

Vagueness, Language, and Ontology

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[1] We all know that language is vague. The majority of our terms admit borderline cases. We are notoriously unable to resolve the precise number grains required for a portion of sand to fall under the predicate "heap". It might be supposed that blurry boundaries are, at bottom, an ontological phenomenon. Perhaps the indeterminacy of our predicates is inherited from the indeterminacy of the properties they denote. Perhaps objects can also be vague, rendering singularly terms, including proper names, uncomfortably imprecise. This thesis has been dismissed, challenged, and championed by various philosophers over the course of the century. Undoubtedly the most widely discussed objection to vague ontology comes in the form of a one-page argument devised by Gareth Evans (1978). Although other arguments against vague objects have been proposed,¹ Evans' argument has occupied center stage, clarifying and provoking debate. Its impact reconfirms the value of Evans' philosophical legacy.

[2] I will review Evans' argument, along with some response strategies. In the end, I will endorse vague objects, siding with Evans' detractors. However, I will also raise questions about the relevance of this position for semantics. Even if the world is vague, that vagueness may not be responsible for much of the imprecision we encounter in language. If we are interested in discovering the primary source of linguistic vagueness, we should follow Evans in looking toward language itself. We have much to gain from investigating the nature of reference in all of its varieties.

1. From Verbalism to Vague Identities

[3] In a seminal address on vagueness, Russell (1923) famously rejected the view that vagueness resides in the world. Treating vagueness as ontological was, in his eyes, a fallacy of verbalism. It erroneously attributes a property of language to the world. Postulating vague objects in order to explain linguistic vagueness is

no more plausible than postulating ambiguous objects to explain linguistic ambiguity. The word "bat", for instance, does not pick out a Janus-headed entity that vacillates between being a flying rodent and being a piece of sporting equipment. Likewise for vague words. Russell's attack echoes Frege's precepts against the vagaries of ordinary language. Vagueness is a flaw of words, on this view, a defect that has unhappily infected ordinary speech. This attitude also influenced the members of the Vienna Circle who sought to exorcise vagueness from language, achieving ideals of precision that they presumably attributed to the world.

[4] Discrediting ontological vagueness as a form of verbalism remained a popular tactic throughout much of this century. Even Wittgenstein, who was more tolerant of vagueness than Frege, regarded it as having a linguistic origin. More in line with Frege, Dummett (1978: 260) once dismissed that the idea that the world might be vague as, "not properly intelligible". He later retracted the remark (Dummett, 1981: 440).

[5] Russell is right that we should guard against the unreflective reification of linguistic phenomena. Nevertheless, the charge loses steam when we consider the disanalogies between vagueness and ambiguity. There are obvious reasons for claiming that ambiguous objects don't answer to ambiguous words. The idea of bi-stable bats can be rejected by simply observing that no object is ever observed as transforming from wood to flesh. Moreover, linguistic ambiguity is easily remedied by fixing a context. With proper guidance, an ambiguous word will only be interpreted as having a single meaning on an occasion. Similarly, an ambiguous word can be translated into a pair of distinct words without loss of meaning. Not so with vagueness. Precise words are notoriously non-synonymous with vague words, and there is no way to establish sharp boundaries for vague expressions by appeal to linguistic context. More to the point, no resolution of vagueness comes from investigating the objects that vague words designate. No studious observations of heaps will ever reveal their minimum number of grains. Likewise, no investigation will establish exactly where the boundaries of the Sahara desert start. There are many grains of sand that lie irresolvably in the Sahara's penumbra. While referents of ambiguous words are decidedly unambiguous, there is deep suspicion that referents of vague words are vague.

[6] Still, one might be inclined to blame language. Perhaps the problem is that our words try to impose boundaries where none exist. On this view, words generate vagueness by trying to draw boundaries in the middle of Nature's thighs rather than at her joints. Perhaps there simply are not as many natural joints as our vocabularies demand. Alternatively, one might say that joints are

pervasive, but too fine. Perhaps, every number of grains marks a natural division between one kind and another, but our linguistic practices are too crude to settle on which of these myriad boundaries gets assigned to the word "heap". On this picture, the problem is not that nature has too few joints, but that language carves nature up with a jackhammer.

[7] These considerations suggest that vagueness *might* derive from semantic indeterminacy, but more must be said to rule out the competing ontological hypothesis. The mere charge of verbalism is inadequate to combat vague ontology. Faith in ontological vagueness does not hinge on a reckless inference from language to world. It derives from a seemingly irresolvable problem of locating boundaries. Therefore, responding to the ontological position requires more than Russell offered. It requires the provision of positive reasons for thinking that the language is the source of vagueness, and, more decisively, substantive arguments against the claim that the world could be vague.

