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VAGUENESS IS A KIND OF CONFLATION

Abstract. This paper sketches an understanding of conflation and vagueness according to which the latter is a special kind of the former. First, I sketch a particular understanding of conflation. Then, I go on to argue that vague concepts fit directly into this understanding. This picture of vagueness is related, but not identical, to a number of existing accounts.

Keywords: conflation; vagueness; nontransitive logic; tolerance; borderline cases

1. Conflation

First, I should explain the sort of thing I intend by 'conflation'. The sort of conflation I'm interested in is roughly what's explored in [5, 16, 17] under the name 'confusion'. It occurs when someone treats two (or more) things as though they were just one.[1]

A vignette from Camp illustrates the phenomenon nicely: Fred has an ant farm. Most of the ants in Fred's farm are small; in fact, there are just two big ones, and all the rest are small. Moreover, the big ones — call them Ant A and Ant B — coordinate their activities so that at most one is visible to Fred at any given time, and so that each is visible for about half the time that any big ant is visible. As a result, Fred thinks there is only one big ant in the farm. He calls it 'Charley', and believes many things about it. These beliefs are based on his observations of both Ant A and Ant B, all the while taking them to be the same ant. Fred's

[1] 'Confusion' was, I think, never the best name for this phenomenon. Although it's become somewhat established, it is not so entrenched that change is impossible; I reckon 'conflation' improves clarity enough to be worth the slight discontinuity in terminology.

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concept CHARLEY conflates the ants: it's a concept that Fred uses to treat two things, Ant A and Ant B, as though they were one.

This is a case of conflating *individuals*; not all cases of conflation are like this. It is possible to conflate *properties*, for example by treating mass and weight as though they were the same. And it is possible to conflate *propositions*, for example by neglecting the difference between $\forall\exists$ and $\exists\forall$ scope in multiply-quantified propositions. I have elsewhere developed a theory of propositional conflation [24]; here, I will focus on conflation of *properties*, since this is the kind of conflation most closely related to vague predicates. Vague predicates, I will maintain, denote particular conflations of properties.[2]

1.1. Conflation need not be a mistake

Millikan, Camp, and Lawlor all take conflation to be a sort of mistake. They sketch different understandings of just what's gone wrong with people like Fred, and how we ought to evaluate their beliefs and reasoning, but they agree that Fred's conflation, and conflation generally, is a kind of error. Unlike these authors, however, I do not think one must always be mistaken in conflating. On the account I will sketch here, conflation is a matter of *risk-taking*; but not all risk-taking is mistaken. Sometimes we are wise to roll the dice.

This matters for my purposes, since I will argue that vagueness is a sort of conflation, and I think it's important to see that deploying vague concepts need not involve us in any sort of mistake. Rather, sometimes it's perfectly appropriate to deploy vague concepts, and seeing when it's appropriate to deploy conflated concepts more generally will help make this plain.[3]

[2] Conflation of individuals, I suspect, is relevant for understanding vagueness in singular terms. But I will not explore this connection here; I restrict my attention to vague predicates in this paper.

[3] In fairness, I think this is not really a disagreement, but rather a slight change of subject. The authors I cite focus the phenomenon of *taking* two (or more) things *to be* one, while I focus on the related but distinct phenomenon of *treating* two (or more) things *as* one. The difference is subtle but important. There is no way to take two things to be one without being mistaken in at least this way: the two things, whatever they are, are not one. But it might well be possible to treat two things as one without being mistaken in any way: treating the two things as one may be just what's called for, and can be done with a clear head. Similarly, it is not consistent to take two things to be one while also believing that they are two, or knowing that they are two; but it is perfectly consistent to treat two things as one while believing

1.1.1. Newton and mass

Let me rehearse some relevant facts: Newton's physical theory involved a notion of mass that more recent physics has subdivided. Nowadays (I'm told), physicists distinguish *relativistic mass* (which I will abbreviate 'rm') and *proper mass* (similarly, 'pm'). The exact grounds of this distinction are not important for my purposes; the rough idea is that one of these quantities, relativistic mass, is connected to momentum, velocity, etc, in the way Newton thought mass was, but varies with frame of reference, while the other, proper mass, is frame-of-reference invariant in the way Newton took mass to be, but is not so directly connected to other quantities like momentum and velocity.[4]

It did not occur to Newton, we can suppose, that there were two distinct quantities involved here. This is not, of course, to criticize Newton at all; at the "slow" speeds he had evidence about, the two quantities approximate each other so closely that it would have been very difficult to distinguish them. It is only at very high speeds, approaching the speed of light, that the two quantities come far apart. So Newton took the two distinct quantities to be one, and used his concept MASS to track this one. He was thus treating the two things as one; this is conflation.[5]

1.1.2. Us and mass

Newton, of course, *was* mistaken about mass. However, our everyday concept MASS conflates in just the way Newton's did; in our usual deal-

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or knowing that they are two. But since my focus is not on exploring these previous accounts, I won't dwell on this slight difference.

