications of ‘∃’” and not “that ‘∃’ has multiple precisifications” because my own version of the argument from vagueness doesn’t explicitly require such a claim.

Given classical propositional logic, which Russell accepts, there is a unique set of red things. In order for different properties to be precisifications of 'red', they must differ in their extension. Thus, there might be a precisification of 'red' that is not instantiated by all the red things. *Redness* incorrectly rules out such a possibility. Similarly, *Unrestricted* incorrectly rules out the possibility of there being a precisification of '$\exists$' that leaves out some existing things.

I sympathize with Russell's argument against *Unrestricted*[16] and remain skeptical about Barnes' argument against *Domains*.[17] However, for the purposes of this paper, I grant that they are both compelling. In light of this, I grant indeterminists that Sider's argument against restricted composition remains unconvincing and that a better strategy is called for. Here is what I plan to do in the rest of the paper. In section 2, I will offer a new understanding of vague existence and I will distinguish between two varieties: positive and negative. Then, in section 3, I will offer a new objection against restricted composition, the argument from determinate vagueness. According to this argument, restricted composition entails what I call *openly negatively vague existence*. After arguing for such a claim, I offer an argument against openly negatively vague existence that relies only on premises indeterminists should be happy to accept.

Section 2: Understanding Vague Composition and Vague Existence

This section introduces an alternative way of understanding the phrases 'vague composition' and 'vague existence'. In the next section, I use this new conception to provide a new objection against restricted composition.

2.1. Vague Composition

On Sider's argument, the difference between *Vague Composition* and *Vague Composition** is cashed out in terms of the notion of numerical relevance. However, there is another approach that has been suggested in the literature.[18] According to it, whereas in *Vague Composition** there is a borderline fusion of bb, i.e., the table, there are no borderline fusions of aa in *Vague Composition*. This leads to the following understanding of vague composition: some xx are a case of vague composition just in case (i) it is vague whether there is something that is a fusion of xx and (ii) nothing is a borderline fusion of xx. As we will see, this conception of vague composition will connect nicely with the conception of vague existence that I am about to introduce.

[16] This is partly because I also accept classical logic myself. However, I take the arguments in this paper to be independent of such a commitment.
[17] My main issue whit her argument is that, if sound, it establishes that $\exists_1$ and $\exists_2$ don't *determinately* differ in their domains. However, *Domains* doesn't require that the difference be determinate, only that there be such a difference. For reasons of space, I will not pursue this criticism any further.
[18] For remarks in this direction, see, among others, van Inwagen 1990: ch 19, Hawley 2002, Donnelly 2009 and Carmichael 2011.

2.2. Vague Existence

As I mentioned at the beginning of section 1, a significant part of the literature understands the phrase "existence is vague" as saying that '$\exists$' has multiple precisifications. Here, I shall explore a different approach. I suggest we understand it as expressing the idea that it is vague which things exist. I shall now give this claim a precise formulation.

Consider the idea that it is contingent which things exist. One way of making this idea more precise goes like this: either (i) there is something which could have been nothing or (ii) there could have been something which actually is nothing.[19] Say that existence is positively contingent in the first case and negatively contingent in the second. Formally:[20]

Positive Contingent Existence	$\exists x \blacklozenge \neg \exists y\, y = x$
Negative Contingent Existence	$\blacklozenge \exists x @ \neg \exists y\, y = x$

I suggest we pursue a similar strategy to formulate the idea that it is vague which things exist. Our task is then to find analogues of '$\blacklozenge$' and '@' in the case of vagueness. As for the first task, I shall introduce the operator 'it is open that', which is the dual of 'it is determinate that' and is defined as follows:

it is open that p $=_{\text{def}}$ it is not determinate that not p

Given the definition of 'it is vague whether' in terms of 'it is determinate that', the following also holds:

it is vague whether p $=_{\text{def}}$ it is open that p and it is open that not p

To make things easier, from now on, these operators will be formalized as follows:

it is vague whether:	∇
it is determinate that:	$\Box$
it is open that:	$\Diamond$

With the openness operator at our disposal, we can say that it is vague which things there are just in case either (i) there is something such that it is open that it is nothing or (ii) it is open that there is something which actually is nothing. Say that existence is positively vague in the first case and negatively vague in the second. For now, we have the resources to express positive vague existence:

Positive Vague Existence $\exists x \Diamond \neg \exists y\, y = x$[21]

[19] I use 'exists' and 'is something' interchangeably.