[8] This is why Evans' argument against vague objects was such an advance. Unlike Russell, who tried to short-circuit the inference from vague language to a vague world, Evans tries to show us that the world cannot be vague, or, at least, that it cannot contain vague objects. Evans' argument also makes another advance. The hypothesis that the world is vague is somewhat obscure. What does it mean to say that objects can be ontologically indeterminate? Evans clarifies this thesis by identifying one of its apparent entailments. If objects are vague, then it might follow that *identities* between objects can be indeterminate. More specifically, the alleged identity between a vague object and a precise object with most of the same parts, or the alleged identity between two highly similar vague objects might be indeterminate. Postulating vague objects, then, is postulating the existing of vague identities. Postulating vague identities is postulating indeterminate identity statements, whose indeterminacy cannot be attributed to linguistic imperfections or ignorance. This formulation does not fully resolve the vexed question of what vague ontology might be, for it directly appeals to vague identities. But it does provide something like a prediction, a claim that might be used to assess the plausibility of ontological vagueness. If it could be demonstrated that certain indeterminate identity statements owe their indeterminacy to something other than semantics or epistemology, vague ontologists would have reason for celebration. Conversely, if decisive reasons could be given against such identities, we would have a principled argument against vague ontology. Like scientific theories, philosophical theories live or die by the predictions they generate.

[9] Evans' argument against ontological vagueness is an argument against vague identities of a certain kind. The argument is deceptively simple. So deceptive that it readily invites misinterpretation. Most commentators on Evans have either been deceived or taken pains to ward off deception. One common misunderstanding is that Evans wants to rule out indeterminate identities *tout court*. To see why this interpretation is both tempting and flawed, we must consider the argument.

[10] Evans begins by having us assume that an indeterminate identity holds between two objects, a and b . We can imagine that a is the Sahara desert, whose boundaries are impossible to discern, and b is a sharply bounded counterpart of the Sahara. Evans represents the indefiniteness of this identity using an indefinitely operator:

$$(1) \nabla(a=b)$$

Next, Evans applies lamda-abstraction, to generate

$$(2) \lambda x \nabla (x=b)a$$

Lamda-abstraction merely converts the expression representing an indefinite identity between a and b into an expression representing the property of being indefinitely identical to b , and predicates this property of a . If it is indefinitely the case that a equals b , then a has the property of indefinitely equaling b . Of course, it is a truism that b , like any precise object, is definitely identical to itself. This entails that b is not *indefinitely* identical to itself:

$$(3) \sim \lambda x \nabla (x=b)b$$

This truism demonstrates that a has a property that b lacks. Only a has the property of being indefinitely equal to b . But identical objects must have all the same properties. This is the principle of the Indiscernability of Identicals, or Leibniz's Law. If a and b have a distinct property, then:

$$(4) \sim(a=b)$$

In short, the assumption that a is indefinitely identical to b entails that a and b are not identical. Of course this is not a contradiction. A more dramatic reduction could be achieved if we make two further assumptions. First, if we can strengthen (1)-(3) with a definitely operator, Δ , then we can establish that a and b are definitely not identical, i.e.:

$$(5) \Delta \sim(a=b)$$

Second, if we assume that Δ and ∇ are duals, we can derive:

$$(6) \sim \nabla (a=b)$$

This directly contradicts the starting assumption.

[11] Evans' argument is easily misunderstood, because it looks like a *reductio* on the claim that there can be indefinite identities. As David Lewis (1988) points out, this would miss the point. Many identities are indefinite, but their indefiniteness derives from either epistemic limitations or semantic indeterminacy. When we assume that an identity is indefinite for one of these reasons, Evans' argument does not go through. First, consider epistemic indeterminacy. Interpreting " Δ " epistemically, it might be true for some believer that:

$$(1') \nabla (\text{Cicero}=\text{Tully})$$

From this we might infer:

$$(2') \lambda x \nabla (x=\text{Tully})\text{Cicero}$$

While at the same time, the believer recognizes that:

$$(3') \sim \lambda x \nabla (x=\text{Tully})\text{Tully}$$

Now, one might be tempted to invoke Leibniz's Law to derive:

$$(4') \sim (\text{Cicero}=\text{Tully})$$

This would obviously be an error. Leibniz's Law does not apply in epistemic contexts. Differences in beliefs do not count as differences in properties of the kind that would preclude identity.

[12] Now consider a case of semantic indeterminacy. Let's stipulate that the name "Cargan" means "The president between Ford and Bush". This generates the semantically indeterminate:

$$(1'') \nabla (\text{Cargan}=\text{Reagan})$$

From this we might want to infer:

$$(2'') \lambda x \nabla (x=\text{Reagan})\text{Cargan}$$

This would be an unacceptable use of abstraction. Lewis makes this point by saying that semantically indeterminate names are non-rigid designators: they pick out different objects on different

precisifications of the language. This remark can be more readily understood by considering the present example. We might paraphrase (1") as, "There are some precisifications where Cargan is Reagan and some where Cargan is not Reagan". But (2") says, "Cargan is such that he is identical to Reagan on some but not all precisification". To evaluate this sentence, we need to consider all ways of making "Cargan" precise. On precisifications where "Cargan" picks out Reagan, the sentence comes out false, because Reagan=Reagan under all precisifications. On precisifications where "Cargan" picks out Carter, the sentence is also false, because ~Carter=Carter on all precisifications. So the sentence is false no matter what, or "superfalse".