[4] In case it's not obvious from that paragraph, I am no expert on either the history or the physics here. I am treating Newton and MASS as players in a toy example only, to make the structure of conflation clear.

[5] [11, 12] discusses this case as a case of 'indeterminacy', rather than one of 'conflation' or 'confusion'. This leads [5, p. 49] to say "I would assimilate [what Field calls 'indeterminacy'] to confusion". But Camp must be mistaken here, since Field applies 'indeterminacy' to cases that are not plausibly understood as involving conflation.

For example, Field explicitly cites the following case as one of indeterminacy in [12], drawing on discussion in [2]: it seems as though there is nothing that could make it the case that our term 'i' refers to one of the square roots of -1 rather than the other. So, Field maintains, it is indeterminate which of the roots 'i' refers to. It should be clear, however, that nothing in this case involves treating multiple things as one; we treat i and $-i$ as *two*. The trouble is in understanding which is which, not in conflating them.

ings, we don't bother about the difference between rm and pm in deploying our conflated concept MASS. Our conflation, though, is not necessarily a mistake. To see this, just imagine the alternative.[6]

Suppose that, rather than deploying our conflated concept MASS, we deployed some nonconflated concept or concepts. There are a number of ways we might do this: for any particular use of MASS, we might replace it with RELATIVISTIC MASS, or PROPER MASS, or the disjunction RM OR PM, or the conjunction RM AND PM, at least — all of these are nonconflated concepts in the area. There is also no reason to antecedently expect a uniform policy of deconflating. Different uses of MASS might be most appropriately replaced with different nonconflated alternatives.

One thing jumps out immediately: it would be really hard to do this. Imagine that you're writing down a bread recipe for a friend. When you write "500 grams of flour", you are conflating rm and pm, and encouraging your friend to do the same. But if you had to decide on a nonconflated alternative, which would you go for? Does the recipe need a relativistic mass of 500 grams or a proper mass of 500 grams? Or is it important to have a quantity of flour that is both? Or does it not matter — will either 500g rm or 500g pm do? The answers to these questions turn on the extent to which the processes involved in baking themselves turn on frame of reference. But you probably don't know that extent, and if you do it's taken you work to know it. Choosing the right nonconflated alternative all the time would be *difficult*.

Just because something would be difficult, of course, is not a full reason not to do the thing. Some difficult things are worth doing. But in this case there would be very little payoff. When you use your conflated concept of mass in writing the recipe for your friend, you can *already* be confident that the recipe will work just as it is. If your friend follows the recipe, they will get bread just fine, and choosing a nonconflated alternative wouldn't help things any. If you chose appropriately, the recipe would work just as well as it already does, but not any better. So replacing this deployment of MASS with a nonconflated alternative would be all cost, no benefit. Don't do it!

The same will hold for almost every deployment of MASS we laypeople make: to choose a nonconflated alternative, we would need to know some-

[6] The discussion here is in some ways consonant with [4], but note that Burgess focuses on cases where some theoretical error is being made, while I deny that conflation always provides us with such cases. Thanks to an anonymous referee for bringing this article to my attention.

thing about how the topic we're concerned with interacts with relativity. Most of us, though, don't know this, and it would take effort to learn it. Having learned it, we would typically find that it made no difference at all to what we were concerned with in the first place. The conflated concept works perfectly well for us. To avoid it would be hard, and would bring no benefit. We ought to continue using our conflated concept.

None of this is to say that conflation is *always* beneficial. It's not even to say that MASS should never be replaced with a nonconflated alternative. If your friend is about to enter a near-light-speed high-stakes bread-baking competition and wants your recipe, you would do well to avoid the conflated concept of mass. One of you should figure out which nonconflated alternative will work best. Although it would be no less difficult than in the more realistic case, there would now be a payoff: in your friend's competition, there will be a serious difference between rm and pm, and knowing how to take these distinct quantities into account will help ensure a tasty loaf.[7]

Time to try to draw a more general lesson. Distinguishing distinct things often carries a cost in time, effort, or the like. But failure to distinguish is sometimes harmless or nearly so. These will overlap; there will be a number of cases in which bothering to distinguish isn't worth the trouble. Conflations are thus to be recommended in a certain range of situations: situations in which the difference between the things being conflated doesn't matter enough to make it worthwhile to be more precise. Since rm and pm approximate each other closely at "slow" speeds, the difference between them doesn't matter for almost every situation in which we find ourselves. It takes outlandish cases like the high-speed bakeoff for the difference to matter. In these cases, the conflation can create trouble, and it becomes worth some cost to avoid it.