[20] I use '$\blacksquare$' and '$\blacklozenge$' to represent metaphysical modality. I reserve '$\Box$' and '$\Diamond$' to represent determinacy and its dual.

[21] Everything is something. So, by *T-det*, everything is such that it is open that it is something. Thus, *Positive Vague Existence* entails that there is something such that it is vague whether it is something. This claim is usually regarded as incoherent: how could you say of x both that it is something and that it is vague whether it is something? I take this is to be an instance of a more general thought according

Introducing actuality in the context of vagueness is a more delicate matter. In principle, we could just borrow the '@' from modal logic. However, there is a problem with such a move. Given the matters under discussion, we want to be able to reason about a certain claim's precisifications via principles like *Precisifications* (see 1.3). This requires being able to identify the constituents of a claim and the kind of precisifications they might have. Unfortunately, it is not clear that claims involving '@' can be subject to that kind of analysis, as it is not clear what the precisifications of '@' might be. Given this issue, I shall pursue a different route.[22]

Suppose we want to say of ϕ that it is actually true. Certainly, to be true is not to be actually true. For every contingent claim that is false is possibly true without being possibly actually true. I propose we understand actual truth as follows: to say of ϕ that it is actually true is to say that is it one of the truths.[23] If we allow ourselves the resources of singular and plural propositional quantification and let '$[\ldots < \ldots]$' express the propositional analogue of plural membership, we can formally express this condition as follows:[24]

$$\exists pp(\forall p(p \leftrightarrow [p < pp]) \wedge [\phi < pp])$$

What about the claim that ϕ is possibly actually true? Here is one alternative: to say that ϕ is possibly actually true is to say that, possibly, the truths are such that ϕ is one of them. Formally (where 'Tpp' abbreviates '$\forall p(p \leftrightarrow [p < pp])$'):

$$\blacklozenge \exists pp(Tpp \wedge [\phi < pp])$$

However, this won't do, as any contingent claim ϕ that is false would satisfy the formula above without being possibly actually true. The solution is to have the propositional plural quantifier take wide scope over the modal operator:

$$\exists pp(Tpp \wedge \blacklozenge [\phi < pp])$$

Informally, to say that ϕ is possibly actually true is to say that the truths are such that, possibly, ϕ is one of them.

to which it is incoherent to say both that p and that it is vague whether p. We should be careful with such thoughts. In particular, with what we mean by 'incoherent'. Certainly, it is inappropriate to assert both that p and that it is vague whether p. Plausibly, one can assert only what is determinate. So, in order for an assertion like that to be appropriate, it would have to be determinate both that p and that it is vague whether p. But that can't be, since, given *T-det*, that would require that p be both determinate and vague. Now, that p is not assertible doesn't entail that it is not the case, let alone that it is incoherent. This applies to *Positive Vague Existence*. I admit that it might not be appropriate to assert such a claim. However, that doesn't entail that it can't be the case, let alone that it is incoherent. This is all we need in order to be able to reason about it.

[22] This worry also applies to backspace operators ('↑', '↓'), which are introduced as a way of increasing the expressive power of modal languages. For discussion on backspace operators, see Fine 1977, Forbes 1989: 27-29, Bricker 1989 and Williamson 2010: 685ff.

[23] My proposal draws inspiration from previous discussions of the connection between actuality and plural quantification such as those in Bricker 1989 and Forbes 1989.

[24] For a defense of the intelligibility of plural propositional quantification, see Fritz, Lederman & Uzquiano 2021 and Fritz 2022.