[13] In sum, Evans' argument is straightforwardly fallacious if we interpret his operator as expressing epistemic or semantic indeterminacy. If vagueness is attributed to the world, however, the argument is difficult to derail. Leibniz's Law apparently goes through, because the disparate properties attributed to the elements in a vague identity are ontological properties, not epistemic properties. Abstraction apparently goes through, because ontologically vague names refer rigidly: they pick out the same vague objects in every world and on every precisification. So, a contradiction can be derived if, *and only if*, the first premise attributes ontological indeterminacy. Vague identities are fine, provided they are not ontological in origin. That's why Evans' argument counts as an argument against ontological vagueness.

2. Answering Evans

[14] I will begin my evaluation of Evans' argument by suggesting that it might be more powerful than he realized. Indeed, it may prove too much. In particular, I think Evans' argument poses a challenge to those who think that vagueness is linguistic in origin. This would be an embarrassment, since Evans himself is willing to admit semantic indeterminacy. More generally, it would show that his argument should be taken seriously by people who do not believe in ontological vagueness. After making this case, I will briefly explore several strategies that friends of vague ontology have deployed in responding to Evans.

[15] Above, I said that Evans' argument could be blocked if the indeterminacy in premise (1) were semantic in origin. Following Lewis, I said that a semantic interpretation of the indeterminacy operator would preclude the needed abstraction step. This may have been premature. While abstraction is not permitted when *one* term in an indeterminate identity is semantically imprecise, it may be permitted when *both* terms are imprecise. Let the term "Reater"

mean "the president between 1977 and 1988". Presumably, the sentence

(1''') ∇ (Cargan=Reater)

is true, because "Cargan=Reater" will have different truth-values on different precisifications. In contrast to (2''), it seems that (2''') is also true:

(2''') $\lambda x \nabla (x=\text{Reater})\text{Cargan}$

If we fix the reference of "Cargan" it still remains indeterminate whether Cargan is Reater, because "Reater" is indeterminate as well. By analogy, let ∇ stand for contingency and consider the following legitimate inference:

(1''''') ∇ (The inventor of bifocals = The fist Postmaster General)

(2''''') $\lambda x \nabla (x = \text{The first Postmaster General})\text{The inventor of bifocals}$

Likewise, the abstraction step cannot be barred when two indeterminate terms are used. If abstraction cannot be barred, then, pending further objections, Evans' argument will inadvertently show that semantically indeterminate identities can be vulnerable to a *reductio*. This result may be unsurprising to those who think that semantic indeterminacy makes language incoherent, but it is an unwelcome result for the many who resist this pessimistic conclusion. If Evans' argument shows that semantically indeterminate identities lead to contradiction, it may prove more than he himself would have been willing to accept. Therefore, those who attribute vagueness to semantic indeterminacy would be well-advised to join vague ontologists in searching for response strategies.

[16] The first response strategy that I will consider tries to soften the blow of Evans' argument by casting doubt on the its last two steps. Perhaps Evans can derive step (4) in his argument, but the contradiction derived in step (6) depends on questionable assumptions. For one thing, it is not clear whether (1)-(3) can be legitimately strengthened with a definitely operator if that operator is really the dual of the indefinitely operator. As a number of commentators have pointed out, "not indefinitely not P" is compatible with "not P" (e.g., Copeland, 1997). An alternative strategy, which doesn't require modal strengthening, is pursued by Pelletier (1989). He points out that steps (1)-(4) can derive:

$$(7) \nabla (a=b) \supset \sim(a=b)$$

by conditional proof. This, by contraposition, yields:

$$(8) a=b \supset \sim\nabla (a=b)$$

If we assume that ∇ and Δ are duals, this can give us:

$$(9) a=b \supset \nabla\sim(a=b)$$

If one assumes that $\Delta P \supset P$, then it is easy to derive a grotesque conclusion:

$$(10) \sim(a=a)$$

[17] This argument might still be questioned. The principle used in deriving (10) cannot be sustained if ΔP is compatible with $\sim P$ as the duality of ∇ and Δ suggests. Of course, one might want to deny the duality claim. Perhaps Δ should be defined as $\sim\nabla$ rather than $\sim\nabla\sim$. This, I believe, is a much more natural interpretation, if we want to respect the meanings of "definitely" and "indefinitely" in English. Denying the more traditional duality undermines both Evans' and Pelletier's arguments. Indeed, if $\sim\nabla$ implies Δ , then (8) will entail:

$$(9') a=b \supset \Delta (a=b)$$

which is not paradoxical.² One might think that (9') itself counts as an objection to vague objects. Wiggins (1986) makes such a claim after deriving (9') by a somewhat different route. This claim is difficult to sustain, for (9') does not say that vague identities are impossible (see also Garratt, 1988). It if a and b are really identical, then perhaps they are definitely identical. The vague ontologist is concerned with cases where a and b are neither really identical nor really non-identical, but wavering in some ontological nebula.