When you're writing a recipe for your friend, of course, you don't often know exactly the circumstance in which they'll be baking. But —

[7] One possibility floated above is that either 500 grams rm or 500 grams pm will do. (This seems unlikely, but it'll do to make the point; it's certainly an available nonconflated alternative.) In this case, I suppose, the benefit to choosing the nonconflated alternative would be smaller: if your friend just wung it, they would do fine no matter which quantity of flour they used. But before undertaking a study of relativistic baking methods, you couldn't be confident this was the case; the choice of rm or pm, for all you know, *might* matter. So there is at least the benefit of increased *confidence* to be had. Not even this benefit is to be had in more usual recipe cases: you're already perfectly confident the conflated recipe will work if followed at home.

at least if your friends are much like mine — you can be confident that it will be some circumstance in which the difference between rm and pm won't matter. So you may as well save yourself the trouble, and not bother distinguishing. If you were not confident about this, on the other hand, then it might be worth it to draw the necessary distinctions. You'd have to weigh your confidence that it would or wouldn't matter against the cost of drawing the distinction.

Using a conflated representation, then, is running a risk: the risk that the representation will blur a distinction that turns out to matter. This risk is to be handled in the way risks are always to be handled: wisely. I don't have much to say about how to handle risks wisely here, except to insist that it is not always a mistake to run them. Sometimes it can obviously be the sensible thing to do, as when you send a recipe to your friend. The chance that your friend, unbeknownst to you, will attempt to execute the recipe at near light-speed is negligible in this case. You may as well run the risk.

So conflation need not be a practical mistake. But it also need not be a theoretical mistake. When we deploy our conflated concept MASS, we do not forget what we know about rm and pm; we can be perfectly aware of MASS's conflated status. While conflation, particularly uncareful or unknowing conflation, can result in mistakes both theoretical and practical, conflation itself is not necessarily any kind of mistake. We can and do, at least sometimes, engage in it fruitfully and clearheadedly.

1.2. Blurring

Here I give a brief overview of a formal treatment of conflation I have developed in [24].[8] Rather than attempt a full picture, I only present those parts of the formal treatment that I will appeal to in Section 2, where I turn to vagueness. This treatment attempts to capture validity in a representational system exhibiting conflation; it says nothing about truth, reference, or the like.[9] The appropriate notion of validity is not a purely formal one; it is, rather, the notion of *material validity*, as explored in [3, 25].

[8] Some details are handled differently here, but the core idea is the same.

[9] Questions about truth and reference as they relate to conflation are interesting and worthwhile, but I will not address them here. [5, 13, 16] give different perspectives on these issues.

If we want to understand the material validities that hold among conflated propositions, we will need some story about which material validities hold among their unconflated analogues. So the treatment involves two formal languages, which I will call $\mathcal{L}$ and $\mathcal{L}^{\approx}$. The sentences of $\mathcal{L}$ are to be understood as *unconflated* propositions, and those of $\mathcal{L}^{\approx}$ as their analogues in a language exhibiting conflation. For example, in the case of Fred and the ant farm, $\mathcal{L}$ contains separate propositions about each of ant A and ant B, while $\mathcal{L}^{\approx}$ contains propositions about Charley instead. Where there is no conflation, there is no need for the languages to differ. Both $\mathcal{L}$ and $\mathcal{L}^{\approx}$ presumably contain the proposition The ant farm is on Fred’s favorite table, for example.

A relation $R^{\approx} \subseteq \mathcal{L} \times \mathcal{L}^{\approx}$ records what is and isn’t conflated. For each sentence t in $\mathcal{L}^{\approx}$, the language exhibiting the conflations we’re concerned with, $sR^{\approx}t$ iff s is among the propositions conflated as t. (When t doesn’t conflate anything, count it as conflating just itself.) For example, in Fred’s case, Ant A is healthy $R^{\approx}$ Charley is healthy, and Ant B is healthy $R^{\approx}$ Charley is healthy. Unconflated propositions are handled easily, since they appear in both $\mathcal{L}$ and $\mathcal{L}^{\approx}$: The ant farm is on Fred’s favorite table $R^{\approx}$ The ant farm is on Fred’s favorite table. The situation can be visualized as in the following figure:

A: Ant A is healthy
B: Ant B is healthy
C: Charley is healthy
T: The ant farm is on Fred’s favorite table

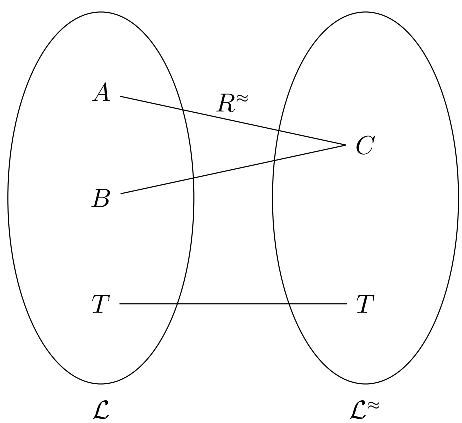

Figure 1. The setup for Fred

Lift $R^{\approx}$ to a relation between $\wp\mathcal{L}$ and $\wp\mathcal{L}^{\approx}$ by setting $\Gamma R^{\approx}\Gamma'$ iff: 1) each $\gamma \in \Gamma$ has some $\gamma' \in \Gamma'$ with $\gamma R^{\approx}\gamma'$, and 2) each $\gamma' \in \Gamma'$ has some $\gamma \in \Gamma$ with $\gamma R^{\approx}\gamma'$. That is, $R^{\approx}$ relates two sets when everything in either set has an $R^{\approx}$-related mate in the other.