Now we have an alternative way of expressing negative contingent existence. To say of an object x that it is actually F is to say that the truths are such that the proposition that x is F is one of them. Thus, to say that there could have something which actually doesn't exist is to say that the truths are such that there could have been something such that the proposition that it doesn't exist is one of them. Formally:

Negative Contingent Existence $\exists pp(Tpp \wedge \blacklozenge \exists x[\neg \exists y\, y = x < pp])$

A similar move can be made in the case of negative vague existence. To say that it is open that there is something which actually doesn't exist is to say that the truths are such that it is open that there is something such that the proposition that it doesn't exist is one of them. Formally:

Negative Vague Existence $\exists pp(Tpp \wedge \Diamond \exists x[\neg \exists y\, y = x < pp])$

Now that we have a precise formulation of both kinds of vague existence, the claim that it is vague which things exist, i.e., our interpretation of the phrase "existence is vague", can be interpreted as the disjunction of *Positive Vague Existence* and *Negative Vague Existence*. As I anticipated, however, only negative vague existence will play a role in the argument from determinate vagueness.[25]

Section 3: The Argument from Determinate Vagueness

This section introduces my new objection against restricted composition, the argument from determinate vagueness, which takes advantage of the new conception of vague composition and vague existence introduced in the previous section. The argument goes like this:

- P1-det If composition is restricted, then, for some xx, it is determinate that [(i) it is vague whether xx have a fusion and (ii) nothing is a borderline fusion of xx].
- P2-det For any xx, if it is determinate that [(i) it is vague whether xx have a fusion and (ii) nothing is a borderline fusion of xx], then it is open that existence is negatively vague.
- P3-det It is not open that existence is negatively vague.
- C Therefore, composition is not restricted.

The argument is clearly valid. In what follows, I defend each of its premises.

3.1. Restricted Composition and Determinately Vague Composition

As I mentioned before, my defense of P1-det assumes the success of Sider's argument for P1. Thus, I set aside views that accept determinate cut-off points (Markosian, Merricks, Hawthorne) or borderline fusions (Carmichael, Williamson). This is a legitimate move, as

[25] There is an interesting connection between *Positive Vague Existence* and *Unrestricted*. Indeed, given *Precisifications*$_{open}$ (see 3.1), a version of *Unrestricted* entails that existence cannot be positively vague (see note 35). However, since I don't accept *Unrestricted*, I leave open the possibility of positive vague existence.

my goal in this paper is not to convince the reader of the success of vagueness arguments, but only of the failure of indeterminism.

In his argument for P1, Sider assumes that, given restricted composition, there are enough numerically relevant pluralities to form a continuous series. For my argument for P1-det, I assume that that there are enough pluralities that don't have borderline fusions to form a continuous series. Now, it seems plausible to assume that we accept such a claim on the basis of our knowledge of specific cases (e.g., *Vague Composition*). That is, we know of those pluralities that they don't have borderline fusions. Given the assumption that knowledge entails determinacy, this entails that there is at least one continuous series such that each of its elements determinately lack borderline fusions. That is, each of the elements xx of those series is such that it is determinate that xx don't have a borderline fusion.[26]

Now, we know from Sider's discussion of P1 that, if composition is restricted, then continuous series can't contain determinate cut-off points. So, they must contain borderline cases. Given what was established in the previous paragraph, this entails that there are continuous series with borderline cases that also lack borderline fusions determinately. In other words, for some xx, (i) it is vague whether xx have a fusion and (ii) it is determinate that xx don't have borderline fusions.

Suppose now that P1-det is false. This entails that, for any xx, it is not determinate that [(i) it is vague whether xx have a fusion and (ii) nothing is a borderline fusion of xx]. This entails that, for any xx, either (i) it is not determinate that it is vague whether xx have a fusion or (ii) it is not determinate that xx don't have a borderline fusion.[27] So, since we have at least some xx for which condition (ii) fails, they would have to satisfy condition (i). That is, even though it is vague whether those xx have a fusion, it is vague whether it is vague whether that is so.[28] In other words, all borderline cases are *borderline* borderline cases.