[18] Retreating backwards, Evans' defenders might argue that the inference from (1)-(4) (summarized in step (7)) is bad enough. Showing that vague identities entail non-identities is, it would seem, an embarrassment to the vague ontologists. Perhaps an embarrassment at first glance, but I think it is a conclusion that the vague ontologist can live with. The reason is that *non*-identities need not be *false* identities if we depart from bivalence. The sentence " $\sim(a=b)$ " might be taken to imply either the falsity of the identity *or* the indeterminacy of the identity. On this reading, the negation operator implies "not true" rather than "false".

[19] Unfortunately, this strategy has its costs. While it may be intuitively acceptable to say that " $\sim(a=b)$ " is true when " $a=b$ " is

indeterminate, this flies in the face of standard vagueness logics. On most multi-valued logics and supervaluationism, the negation of an indeterminate sentence is itself indeterminate. Departing from that assumption in order to handle Evans' argument may cause more trouble than it's worth. Consequently, it is more desirable to try and block Evans' argument before step (4) can be derived.

[20] A second response strategy, pursued by Michael Tye (1990), attacks at ground zero. It challenges Evans' assumption that vague objects yield ontologically indeterminate identities. As Tye points out, it is consistent with the possibility of vague objects that the identity relation remains perfectly precise. Identity might demand exact correspondence of parts. In other words, it might be that two things count as identical only if they have all the same precise parts and all the same borderline parts. If one object has fuzzy edges and another does not, they cannot be identical. Neither can an identity obtain between two objects with distinct fuzzy edges. On such a strict construal, identity statements are never indeterminate. Alleged identities between vague objects and their precise counterparts come out false. The vague ontologist who follows this line would not endorse Evans' first premise. This would prevent the *reductio* from taking off.

[21] Another strategy targets Leibniz's Law. Some have argued that it does not have application in vague contexts. A recent example of this strategy is Copeland's (1997) attempt to demonstrate that Leibniz's Law is not honored by fuzzy logic. The point can be illustrated more easily by considering a typical three-valued logic, characterized using the following Kleene truth table for non-classical implication:

p	q	$p \rightarrow q$
T	I	I
I	T	T
F	I	T
I	F	I
I	I	I

Now consider the version of Leibniz's Law that seems to be operative in Evans' argument:

$$(LL) (a=b) \equiv (F)(Fa \times Fb)$$

According to our truth table, if the antecedent of (LL) is indeterminate, the whole conditional will be indeterminate whenever the consequent is indeterminate or false. Thus, (LL) will not guarantee true inferences with indeterminate identities. In Evans' argument, the consequent would say that a is indefinitely identical to b if and only if b is indefinitely identical to itself. That claim is false, rendering the entire formula indeterminate. It seems that Evans begs the question against the hypothesis of ontological vagueness, by invoking a principle whose status is challenged by that very hypothesis.

[22] Is there any reason to prefer one of the two strategies that have just been presented? Tye calls the rejection of Leibniz's Law *ad hoc* and claims that the abolition of vague identities is a better response to Evans' argument. It's hard to see why he holds this view, for he himself endorses the same three valued logic that I just used to demonstrate why Leibniz's Law should fail. The rejection of Leibniz's Law is not an *ad hoc* move if it is a consequence of an independently motivated logic of vagueness. Moreover, Tye's preferred strategy of rejecting vague identity might needlessly undercut solutions to other philosophical problems. Consider the problem of the many. If there are billions of distinct sets of particles occupying roughly the same region as any mid-sized material object, one might suppose that each apparent material object is really a multitude. If we allow vague identity, however, each of these sets might qualify as vaguely identical. Moreover, if vague identity does not entail non-identity, then the multitude of sets can be regarded as a single vague set. Much more would need to be said to make this story work, but its potential success counts against any wholesale rejection of vague identity. ³

[23] One might worry that the rejection of Leibniz's Law restricts the vague ontologist to multi-valued logics. Multi-valued logics have their critics. The most popular alternative is supervaluationism (e.g., Lewis, 1970; Kamp, 1975; Fine, 1975). On this approach, the truth value of a vague sentence is determined by considering the value that the sentence would have on every way of making it precise. Sentences are true (false) just in case they are true (false) on every precisification. It is generally assumed that supervaluationism is incompatible with an ontological explanation of vagueness. As we saw above, precisifications are supposed to be ways of making language more precise, thereby attributing vagueness to semantic indeterminacy. This is not the only available

interpretation, however. As Tye remarks, we might think of precisifications as ways of making the world more precise. On this version of supervenience, a sentence would count as true just in case it was true in every world in which the objects and properties it designates were perfectly precise. If one prefers supervenience logic, as I do, the rejection of Leibniz's Law becomes more problematic. Imagine that $a=b$ is a vague identity. This means that, on some ways of precisifying the objects, a and b , their identity comes out true, and on other ways it comes out false. In worlds where the identity is false, (LL) will be true, because it will have a false antecedent. In worlds where the identity is true, (LL) will be true, because those will be just the world in which a and b have exactly the same properties. Therefore, the supervenienceist seems to be stuck with Leibniz's Law and vulnerable to Evans' argument.