Let a *sequent* on a language be a pair of subsets of the language, and let a *consequence relation* on a language be a set of sequents on the language. Each sequent represents an argument, with a set of premises and a set of conclusions; a consequence relation says which sequents are valid (by containing them) and which are not (by excluding them). Let $C(\mathcal{L})$ be the set of consequence relations on $\mathcal{L}$, and likewise for $C(\mathcal{L}^{\approx})$. Then we can induce a function $\mathtt{blur}\colon C(\mathcal{L}) \to C(\mathcal{L}^{\approx})$ from $R^{\approx}$ as follows:

$$\langle \Gamma, \Delta\rangle \in \mathtt{blur}(X) \quad \text{iff} \quad \exists\langle \Gamma', \Delta'\rangle \in X \text{ such that } \Gamma' R^{\approx} \Gamma \text{ and } \Delta' R^{\approx} \Delta.$$

Where X records the unconflated material validites for $\mathcal{L}$, $\mathtt{blur}(X)$ gives the material validities for the conflated language. This way of understanding conflation has a number of nice features (explored in more depth in [24]). First, whenever a $\mathcal{L}$ argument is valid according to X, any argument appropriately related to it by $R^{\approx}$ is valid according to $\mathtt{blur}(X)$. This is closely connected to Camp's [5] desideratum of 'inferential charity', and records (the contrapositive of) the commonsense notion that drawing new distinctions can only *invalidate* arguments, not validate new ones. Second, this approach does not generate validities willy-nilly; if an argument is valid according to $\mathtt{blur}(X)$, then there must be *some* underlying unconflated validity. In a (perhaps not very catchy) slogan: conflated propositions have all the inferential properties of the propositions they conflate, and no more.

In general, $\mathtt{blur}(X)$ can differ from X in a variety of ways. In particular, even if X is a transitive consequence relation, $\mathtt{blur}(X)$ need not be. An example reveals this:

- $\mathcal{L}$: a usual propositional language
- $\mathcal{L}^{\approx}$: the same language as $\mathcal{L}$
- $R^{\approx}$ relates each proposition in $\mathcal{L}$ to itself, and in addition relates each disjunction $A \vee B$ in $\mathcal{L}$ to $A \wedge B$.

Now, let X be the usual consequence relation of classical propositional logic. This is clearly a transitive consequence relation. But $\mathtt{blur}(X)$ is not; according to $\mathtt{blur}(X)$, the argument from p to $p \wedge q$ is valid, and the argument from $p \wedge q$ to q is valid, but the argument from p to q is not valid. Let's look at each of these three claims in turn. First, note that the argument from p to $p \vee q$ is valid according to X. Since $pR^{\approx}p$ and $p \vee qR^{\approx}p \wedge q$, this gives the validity according to $\texttt{blur}(X)$ of the argument from p to $p \wedge q$. Second, since the argument from $p \wedge q$ to q is already valid according to X, and since both $pR^{\approx}p$ and $p \wedge qR^{\approx}p \wedge q$, this gives the validity according to $\texttt{blur}(X)$ of the argument from $p \wedge q$ to q. Finally, we turn to the argument from p to q. Neither of these is conflated with anything (other than itself): p is the only A such that $AR^{\approx}p$, and q the only A such that $AR^{\approx}q$. Since the argument from p to q is not valid according to X, then, neither is it valid according to $\texttt{blur}(X)$.

So with this choice of $R^{\approx}$, the blurring process can take us from a transitive consequence relation to a nontransitive one. This is the manifestation, within this approach, to the phenomenon of *equivocation*. It is possible for the argument from A to B to be valid, and for the argument from B to C to be valid, without the argument from A to C being valid, if B conceals an equivocation. That is, equivocation leads directly to nontransitivity; this is captured on this approach to conflation. (Again, see [24] for more on this approach to conflation.)

2. Vagueness

This section will lay out an understanding of vagueness as a sort of conflation, and argue that this understanding can shed light on why vague concepts behave as they do, in particular why they exhibit *tolerance* and *borderline cases*.

2.1. Vagueness and multiplicity

There is a picture of vagueness as some kind of multiplicity that appears in a number of very different theories; here I'll gesture at the examples of contextualism, epistemicism, and supervaluationism, or at least particular varieties of these three approaches. (For my purposes here, it is not the formal differences between these approaches that matter, but their different philosophical understandings of vagueness.)