Though I don't have a knock-down argument against this picture, I found it implausible and unmotivated. First, as I mentioned before, it is common to assume that knowledge requires determinacy. So, this picture entails that there are borderline cases of the relevant kind, but we are unable to know that they are borderline cases. Even though we have accepted that there are borderline cases on the basis of an argument against determinate cut-off points, it also seems reasonable to accept it on the basis of specific pluralities (e.g., *Vague Composition*) of which we know that they are borderline cases, which would require that it be determinate that they are borderline cases. On the other hand, there doesn't seem to be anything particularly attractive about this picture besides the fact that it allows us to resist P1-det while retaining P1. In that sense, it is different from the kind of picture suggested by those who oppose the argument for P1 either by accepting determinate cut-off points or by positing borderline fusions in borderline cases. For these reasons, I concluded that we should accept P1-det.

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[26] Most theorists of vagueness accept the assumption that knowledge entails determinacy. For a dissenting opinion, see Dorr 2003. For a response, see Bacon 2018: ch. 5.

[27] This reasoning relies on the principle that if it is determinate that p and it is determinate that q, then it is determinate that [p and q], which follows from *K-det*.

[28] It is not determinate that they are borderline cases. Since they are borderline cases, it is not determinate that they are not borderline cases. So, it is vague whether they are borderline cases.

3.2. Determinately Vague Composition and Openly Negatively Vague Existence

Before stating my argument for P2-det, I shall do two things. First, I shall introduce a principle that will be of use during the argument. Second, I shall deal with a complication in the formalization of the claim that xx lack borderline fusions.

Indeterminist Barcan

My argument for P2-det relies on a principle akin to a familiar principle from modal logic. We start with the Barcan formula:

Barcan $\forall x \blacksquare \phi x \rightarrow \blacksquare \forall x \phi x$

As is well-known, the Barcan formula rules out what I have called negative contingent existence.[29] Thus, those who want to make room for the possibility of negative contingent existence cannot accept such a principle. However, they can accept a weaker version:

Contingentist Barcan $\forall x \blacksquare \phi x \rightarrow \blacksquare \forall x (\neg \phi x \rightarrow @\neg \exists y\, y = x)$

Instead of saying that everything being necessarily ϕ entails that necessarily everything is ϕ, *Contingentist Barcan* says that everything being necessarily ϕ entails that necessarily, if something is not ϕ, then actually it doesn't exist. Given our preferred way of expressing actuality, this principle will be reformulated as follows:

Contingentist Barcan $\forall x \blacksquare \phi x \rightarrow \exists pp\big(Tpp \wedge \blacksquare \forall x (\neg \phi x \rightarrow [\neg \exists y\, y = x \ < pp])\big)$

Informally, *Contingentist Barcan* says that, if everything is necessarily ϕ, then the truths are such that, necessarily, if something is not ϕ, then the proposition that it doesn't exist is one of them.

When it comes to vagueness, an analogue of the Barcan formula can be stated as follows:

Barcan-det $\forall x \Box \phi x \rightarrow \Box \forall x \phi x$

Barcan-det rules out negative vague existence. Thus, indeterminists have every right to resist it. The following principle, however, shouldn't cause them any trouble:

Indeterminist Barcan $\forall x \Box \phi x \rightarrow \exists pp\big(Tpp \wedge \Box \forall x (\neg \phi x \rightarrow [\neg \exists y\, y = x \ < pp])\big)$

Informally, *Indeterminist Barcan* says that, if everything is determinately ϕ, then the truths are such that, determinately, if something is not ϕ, then the proposition that it doesn't exist is one of them.

Since *Indeterminist Barcan* has the status of a logical truth, it holds determinately. Thus:

[29] It is uncontroversial that everything necessarily actually exists. By the Barcan formula, this entails that necessarily everything actually exists. In other words, existence is not negatively contingent.