[24] Here, one might try to adopt another strategy. Most notably, one might argue that a supervenience approach allows the vague ontologist to bar abstraction. On the ontological brand of supervenience, it is natural to interpret the sentence " $\Box(a=b)$ " as saying that a and b are identical in some, but not all, ways of making the objects precise. This is a modal claim, and its terms behave like non-rigid designators. They pick out different objects in different precise worlds. Alternatively, one might think of vague terms as *quasi-rigid*. They pick out the same objects in different worlds, but having lost their fuzziness, those objects have slightly different identity conditions. Even more accurately, we might say that vague designators pick out vaguely identical objects in all possible worlds. The quasi- in this quasi-rigidity explains why abstraction can be problematic. Evans erroneously saddles the vague ontologist with purely rigid designators. With quasi-rigid designators, the move from " $\nabla (a=b)$ " to " $\lambda x \nabla (x=b)a$ " may be invalid.

[25] There is an immediate problem with this strategy. Barring abstraction falls prey to the argument at the beginning of this section: it only works when *one* vague term is used. If both a and b are vague, then abstraction should be permissible. There may, however, be a solution to this problem. The Evans argument uses abstraction twice: once explicitly to derive " $\lambda x \nabla (x=b)a$ " and once implicitly, when " $\sim \lambda x \nabla (x=b)b$ " is derived. The latter is supposed to be entailed by the platitude that b is not indefinitely identical to itself. This inference seems innocent enough, but it becomes problematic in contexts where b is vague. If we fix the reference of b in this world, b might be such that it is not identical to b in other, more precise world. This is a direct consequence of treating vague names as not fully rigid. By parity, it is necessary that the inventor of bifocals is the inventor of bifocals, while it is not the case that the

inventor of bifocals (in this world) is necessarily the inventor of bifocals (in all other possible worlds). It looks like the implicit abstraction step fails when two vague names are used. This solves the problem for the ontological supervaluationist and the more traditional linguistic supervaluationist. The worry that began this section has been answered.

[26] Unfortunately, a problem remains. The ban on abstraction hinges on the assumption of non- or quasi-rigidity. Evans' is wrong to saddle the vague ontologist with the claim that vague names are rigid. There is a cheap way to purchase rigidity, however. We can simply use rigidifying operators, like "the actual" or Kaplan's *dthat*. If we use such operators in front of all names in Evans' argument, we will fix reference in this world, even inside the scope of the modal operators. This will prevent any attempt to exploit world shifting in rejecting the abstraction steps. By parity, it is necessary that the actual inventor of bifocals is the actual inventor of bifocals, *and it is also the case that* the actual inventor of bifocals is necessarily the actual inventor of bifocals. In a similar manner, Evans' argument can be regenerated.

[27] Fortunately, the supervaluationist has recourse to another move. While it appears that (LL) is unimpeachable on a supervalvaluational account, closer analysis suggests otherwise. The specific instantiation of (LL) needed for Evans' argument is:

$$(11) (a=b) \dots (\lambda x \nabla (x=b)a \times \lambda x \nabla (x=b)b)$$

If we let " ∇ " mean "true on some but not all precisifications", then (11) is indeterminate in a supervalvaluational logic. In worlds where " $(a=b)$ " is false, (11) comes out true, because it has a false antecedent. In worlds where " $(a=b)$ " is true, (11) comes out false for the following reason. In such worlds, " $\lambda x \nabla (x=b)a$ " is true, because a remains such that there are other admissible worlds where it is not identical to b . In contrast, " $\lambda x \nabla (x=b)b$ " is false, because b is self-identical in all worlds. Consequently, the biconditional consequent of (11) is false in worlds where its antecedent is true. Therefore, the whole conditional is false in such worlds. If (11) is true in some worlds and false in others, it is supervalvaluationally indeterminate. Despite initial appearances, the relevant application of Leibniz's Law is invalid even on a supervalvaluational logic.

[28] Other commentators have challenged Evans' argument in other ways. I am content to stick with the preceding objections. Of these, I think the restriction on Leibniz's Law poses the most serious threat. (LL) is precisely the sort of principle that vague ontology should call into question. It is only legitimate in precise contexts. Those who want to reject Evans' argument in order to preserve the

possibility of coherent *semantic* indeterminacy might also adopt this strategy. It can be supported by consideration of the best vagueness logics, regardless of whether vagueness is ontological or linguistic in origin.

3. How Could the World be Vague?

[29] Answering Evans' argument opens up the possibility that the world might actually be vague. Vague identities do not lead to contradictions, even if we assume they are neither linguistic nor epistemic in origin. Still, one might worry that the hypothesis of ontological vagueness is unmotivated.

[30] A number of authors have offered positive defenses of vague objects or ontological indeterminacy (e.g., Boyd 1989; Rolf 1980; Tye 1990; van Inwagen 1990). I will only review such considerations briefly. First, it is helpful to clarify what it means to suppose that the world is vague. Following the definition of a vague predicate, we might define a vague property as one for which there is no fact of the matter whether or not certain entities possess it. Alternatively, we might say that properties are precise and that the possession relation is undecidable for certain cases. The details will depend on one's metaphysical proclivities. If one is a universalist about properties, one can postulate vague universals or a vague instantiation relation. If one is a resemblance particularist, one can postulate indeterminacy in the similarity relation uniting tropes or vagueness in the compresence relation that ties tropes to objects (which may themselves be collections of tropes).