All these theories of vagueness associate each vague concept with a set of precise properties; I'll refer to this set as the vague concept's *range*. For example, consider the vague concept NOONISH. Its range comprises precise properties like WITHIN 5 MINUTES OF NOON, WITHIN 6 MINUTES

OF NOON, etc.[10] There is some limited agreement that associating vague concepts with ranges is a helpful way to understand them. But just what the relation is between a vague concept and its range is a matter of some dispute, even among those who accept the general idea.

Contextualists, for example [10, 18, 19], think that each deployment of a vague concept is coextensive with some particular member of its range, but allow that different deployments are coextensive with different members.[11] Thus, vague concepts end up with precise but shifty extensions: vagueness is a dynamic phenomenon.

For a different approach, we can look to epistemicists, for example [28, 29], who take each vague concept to be coextensive with some particular member of its range. A concept's range for the epistemicist comprises those precise properties that can't be known not to be coextensive with the vague predicate. We can see them as the precise properties that are coextensive with the vague concept at various epistemically accessible worlds. One of these epistemically accessible worlds is actual, but we don't know which; such is epistemic accessibility.

Or we can consider supervaluationists, for example [15]. According to Keefe, "our practices do not determine a precise extension to 'tall', [but] they do determine a (vague) range within which the precise extension would have to be if there were one" (p. 153). On an approach like this one, the members of the range of a vague concept are those precise properties such that our practices do not rule out that they are coextensional with the vague concept in question.

Of course this is very far from an exhaustive list, and there are a number of theories of vagueness, such as many fuzzy theories, that are probably not well-understood in this way. But it is striking that so many different approaches, with different motivations, are drawn to understanding vague concepts via their ranges. Moreover, there is very little disagreement between these approaches as to *which* precise properties

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[10] The extent of a vague concept's range is almost always itself taken to be vague; this is one kind of 'higher-order vagueness'. For the most part, I will set higher-order vagueness aside in this paper, although see Section 2.3. See also [23] for a fuller attempt to explain why higher-order vagueness does not pose a serious worry for at least some range-based theories. I believe the strategy I outline there will adapt to the present case, but I won't pursue the point.

[11] Other contextualist views, such as those in [14, 27], don't fit this setting quite as cleanly. Details of these various accounts are beside the point here, though.

fall in the range of any particular vague concept. The disagreement is only about the nature of the relation between a concept and its range.

2.2. Why conflation?

So there is some limited consensus that vagueness can be productively understood as multiplicity of some sort. I want to add to this consensus a voice that takes vague concepts to denote *conflations* of the precise properties falling in their range.

I will limn this view by showing how it explains, quite naturally, the two phenomena most characteristic of vagueness: tolerance and borderline cases. Moreover, the ways in which this theory explains these phenomena are not shareable by other multiplicity-based theories. Of course, those theories may offer different explanations; nothing I say here argues otherwise. In particular, I am certainly not here arguing that the conflation theory offers *better* explanations than are available to these other theories; that's for another day. For now, I merely want to point to explanations available to the conflation theory that would not otherwise be available. These explanations will draw on the formal treatment of conflation sketched in Section 1.2.

2.2.1. Tolerance

First, tolerance, in the sense of [30]. Vague concepts seem to be *tolerant*; that is, when we have two objects that differ from each other only slightly in the respects relevant for some vague concept, then the concept either applies to both of them or neither of them. The concept can't draw a sharp line between things that differ only slightly. Consider the concept TALL, and suppose for a moment that all that matters for whether someone is tall is their height. Then if we have two people whose heights differ by a tiny amount, no matter what their heights actually are, it cannot be that one is tall and the other is not. If one is tall, then so is the other.

This not only seems to be true of vague concepts, but it is crucial to understanding the role they have played in philosophical discussion. It is tolerance that drives the sorites paradox, seeming to lead us inexorably from reasonable judgments towards unreasonable ones. To understand how sorites arguments fail (as they must), it's vital to understand the source and nature of tolerance intuitions.

If vague concepts are conflations of the precise properties in their range, though, then we should expect them to exhibit tolerance, as I will now argue. Consider TALL on this approach, as represented in this toy model:

- $\mathcal{L}$: a usual first-order language with a unary predicate $T^{>x}$ for each height x, meaning IS TALLER THAN x, and a binary predicate $D^{<d}$ for each difference d in heights, meaning DIFFER IN HEIGHT BY LESS THAN d.
- $\mathcal{L}^{\approx}$: a usual first-order language with all the vocabulary of $\mathcal{L}$, plus an additional unary predicate T, meaning TALL.
- $R^{\approx}$ relates each proposition in $\mathcal{L}$ to itself in $\mathcal{L}^{\approx}$, and in addition relates each proposition P in $\mathcal{L}$ to the proposition in $\mathcal{L}^{\approx}$ obtained from P by replacing each $T^{>x}$ such that $T^{>x}$ is in the range of TALL with T.