Det-Indeterminist Barcan $\quad \Box\left(\forall x \Box \phi x \rightarrow \exists pp\left(Tpp \wedge \Box \forall x(\neg \phi x \rightarrow [\neg \exists y\, y = x \ < pp])\right)\right)$

No Borderline Fusions

Given the formalism we have been using, it seems natural to formalize the claim that xx lack borderline fusions as follows: $\neg\exists x \nabla Fx$. This claim entails $\forall x(\Box Fx \vee \Box\neg Fx)$. The problem is that this formalization might be seen as begging the question against the indeterminist. Let me explain. If one is a contingentist, then one cannot formalize the claim that x is not contingently human in such a way that it entails $\blacksquare Hx \vee \blacksquare\neg Hx$. For, assuming that being human entails existing, that formula entails that all humans exist necessarily. Similarly, if one is an indeterminist, one cannot formalize the claim that x is not a borderline fusion as $\Box Fx \vee \Box\neg Fx$. For, assuming that being a fusion entails existing, that formula entails that all fusions exist determinately, which might be an undesirable consequence from an indeterminist perspective.

The solution to this problem is to adopt a different formalization of the no-borderline-fusions claim, which mirrors the strategy deployed by contingentists to formalize the non-contingency of certain properties. From now on, the claim that xx lack borderline fusions will be formalized as $\forall x\big(\Box(\exists y\, y = x \rightarrow Fx) \vee \Box(\exists y\, y = x \rightarrow \neg Fx)\big)$. Informally, everything is such that, either it is determinate that [if it exists, then it is a fusion of xx] or it is determinate that [if it exists, then it is not a fusion of xx].[30]

Defending P2-det

I can now state my argument for P2-det. Consider some arbitrary xx. Assume that it is determinate that [(i) it is vague xx have a fusion and (ii) nothing is a borderline fusion of xx]. Given *K-det*, this entails that it is determinate that it is vague whether xx have a fusion (formally: (A) $\Box\nabla\exists x Fx$) and that it is determinate that nothing is a borderline fusion of xx (formally: (B) $\Box\forall x\big(\Box(\exists y\, y = x \rightarrow Fx) \vee \Box(\exists y\, y = x \rightarrow \neg Fx)\big)$). The argument for P2-det proceeds in two steps:

<u>Step 1:</u> Given *T-det*, (A) entails $\nabla\exists x Fx$, which, by the definition of '∇' in terms of '$\Diamond$', entails $\Diamond\neg\exists x Fx$. This claim and (A) entail $\Diamond(\neg\exists x Fx \wedge \nabla\exists x Fx)$.[31]

<u>Step 2:</u> Now we show that $\Diamond(\neg\exists x Fx \wedge \nabla\exists x Fx)$ entails that it is open that existence is negatively vague. Assume $\Diamond(\neg\exists x Fx \wedge \nabla\exists x Fx)$. The following derivation shows that, given (B), that entails $\Diamond(\forall x \Box(\exists y\, y = x \rightarrow \neg Fx) \wedge \Diamond\exists x Fx)$:

1. $\Diamond(\neg\exists x Fx \wedge \nabla\exists x Fx)$ As
2. $\Box\forall x\big(\Box(\exists y\, y = x \rightarrow Fx) \vee \Box(\exists y\, y = x \rightarrow \neg Fx)\big)$ As

[30] Thanks to Maegan Fairchild for raising this point and to Jeremy Goodman for discussion.
[31] This move relies on the following principle:

Open-Det $\quad (\Diamond p \wedge \Box q) \rightarrow \Diamond(p \wedge q)$

Open-Det can also be derived from *K-det*.