[31] Vague objects are most happily defined as ones that have borderline parts. For example, there might exist grains of sand that are borderline parts of the Sahara desert. This may be attributable to an ontological uncertainty of the relation, x is a part of y . Borderline parts are the most likely source of vague identities. Two objects may be vaguely identical just in case they differ in their borderline parts. Objects can also be vague in another sense: they can be borderline cases of vague properties. A neonate may be a borderline instance of the property person even if it lacks borderline parts. Some objects may be vague in both senses. For example, an object that is a borderline instance of being a mountain may also have borderline parts around its periphery.

[32] Why think ontological vagueness exists? This will depend again on one's metaphysics. For example, one might follow Boyd (1989) in thinking of real kinds as homeostatic property clusters. Collections of attributes that tend to mutually reinforce each other's co-occurrence. Such clusters may lack unifying properties that are

essential, in the sense of being possessed by every member of a kind. Without a fixed essence, some vagueness might enter into the question of how many cluster properties are sufficient for kind membership. If this question has no ontological resolution, real borderline cases will arise. There may also be some indeterminacy about whether a property belongs to such a cluster. It may be undecided exactly how strongly correlated a property must be to achieve cluster membership. Individual objects can also be regarded as homeostatic clusters, giving rise to the same kinds of vagueness.

[33] In a similar vein, one might follow Shoemaker (1980) in using causal powers to individuate properties. There may be ontologically undecided questions about whether an object has certain causal powers or what causal powers constitute a given property. If we extend this approach to object individuation, we can also find an explanation of borderline parts. Suppose something counts as the object it is in virtue of having certain causal powers, or in virtue of instantiating a property that is so-individuated. If the object is macro-sized, there will probably be some micro-sized bits around its periphery that are indeterminably relevant to its causal potential. For example, something may count as Mount Bigberg just in case it enters into the kinds of causal laws that geology uses to identify mountains. Its subsumption under those laws may depend on it having certain parts and not others. However, there may also be parts around its periphery that have an indeterminate status in allowing Mount Bigberg to fall under mountain laws. Qua mountain, these may be borderline parts of Mount Bigberg. This indeterminacy could be rampant in the special sciences. If special science laws are real and contribute to object and property individuation, we should expect to see some ontological vagueness.

[34] These remarks are impressionistic, but hopefully they help reveal why ontological vagueness might arise. Our best metaphysical theories of objects, kinds, and properties may leave us with some indeterminacy. Science tells us that certain kinds of entities are real, without giving us precise ways of distinguishing them or their parts. There is little reason to think that such precision is forthcoming.

4. Linguistic Vagueness

[35] Having replied to Evans and motivated the possibility of ontological vagueness, it might look like our business is done. Vague ontologists can breathe a sigh of relief. Unfortunately, this is

not the end of the story. One of the attractions of the ontological view is that it might be regarded as the source of linguistic vagueness. Perhaps language is not flawed after all; the world alone is to blame. Perhaps Fregean strictures against ordinary language must be reconsidered. Closer analysis suggests that this picture is mistaken. The vagueness of language cannot all be attributed to vagueness in the world.

[36] To see this, we must ask how words get assigned to objects and properties. We must ask how reference works. This question gets less attention than it should in the vagueness literature.⁴ If vagueness were the fault of ontology, then we should be able to deliver theories of reference that explain how words get determinately assigned to vague objects and properties. The reference relation itself should be precise. If reference were imprecise, it might be appropriate to attribute vagueness to that imprecision, not to the imprecision of the world. Imagine that there is a family of highly similar but non-identical objects that a word might pick out. If the reference relation is such that it cannot select from these objects, then that word will be vague. It will be semantically undecided which one it refers to. Now imagine that some of the highly similar objects are themselves ontologically vague. Would this contribute to the vagueness of the word? Maybe, maybe not. If reference is imprecise, it may be that, for every possible vague object that a word refers to, there are also precise objects that it refers to, which either lack or have the borderline parts of the initial vague object. If that were the case, then the ontological vagueness would not make the word more vague than it would have been otherwise. This possibility suggests that vagueness may have an adequate linguistic explanation, even when words refer to vague objects.

[37] Is there any reason to think that reference is precise? The answer may vary with different classes of words, but I suspect most varieties of reference leave room for vagueness. Consider, first, words like "bald" and "heap", which so notoriously give rise to sorites paradoxes. It is unclear whether baldness and heaphood are really natural kinds. They are not the sorts of things that a science could easily examine. They seem to lack underlying characteristics, which typify natural kinds. If they are natural kinds, our ability to refer to them does not seem to involve deference to experts or to future theories. We regard ourselves as roughly equal authorities in identifying bald heads and heaps. If two people with equal knowledge and equally good senses disagreed about whether something was a heap, no science could step in to adjudicate. Consequently, it is reasonable to think that the terms "bald" and "heap" refer in a way that depends on our recognitional capacities. Since those recognitional capacities are incapable of drawing sharp

lines between the positive and negative extensions of these terms, there is an irresolvable vagueness. This can be described in three ways. First, baldness and heaphood might not qualify as real kinds at all, in which case the issue of ontological vagueness does not arise. Second, baldness and heaphood might be real kinds, but our predicates cannot precisely lock onto them, because their reference depends on our limited discrimination capacities. Finally, baldness and heaphood might be real kinds that are in some sense mind-dependent, in which case their boundaries are ontologically indeterminate but only in a way that is parasitic on semantic indeterminacy. This last possibility might also apply to artifact terms, like "boat", phenomenal terms, like "red", or even some social terms, like "bully".⁵ On each of these interpretations, vagueness depends on the indeterminacy of reference.