The situation is partially represented in Figure 2. This figure makes a particular concrete assumption about the range of TALL; I am setting aside the fact that this range is itself certainly vague, for the sake of a clearer illustration.

Assuming: the range of TALL includes $T^{>x}$ with $170cm \leqslant x \leqslant 185cm$.

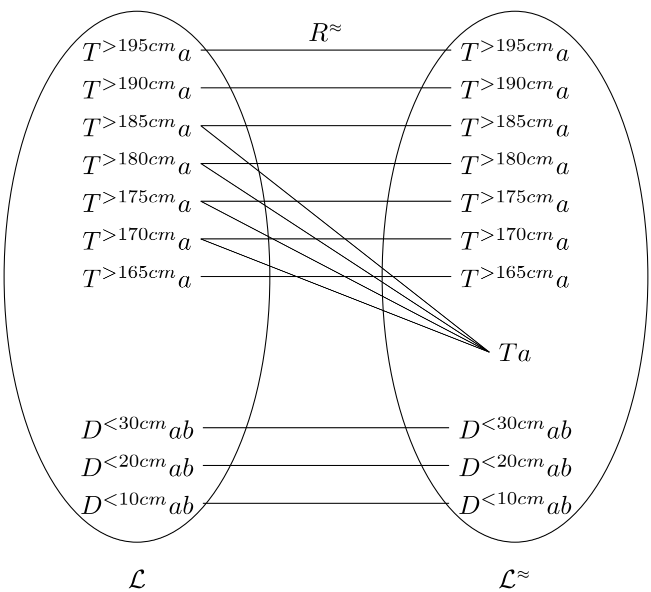

Figure 2. Part of the setup for TALL

This choice of $R^{\approx}$ is given by the conflation-based theory of vagueness under consideration, together with a simpleminded (but I believe correct) idea about how conflation relates to the compositional structure of a language. The needed idea here is that when we conflate properties, we thereby conflate propositions that feature those properties in corresponding ways. So, for example, conflating $T^{>h}$ with $T^{>i}$, giving T, should lead to conflating $\forall x T^{>h} x \wedge \exists y T^{>i} y$ with $\forall x T^{>i} x \wedge \exists y T^{>i} y$ (among other things), giving $\forall x T x \wedge \exists y T y$.[12]

Now, take heights x and y in the range of TALL such that $y < x$. The following arguments are materially valid in $\mathcal{L}$, because math:

$$D^{<x-y}ab \vdash T^{>x}x \supset T^{>y}b$$
$$D^{<x-y}ab \vdash (T^{>y}x \wedge T^{>y}b) \vee (\neg T^{>x}a \wedge \neg T^{>x}b)$$

That is, given that a and b differ in height by less than $x-y$, it must be that if a is taller than x then b is taller than y, and it must be that either both are taller than y or else neither is taller than x. For either conclusion to fail, a and b would have to differ in height by more than $x-y$; but this is just what the premise rules out in each case.

Given the approach to conflation sketched in Section 1.2, though, this gives us the following as materially valid in $\mathcal{L}^{\approx}$:

$$D^{<x-y}ab \vdash Ta \supset Tb$$
$$D^{<x-y}ab \vdash (Ta \wedge Tb) \vee (\neg Ta \wedge \neg Tb)$$

These validities are statements of tolerance: given that a and b differ in height by less than $x-y$, if a is tall then so is b, and either both are tall or neither is. All that we needed to reach this conclusion is that $T^{>x}$ and $T^{>y}$ are both in the range of TALL. (Surely they are not the only two precise predicates in this range, but that does not affect the situation.)

Of course, TALL is just one vague concept. But the way we have arrived at tolerance here will also work in general. The properties needed for the range are just the usual properties invoked by range-based theories of vagueness of all sorts. The only additional ingredient needed here is something to play the role played by $D^{<d}$ above: a *similarity* predicate, recording similarity in the appropriate respects. For TALL, this is similarity in height; for BALD, similarity in hairiness; for NICE, similarity in niceness; and so on. Tolerance, on this approach, is a statement of the

[12] Some initial argument for this is given in [24]. Detailed study of the interaction between conflation and the compositional structure of a language awaits future work.

interaction between a vague predicate and a related similarity predicate. Many usual formal statements of tolerance work differently: they bury the similarity claim in an informally-understood notion of 'next thing in a sorites series'. But what it is for a series of objects to *be* a sorites series for a predicate P depends on a notion of similarity in respects relevant for the application of P; we may as well formalize this directly, rather than leave it offstage.