3. $\Diamond(\forall x\neg Fx \wedge \nabla\exists xFx)$ (1)
4. $\Diamond\big(\forall x\big(\Box(\exists y\, y = x \to Fx) \vee \Box(\exists y\, y = x \to \neg Fx)\big) \wedge \forall x\neg Fx \wedge \nabla\exists xFx\big)$ (2,3)[32]
5. $\Diamond(\forall x(\Box(\exists y\, y = x \to Fx) \vee \Box(\exists y\, y = x \to \neg Fx)) \wedge \forall x(\exists y\, y = x \wedge \neg Fx) \wedge \nabla\exists xFx)$ (4)
6. $\Diamond(\forall x(\Box(\exists y\, y = x \to Fx) \vee \Box(\exists y\, y = x \to \neg Fx)) \wedge \forall x\neg(\exists y\, y = x \to Fx) \wedge \nabla\exists xFx)$ (5)
7. $\Diamond(\forall x(\Box(\exists y\, y = x \to Fx) \vee \Box(\exists y\, y = x \to \neg Fx)) \wedge \forall x\neg\Box(\exists y\, y = x \to Fx) \wedge \nabla\exists xFx)$ (6)[33]
8. $\Diamond(\forall x\Box(\exists y\, y = x \to \neg Fx) \wedge \nabla\exists xFx)$ (7)
9. $\Diamond(\forall x\Box(\exists y\, y = x \to \neg Fx) \wedge \Diamond\exists xFx)$ (8)

Given *Det-Indeterminist Barcan*, the conclusion above entails that $\Diamond\big(\exists pp\big(Tpp \wedge \Box\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp])\big) \wedge \ \Diamond\exists xFx\big)$, which in turn entails that $\Diamond\exists pp(Tpp \wedge \Box\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \Diamond\exists xFx)$. Now, the following derivation shows that this claim entails that existence is openly negatively vague:

1. $\Diamond\exists pp(Tpp \wedge \Box\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \Diamond\exists xFx)$ As
2. $\Diamond\exists pp\big(Tpp \wedge \Diamond(\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \exists xFx)\big)$ (1)[34]
3. $\Diamond\exists pp\left(Tpp \wedge \Diamond\big(\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \exists x(\exists y\, y = x \wedge Fx)\big)\right)$ (2)
4. $\Diamond\exists pp\left(Tpp \wedge \Diamond\big(\forall x(\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \exists x\neg(\exists y\, y = x \to \neg Fx)\big)\right)$ (3)
5. $\Diamond\exists pp\left(Tpp \wedge \Diamond\exists x\big((\neg(\exists y\, y = x \to \neg Fx) \to [\neg\exists y\, y = x \ < pp]) \wedge \neg(\exists y\, y = x \to \neg Fx)\big)\right)$ (4)
6. $\Diamond\exists pp(Tpp \wedge \ \Diamond\exists x[\neg\exists y\, y = x \ < pp])$ (5)

Recall that negative vague existence was formalized as $\exists pp(Tpp \wedge \ \Diamond\exists x[\neg\exists y\, y = x \ < pp])$. Thus, the last step in the derivation above formalizes the claim that it is open that existence is negatively vague.

This concludes my defense of P2-det.

3.3. Against Openly Negatively Vague Existence

Indeterminists reject vague existence altogether. In section 2, I distinguished between two varieties: positive and negative. What is distinctive about the argument from determinate vagueness is that it relies only on the rejection of negative vague existence. More specifically, of *openly negatively vague existence*. Here I show that such a move can be made by appealing to restrictions on the precisifications of '∃' that are plausible even from the perspective of an indeterminist.

Let me start by introducing the two principles that will play an important role in the argument.

Precisifications

The first principle to consider is in the same spirit as Sider's *Precisifications*:

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[32] By *Open-Det*.
[33] By *T-det*.
[34] By *Open-Det*.

Precisifications$_{open}$ If the claim that {$\exists$, c^1, c^2, …, c^n} is open and each of c^1, c^2, …, c^n lacks multiple precisifications, then there is a precisification of '$\exists$', call it $\exists_1$, such that {$\exists_1$, c^1, c^2, …, c^n}.[35]

Indeed, we will need a stronger version:

Det- Precisifications$_{open}$ It is determinate that [if the claim that {$\exists$, c^1, c^2, …, c^n} is open and each of c^1, c^2, …, c^n lacks multiple precisifications, then there is a precisification of '$\exists$', call it $\exists_1$, such that {$\exists_1$, c^1, c^2, …, c^n}].