[38] These remarks have implications for a theory of vagueness that is increasing in popularity. According to authors like Sorensen (1988) and Williamson (1994), vagueness is epistemic in origin. Our words refer precisely to precise objects and precise properties. Vagueness arises only because we can't tell where boundaries are. The proponent of the epistemic approach should explain why we are so ignorant of boundaries. If sharp boundaries exist, why can't we find them? Appeals to limitations in our discriminative capacities offer a natural line of explanation, and Williamson pursues this strategy forcefully. There is, however, something else that must be explained. How does reference work such that our terms end up referring precisely? Here Williams is less convincing. He suggests that reference may depend on subtle patterns of linguistic practice, but admits that such practice is often silent when it comes to borderline cases. We simply have no history of verbal behaviors in which definitive judgment was passed about borderline cases of "bald". Williamson suggests that, in cases where a predicate has not been used positively or negatively, we should default to the negative. If we have never said of a certain number of hairs that it is bald or not bald, then it is not bald (1994: 208). This might eliminate blurry boundaries, but it seems flagrantly ad hoc. Why not go the other way? Moreover, it's not clear what to do in cases where judgments have been inconsistent. If a certain number of hairs has been identified as bald half the time and not bald the other half of the time, what should we say about it? Finally, it seems we often explicitly insist that certain instances are indeterminate and sharply distinguish these from false cases. If meaning supervenes on use, and use distinguishes the false from the indeterminate, why should we treat all non-true cases as false? No independently motivated theory of reference seems equipped to answer such questions. The most widely accepted independently motivated theories of reference seem to imply that many of our terms will not refer precisely. This, I suspect, is the primary source of vagueness for terms like "heap" and "bald".

[39] Somewhat more surprisingly, semantic indeterminacy seems to generate vagueness in bona fide natural kind terms, like "dog", "water", and "tomato". It is widely believed that natural kind reference is established causally. I will focus on causal history accounts.⁶ According to such accounts, a word refers to a kind, because there is an initial baptism in which the introducers of a word are in causal contact with an instance of that kind. One problem with this view, which Devitt (1981) emphasized, is that each object falls under numerous categories, including numerous natural kinds. A single object can be a rottweiler, a dog, an animal, a living thing, and so on. If the word "dog" is coined in the presence of a rottweiler, there is an immediate indeterminacy about which of these kinds a new term will refer to. Devitt calls this the qua-problem. At first blush this problem seems to primarily involve selecting an appropriate level from an ontological hierarchy. Suppose a solution to this problem were devised. Suppose, for instance, that counterfactuals are used to establish that the initial use of the word "dog" was causally related to entities at the dog level of the ontological hierarchy. We might say that the rottweiler caused the initial baptism *qua* dog, because the baptism would have taken place had the dog been replaced by a poodle, and it would not have taken place had the dog been replaced by horse. Such counterfactuals might establish that "dog" refers to a kind that subsumes rottweilers, poodles, and cha hua huas, but not horses. The problem is that there is no guarantee that there is only one such kind. If natural kinds are something like homeostatic property clusters, then there may be numerous kinds that subsume all the existing things we call "dogs". These highly similar natural kinds may differ slightly in their phylogeny or in their permissible degrees of genetic variance. If causal relations determine reference, any number of highly similar real kinds might be causally sufficient for generating tokens of our linguistic expressions. Our initial baptisms of natural kind expressions may be causally overdetermined. They may be like two-bullets cases, in which singular attribution of causal responsibility becomes strained. This would give rise to indeterminacy and the possibility of borderline cases. If our reference determining mechanisms are unable to preclude indeterminacy, vagueness may have more to do with language than with the world.

[40] One might think such indeterminacy problems could be escaped by appeal to scientific deference. Perhaps science can differentiate the subtly different natural kinds, and in deferring to science, our words refer precisely. The problem with this proposal is that scientific differentiation may amount to meaning change. If there really are several highly similar natural kinds that support the counterfactually sensitive lexical baptisms, then science cannot establish which of these kinds our words initially refer to. If they discover several candidates and stipulate that a word refers to one

and not the others, this will be mere fiat. For a vivid case, we can consider the raging debate about whether natural taxa should be individuated morphologically or phylogenetically. It may turn out that both of these methods pick out natural kinds. If so, our baptismal dog encounters put us into contact with two natural kinds: one whose members are determined phylogenetically and one whose members are determined morphologically. If science stipulates that "dog" refers to just one of these, this will alter the meaning of the original term whose reference was grounded in a context indifferent to the distinction. Thus, our current natural kind concepts may suffer from an irresolvable indeterminacy, even if they are grounded in reference to the scientific community.