If, then, the material validities obeyed by conflated concepts are as I've outlined in Section 1.2, and if vague predicates indeed denote conflations of the concepts in their range, then tolerance is materially valid for vague predicates. Moreover, if the approach to conflation outlined in Section 1.2 not only captures but also *explains* the material validities obeyed by conflated concepts,[13] then if vague predicates indeed denote conflations of the concepts in their range, this tells us *why* they are tolerant.

The conflation theory of vagueness predicts that vague predicates will obey tolerance, and the way this prediction is generated is unique to the conflation theory. This approach sees different parts of tolerance as contributed by different members of a vague concept's range, and sees the vague concept itself as treating these different sources as one. So long as a vague concept is what we use when we ignore the difference between precise concepts in its range, we are right to take the vague concept to obey tolerance; it does.

The other range-based theories under present consideration — contextualism, epistemicism, and supervaluationism — are different. Proponents of these approaches say we are mistaken to take the vague concept to obey tolerance. So the conflation theory differs substantially from these in its approach to tolerance, by endorsing it.

Of course, it is usually taken as a truism that tolerance *cannot* be valid, since that would seem to get us right back into trouble with the sorites paradox. In this setting, though, that trouble does not arise. While $D^{<x-y}ab \vdash Ta \supset Tb$, and $D^{<x-y}bc \vdash Tb \supset Tc$ (the latter by the same reasoning as the former, mutatis mutandis), we do *not* have $D^{<x-y}ab, D^{<x-y}bc \vdash Ta \supset Tc$.[14] *One* difference less than $x - y$ can't take us from under y to over x, but *two* such differences may well.

[13] I believe this is a plausible thesis, but will not argue the point here.

[14] That is, the current assumptions in play about x and y do not suffice for this. If x and y are chosen close enough to each other, it might take more than two steps to reveal the breakdown in reasoning.

While the validity of tolerance guarantees that *each* step of a sorites argument is valid, nothing at all guarantees that these steps can be *chained together* in a way that preserves validity. As I pointed out in Section 1.2, the blurring technique deployed to understand conflation can lead to failures of transitivity. This is so even if the underlying precise (unconflated) language obeys a perfectly transitive consequence relation. This way of understanding vagueness and conflation, then, leads directly to treatments of sorites paradoxes like those in in [6, 22].

2.2.2. Borderline cases

So much for tolerance; on to borderline cases. Figuring out which cases are the borderline cases is easy on any range-based approach: a borderline case of a vague concept is an object that falls in some members of the concept's range and out of others. This much is available to any theory involving such ranges. But different understandings of the nature of the ranges result in different understandings of what borderline cases are.

Among the phenomena that any account of borderline cases needs to capture: we are *torn* about assertions of things like "Alice is tall", when Alice is a borderline case of TALL. We often genuinely do not know what to say, and not in a comfortable way. We want to say that Alice is tall, and we want to say that she is not. We want to resist saying either of these things, too. We also want to say that she is both, and that she is neither.[15] Moreover, when pressed to describe the borderline case, we often prefer to avoid the vague concept entirely, either switching to a precise concept ('Is she tall? Well, she's x in height / taller than Jim.') or a different vague concept with its borderline safely tucked out of the way ('Is she tall? Well, she's not short.').

The conflation hypothesis explains all these phenomena directly, in a way unavailable to the other multiplicity-based theories. When we try to use a vague concept in its own borderline, we are deploying a conflated concept in a case where the conflation makes a difference. It is as though we were offering our friend an ordinary recipe for their high-speed bake-off. When the difference between things makes a difference, we should not treat them as one. But to use the vague concept, on the conflation theory, is to treat them as one. This explains, right off the bat, why we'd often prefer to use different concepts entirely in the borderline area.

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[15] For supporting experimental work, see [1, 9, 20] — but note also [26].

But it also explains why, when we *do* deploy a vague concept in its own borderline, we deploy it with such tension and ambivalence. Suppose that Alice is a borderline case of TALL. Then there are precise properties $T^{>y}$ and $T^{>x}$ in the range of TALL such that Alice has $T^{>y}$ and lacks $T^{>x}$. Where A is the precise truth about Alice's height, we presumably have the following precise material validities:

$$\begin{aligned}&A \vdash T^{>y}a\\&A \vdash \neg T^{>x}a\\&A \vdash T^{>y}a \wedge \neg T^{>x}a\\&A \vdash \neg(T^{>x}a \vee \neg T^{>y}a)\end{aligned}$$

Blurring as before, this gives the following:

$$\begin{aligned}&A \vdash Ta\\&A \vdash \neg Ta\\&A \vdash Ta \wedge \neg Ta\\&A \vdash \neg(Ta \vee \neg Ta)\end{aligned} \tag{1}$$

The truth about Alice's height entails that she is tall, and that she's not, and that she's both tall and not tall, and that she's neither tall nor not tall. But things are not this simple, owing to the validity of the following precise arguments:

$$\begin{aligned}T^{>x}a &\vdash T^{>x}a\\\neg T^{>y}a &\vdash \neg T^{>y}a\\T^{>x}a \wedge \neg T^{>x}a &\vdash \bot\\\neg(T^{>x}a \vee \neg T^{>x}a) &\vdash \bot\end{aligned}$$