I motivate *Precisifications$_{open}$* as follows. Consider the claim that {$\exists$, c^1, c^2, …, c^n} and assume each of c^1, c^2, …, c^n lacks multiple precisifications. For any i, let c_1^i be the unique precisification of c^i. Each precisification of {$\exists$, c^1, c^2, …, c^n} then consists of a precisification of '$\exists$' plus c_1^1, c_1^2, …, c_1^n. Suppose it is open that {$\exists$, c^1, c^2, …, c^n}. That means that one its precisifications is true. So, there is a precisification of '$\exists$', call it $\exists_1$, such that {$\exists_1$, c_1^1, c_1^2, …, c_1^n}. If E_1 expresses the unique precisification of E, then they are intersubstitutable. So, since it is true that {$\exists_1$, c_1^1, c_1^2, …, c_1^n}, it is also true that {$\exists_1$, c^1, c^2, …, c^n}. So, there is a precisification of '$\exists$', call it $\exists_1$, such that {$\exists_1$, c^1, c^2, …, c^n}. Therefore, *Precisifications$_{open}$* is true.

How do we go from *Precisifications$_{open}$* to *Det-Precisifications$_{open}$*? I take it that we accept the principles involved in the argument for *Precisifications$_{open}$* because we know them. So, they must hold determinately. Therefore, we can turn the argument for *Precisifications$_{open}$* into an argument for *Det-Precisifications$_{open}$*.

Logical Determinism

The second principle belongs to the same class as Sider's *Domains* and *Unrestricted*. That is, it imposes restrictions on the kind of second-order properties that can precisify '$\exists$'. However, it does so in a more principled way.

When discussing the possibility of there being multiple precisifications of '$\exists$', even indeterminists accept that every such precisification must possess all the logical features of '$\exists$'. For instance, Båve speaks of an *auxiliary logic* as a list of axioms and inference rules that is common to all precisifications of '$\exists$' (2011: 106ff). Plausibly, the logical features of

[35] As I mentioned in footnote 25, *Precisifications$_{open}$* entails that a version of *Unrestricted* is inconsistent with *Positive Vague Existence*. First, we reformulate *Unrestricted* as follows (where '$\mathcal{P}(X, Y)$' abbreviates the claim that X is a precisification of Y):

*Unrestricted** $\forall Q(\mathcal{P}(Q, '\exists') \to \neg\exists x \neg Qy\, y = x)$

Suppose existence is positively vague. That is, suppose $\exists x \Diamond \neg \exists y\, y = x$. Let an object a witness that claim. So, $\Diamond \neg \exists y\, y = a$. That is, the claim that $\neg \exists y\, y = a$ is open. Assume that logical connectives and the identity predicate lack multiple precisifications. So, given *Precisifications$_{open}$*, it follows that there is a precisification of '$\exists$', call it $\exists_1$, such that $\neg \exists_1 y\, y = a$. Formally: $\exists Q(\mathcal{P}(Q, '\exists') \land \neg Qy\, y = a)$. This entails $\exists x \exists Q(\mathcal{P}(Q, '\exists') \land \neg Qy\, y = x)$, which in turn entails $\exists Q(\mathcal{P}(Q, '\exists') \land \exists x \neg Qy\, y = x)$. This contradicts *Unrestricted**.

'∃' are those that are expressed in the logical truths where '∃' features. This leads to the following principle:

Logical Determinism If it is a logical truth that $\Phi(\exists)$, then any precisification Q of '∃' is such that $\Phi(Q)$.

As before, we can assume that we know this principle. So, it holds determinately:

Det-Logical Determinism It is determinate that [if it is a logical truth that $\Phi(\exists)$, then any precisification Q of '∃' is such that $\Phi(Q)$].

Unlike *Domains* and *Unrestricted*, *Logical Determinism* and its determinate variant are supported not just by specific thoughts about '∃' but by a plausible conception of the connection between logical truths and precisifications.

Defending P3-det

My argument against openly negatively vague existence proceeds in two steps, each of which will make use of one of the principles stated above.