[41] One might also object by arguing that the present phenomenon gives rise to generality rather than vagueness. The existence of numerous highly similar natural kinds may simply imply that our natural kind terms refer to disjunctive sets of kinds. Perhaps "dog" refers to *both* morphologically and phylogenetically unified kinds. I think this characterization is unconvincing. We have a deep faith that our natural kind terms refer to univocal kinds with common underlying essences. This supposition grounds the rich inductive potential of natural kind concepts. We think properties of individual members of a kind can be attributed to others. Such projectability would be imperiled by treating natural kind terms as general terms. More significantly, our assumption of univocal essences impacts our linguistic behavior: we use kind terms as if they pick out unique kinds. This linguistic policy has semantic implications; it is presumably what makes our natural kind terms qualify as such. Given our intentions to use natural kind terms univocally, it is reasonable to believe that any inadvertent polysemy converts into vagueness. If a term is causally sensitive to two distinct natural kinds and one of the kinds excludes a possible instance that the other includes, then the instance will count as a borderline case. For example, a creature that is morphologically dog-like but not appropriately related to the phylogenetic branch containing familiar dog species, its status as a dog is semantically unresolved. This, at least, is a plausible assessment of how essentialist assumptions and causal over-determination might interact in an adequate theory of reference. If this is the right story, then semantic indeterminacy will generate vagueness in natural kind terms.

[42] A similar claim can be made about proper names. There may be multiple collections of spatiotemporal parts that are candidates for the reference of any name. Each of these collections may be causally sufficient for the state that prompted an initial baptism or for the states that permit covariation. Because I can't distinguish the various regions that might be candidates for the Sahara desert, my

term "Sahara" refers indeterminately. As I remarked above, many of the distinct part collections associated with an object may be vaguely identical, rather than non-identical. Therefore, "Sahara" might end up referring to a single vague multitude rather than referring multiply. In this case, we would say we have a case of a vague referent rather than vague reference. But this does not undermine the case for vague reference. If the members of the multitude turned out to be non-identical, my term would refer multiply. Reference is still fundamentally imprecise, even when metaphysics complies to eliminate referential indeterminacy. The world cannot be properly blamed for the vagueness of proper names, because they would be vague even if the world were precise. At best, we must blame both semantics and ontology.

[43] These considerations do not constitute a decisive argument for the claim that all linguistic vagueness derives from semantic indeterminacy, but they show how that might be the case. At the very least, they give us reason to believe that language would be vague even if the world were precise. There is little reason to think that reference relations can guarantee precision, as proponents of epistemicism would have us believe. A fully adequate case for this claim would require a more detailed examination of how reference works. In this section, I tried to demonstrate that a complete theory of vagueness cannot exist without a complete theory of reference. In the preceding section, I tried to demonstrate that a complete theory of vagueness also requires a theory of objects, properties, and identity. This is why the study of vagueness so philosophically rewarding.

5. Conclusions

[44] Evans' argument against vague objects has significantly advanced debate. It has forced his opponents to clarify the hypothesis that vagueness is ontological in origin, and it has exposed implications that this hypothesis may have for the logic of identity. Still, Evans' argument does not succeed. Its invocation of Leibniz's Law begs the question against vague ontologists. This deficiency opens up room for the possibility that the world is vague. At the same time, I think we should not jump to the conclusion that all the vagueness of language has an ontological origin. If the world were precise, language would remain vague, because reference is determined in ways that do not preclude indeterminacy. The existence of ontological vagueness does not let language off the hook. Understanding the origin of vagueness in language demands scrutiny of the reference relation. To this extent, Evans' prescription that we should look to language in

understanding vagueness is overly restrictive but not entirely misplaced.

Jesse Prinz

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Notes

¹ Salmon (1982) independently arrived at an argument quite like Evans'. Wiggins (1986) and Pelletier (1989) adopt similar strategies. A different approach is developed by Heller (1996). ([back](#))

² (9') might also be used to generate an argument for supervaluationism, because it seems to come out supertrue, when $a=b$ is a vague identity. If a multi-valued logic were used, the antecedent of (9') could have a non-integral value, while its consequent was false. In most systems (including the three valued logic mentioned above), the whole conditional would be assigned a value between true and false. ([back](#))

³ I thank Hud Hudson for getting me thinking about this problem. [\(back\)](#)

⁴ A notable exception is Wheeler (1975) who appeals to theories of reference in arguing for the conclusion that predicates like "tall" are vacuous. This radical conclusion depends, I believe, on unreasonably strict views of lawhood. This, unfortunately, is beyond the scope of the present discussion. [\(back\)](#)

⁵ For the latter two, see Kamp and Partee (1993) [\(back\)](#)

⁶ I think parallel arguments can be devised for informational theories of reference, but I leave this for another occasion. Elsewhere I endorse a mixed informational/historical theory (Prinz, in press). [\(b a c k \)](#)

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