(Here, we can understand $\bot$ simply as 'a contradiction obtains', to avoid too many contentious logical assumptions.) Because of these, blurring yields the following:

$$Ta \vdash T^{>x}a \tag{2}$$

$$\neg Ta \vdash \neg T^{>y}a \tag{3}$$

$$Ta \wedge \neg Ta \vdash \bot \tag{4}$$

$$\neg(Ta \vee \neg Ta) \vdash \bot \tag{5}$$

Although the plain truth about Alice's height entails, as in (1), the premises of each of these arguments, each of the conclusions of these arguments is the sort of thing we may well not want to accept. (For (2) and (3), this is straightforward; nobody should want to accept that Alice is taller than x, or that she is not taller than y, since it was part of the specification of the case that she *is* taller than y and *not* taller than x. For (4) and (5), this relies on reluctance to accept that a contradiction obtains, which is controversial in this setting. Here, I will simply take such reluctance as given.)

This leaves us with some difficulty about what to say regarding the four crucial pivot sentences: Ta, $\neg Ta$, $Ta \wedge \neg Ta$, and $\neg(Ta \vee \neg Ta)$. Each of them is entailed by straightforward facts about Alice's height, and yet each of them entails claims we want to resist. We ought to be torn, and we are.

If we assume that material validities are transitive, then this difficulty spreads: we would have straightforward facts about Alice's height themselves entailing the claims we want to resist. But as pointed out in Section 1.2, material validities involving conflations need not be transitive, even when the underlying unconflated material validities are transitive. In particular, given the languages and blurring relation specified here, we retain all of the following *in*validities in $\mathcal{L}^{\approx}$:

$$A \nvdash T^{>x}a$$
$$A \nvdash \neg T^{>y}a$$
$$A \nvdash \bot$$

None of these arguments involves anything that has been conflated in the move from $\mathcal{L}$ to $\mathcal{L}^{\approx}$, and so each is valid in $\mathcal{L}^{\approx}$ iff it is valid in $\mathcal{L}$. Since none are valid in $\mathcal{L}$, none are valid in $\mathcal{L}^{\approx}$. To take them to be valid on the basis of (1) and (2)–(5) would be to equivocate.

So while we have difficulty in saying whether Alice is tall, or not tall, or both tall and not tall, or neither tall nor not tall, this difficulty does not spread to any precise claims about her height. The trouble stays confined to the concept actually wrapped up in the conflation: TALL.[16]

2.3. Higher-order vagueness

I'll close by remarking briefly on higher-order vagueness in this setting. One kind of higher-order vagueness is usual for range-based theories: while I have been treating the range of a vague predicate as having

[16] For further discussion of how we might respond in such a situation; see e.g. [6, 7, 21].

precise boundaries, this is presumably something of an idealisation. We should expect that the range is itself vague. That is, it is vague *which* precise properties are conflated in the move to vague concepts.

The construction outlined in Section 1.2, though, is ready for this. While I there presented $\mathcal{L}$ as an unconflated language, in fact nothing at all in the construction hangs on this. It is possible to take the $\mathcal{L}^{\approx}$ produced as output by this construction and use it as the input $\mathcal{L}$ for another run, simply by providing another conflation relation $R^{\approx}$. This is as it should be; it is perfectly possible to conflate things even when one or more of those things is itself already a conflation. (We do this, for example, when we conflate WEIGHT with MASS; as we've seen, MASS itself is already conflated.)

So if first-order vague concepts are conflations of precise ones, second-order vague concepts can be conflations of first-order vague ones, third-order vague concepts can be conflations of second-order vague ones, and so on. The formalism provided here can accommodate all this without trouble, if needed.

3. Conclusion

In this paper, I've sketched an understanding of conflation — treating distinct things as one — on which we can see conflated concepts as inheriting all the inferential behavior of the things they conflate. I've abstracted the idea of a *range* from a variety of different approaches to vagueness, and explored the idea that vague concepts denote conflations of the precise properties in their range. If the suggested theory of conflation is correct, and if vague concepts do indeed denote such conflations, then immediate predictions follow: first, vague predicates are *tolerant*, in the sense of [30]; and second, we should be *torn* about how (or whether) to apply them to borderline cases. Both predictions are accurate.

I have not here done much to explore the logic of vague predicates on this approach. This logic will certainly be nontransitive, for reasons that this paper has examined. The overall shape of the logic, though, will depend on the shape of the underlying logic taken to apply to unconflated or precise terms. When this logic is classical, the resulting logic for vagueness turns out to bear very close connections to the logics proposed in [6, 8, 22]; exactly how close these connections prove to be is a question for future work.

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