First, I shall identify a consequence of openly negatively vague existence. Suppose it is open that existence is negatively vague. That is, suppose $\Diamond\exists pp(Tpp \wedge \Diamond\exists x[\neg\exists y\, y = x < pp])$. Like Sider, I assume that the logical connectives and the identity predicate lack multiples precisifications. In addition, I assume the same about the propositional plural membership predicate and also assume that all those assumptions hold determinately. Let '$\mathcal{P}(X,Y)$' abbreviate the claim that X is a precisification of Y. Now, given *Det-Precisifications$_{open}$*, $\Diamond\exists pp(Tpp \wedge \Diamond\exists x[\neg\exists y\, y = x < pp])$ entails $\Diamond\exists pp\big(Tpp \wedge \exists Q(\mathcal{P}(Q,'\exists') \wedge Qx[\neg Qy\, y = x < pp])\big)$.

The second step consists in providing a reductio of this claim. We start with the following logical truth: $\forall x\exists y\, y = x$. Informally, this says that everything is something. Given the interdefinability of the quantifiers, this is logically equivalent to $\neg\exists x\neg\exists y\, y = x$. Given our preferred way of regimenting actuality, this is also logically equivalent to:

Universal Being $\exists pp(Tpp \wedge \neg\exists x[\neg\exists y\, y = x < pp])$

Informally, *Universal Being* says that the truths are such that nothing is such that the proposition that it doesn't exist is one of them.

Notice now that we can understand *Universal Being* as saying something about ∃:

Universal Being $\big(\lambda Q.\exists pp(Tpp \wedge \neg Qx[\neg Qy\, y = x < pp])\big)\exists$

Universal Being is a logical truth. Moreover, it is determinate that it is a logical truth. Given *Det-Logical Determinism*, that entails that it is determinate that any precisification of '∃' satisfies the feature *Universal Being* attributes to '∃'. That is, $\Box\forall Q\big(\mathcal{P}(Q,'\exists') \rightarrow \exists pp(Tpp \wedge \neg Qx[\neg Qy\, y = x < pp])\big)$. This entails $\Box\exists pp\big(Tpp \wedge \forall Q(\mathcal{P}(Q,'\exists') \rightarrow \neg Qx[\neg Qy\, y = x < pp])\big)$, which contradicts the consequence of openly negatively vague existence we identified above. Thus, we conclude that it is not open that existence is negatively vague.

This concludes my defense of the argument from determinate vagueness. In a nutshell, I showed that restricted composition entails a form of vague existence that is unacceptable even from an indeterminist perspective, namely openly negatively vague existence. Thus, we should reject restricted composition.

Conclusion

My goal in this paper has been to argue that indeterminism is ineffective as a response to vagueness-based objections against restricted composition. When confronted to the argument from vagueness, indeterminists resist Sider's attack on vague existence by rejecting either *Domains* or *Unrestricted*. A similar move is unavailable to them in the case of the argument from determinate vagueness. This is because my attack on openly negatively vague existence relies only on *Logical Determinism,* a principle that should be acceptable even by indeterminist lights.

This, of course, falls short of establishing the success of vagueness arguments. As I made it clear at various points throughout the paper, one can also resist these arguments by positing determinate cut-off points or by accepting the existence of borderline fusions. The failure of indeterminism, however, teach us an important lesson about the dialectical power of vagueness arguments.

An attractive feature of indeterminism is that it allows us to respond to vagueness arguments without making any substantial claims about the metaphysics of composition. When confronted with the argument, indeterminists just reject the third premise, endorse vague existence and keep a moderate metaphysical view about composition. In fact, the same strategy can be used to deal with vagueness arguments in other domains, e.g., social or abstract objects. Indeterminism appears thus as a very convenient way of defending moderate metaphysics from its objectors.[36]

Nevertheless, what we learn from the argument from determinate vagueness is that this is not a viable alternative. If one wants to keep a moderate picture about a certain domain *D*, one has to engage in substantial metaphysical debates about *D* and claim either that the moderate picture of *D* doesn't entail vagueness of the relevant kind or that such vagueness doesn't entail the wrong kind of vague existence. I leave discussion of these alternatives to future work.

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[36] For discussion of arguments from vagueness in other domains, see Korman 2014, 2105: ch. 9 and my (unpublished).

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