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Toward a Rigourous Definition of Vagueness in Semantics

Philippe Gauthier
Western University, pgauthi3@uwo.ca

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1.   Introduction

Consider the following propositions:

(1)   Jean is old.
(2)   This paper is red.
(3)   Burt is bald.
(4)   This coffee is expensive.

They share one particular characteristic, namely that of vagueness. That is, whereas the individual words may be simple enough to define, determining the truth value of the propositions remains an elusive task. For instance, even if we determine Jean's age with incredible precision, it is still difficult to tell whether she counts as being old. In fact, it is the predicates *old* and *red* which seem to be the loci of this uncertainty. Bueno and Colyvan (2012) suggest that vagueness can be thought of as the uncertainty about the application of the predicate in question, once all other epistemic uncertainty is stipulated away—it is the uncertainty that is left over.

At first blush, a vague predicate exhibits the following characteristics (Kennedy 2011): context-sensitive truth conditions; borderline cases; *sorites*[1] susceptibility. A vague predicate has context-sensitive, variable truth conditions: we could construct two different contexts in which the example from above, *Jean is old*, would have different truth values. For instance, imagine that Jean is a 6-year-old toddler just entering kindergarten, where all of her peers are no older than 4. In this context, the proposition *Jean is old* would be true. Of course, it is trivially easy to imagine a scenario in which, for instance, Jean is now back home where she is the youngest of 3 siblings ranging from 10 to 15 years of age. In this context, the same proposition is no longer true. Note that, although Jean's age has not changed, a change in context is enough to signal a change in truth value.

A vague predicate allows for borderline cases. To illustrate, let us consider the second example of a vague predicate from above, *red*. Imagine a booklet with 20 paint samples. On the first sample we see a bright firetruck engine red, while sample 20 displays a categorical orange. Each sample in between shows a shade of red progressing gradually toward orange. Sample 2 is slightly less red than sample 1, while sample 19 is slightly less orange than sample 20, and so on. Imagine flipping to sample 10, which is painted a shade of colour not quite red but not quite orange. The proposition *this paper is red* is therefore not quite true, but not quite false either. In other

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[1] Hyde (2011) provides the etymology for the name of this paradox, which derives from the Greek word *soros*, meaning 'pile'. The original version is a challenge to determine at which point a set of individual grains of rice becomes a pile. Clearly a single grain does not count, nor do two. Equally clearly is that at some point, a pile is formed after sufficiently many grains are added. How can we know the definition of the word 'pile' when we can't tell the moment one is created?

words, sample 10 is a borderline case of redness since its inclusion in the set of all things that are *red* is not quite determinable.

Finally, vague predicates lead to various paradoxes, chief among them is the sorites paradox. This is an inductive reasoning where the first two premises are true but the conclusion is false. Consider the following example:

(5) Sorites paradox:
  I. A one-day old person is not old.
  II. If an n day old person is not old, then an n+1 day old person is not old.
  III. A 36,500 day (i.e. 100 years) old person is not old (false).

The challenge posed by the sorites is that each of the first two premises seems sound, yet the conclusion is definitely false. Specifically, the second premise seems to be where this argument breaks down. After some number of iterations, we no longer feel that it is true. Of course, it is impossible to determine which iteration is false. This can be termed the problem of fuzzy boundaries, i.e. there clearly is a point after which n days old is old, but we can't determine exactly where that is.

Write (1975) describes vagueness in terms of *tolerance* whereby a vague predicate tolerates a certain margin within its scope. Given some vague predicate P, there exist some values, x1 and x2, which have a marginal distance such that P(x1) and P(x2) have the same truth conditions. The predicate *bald* is vague since it allows a certain minimal number of strands of hair before its application is false. In other words, Burt, who has absolutely no hair, and Ray, who has 10 hairs in total, both count as examples of bald men. Even if it is impossible to determine at what point does a man no longer count as being bald, both Burt and Ray are within the margin of tolerance for this predicate.

1.1   Preliminaries

The topic of vagueness is relevant not only to the philosopher, who has to deal with the fact that these predicates lead to paradoxes, but also to the linguist, who wonders what implications the existence of vagueness has on our knowledge of lexical items, and so on. Consider for instance the predicate *tall* and the proposition *Taylor is tall*. Presumably we know certain properties about Taylor, the most relevant among which is that she is 130 cm tall. We might also stipulate that she is female, human, North American, 12 years old, etc. As for the predicate, its definition would presumably state that a particular object's height must surpass a particular threshold. The problem is clear: given all this information, it remains unclear whether Taylor counts as *tall*.

In order to properly examine the phenomenon of vagueness, a proper understanding of its characteristics is paramount. Obviously this includes a proper understanding of exactly what characterises vagueness in the first place. Bueno and Colyvan (2012) suggest that in characterising vagueness, various authors have begged the question against one or more schools of thought, effectively introducing bias into the research question from the start. In order to avoid such bias, the goal of the current paper is therefore twofold: first, we survey the main schools of thought with respect to vagueness; second, we attempt to arrive at a more narrowed definition of what characterises vagueness. One of the benefits of this endeavour is a more nuanced understanding of what constitutes a vague predicate. It will become clear, for instance, that proper vagueness is often conflated with epistemic uncertainty in general, which ultimately skews our understanding of the phenomenon.

Before starting such a discussion, I believe that the three properties of vagueness given above can be narrowed into two main problems. Consider the first property, that of context-sensitive truth conditions. This states that the truth value of a proposition P(x), where 'P' is a vague predicate such as *old* and 'x' is a particular extension such as *Debbie*, depends on the context. This dependency implies a comparison between two entities, 'x' and 'A', along the P-dimension. In this case, 'A' can be thought of as a prototypical entity which renders P(A) true. In other words, imagine that we set A=Gerry, where Gerry is 50 years old and the proposition *Gerry is old* is determined to be true. Now, determining whether *x=Debbie* counts as *old* is just a matter of comparing her age with Gerry's. If they are similar (or if hers is greater than his), we can now determine that P(x) is also true.

Alternatively, we can think of A as a particular value, such as 50 years old. In fact, this abstraction does not change the overall logic of the comparison. That is, if 'A' is such that P(A) is true, and 'A' and 'x' are sufficiently similar, then P(x) is also true.

The sorites paradox, by contrast, determines the context 'A' in the first two premises. The goal of the third line is to choose some entity 'x' which is sufficiently dissimilar to A along the P-dimension such that P(x) is false. For instance, observe the following two formulations of the first line of the paradox:

(6) a   A 45-year-old person is old.
     b   A 200-year-old person is old.

Under premise (6a), Debby's age is compared against 200 years old. Clearly, Debby no longer counts as old, given premise (6b). On the other hand, premise (6a) sets the starting value at a mere 45 years old. Debby would therefore count as old under premise (6a) since these values are sufficiently similar. In other words, the sorites relies on a comparison between premise (6a) and the concluding line. If these are sufficiently dissimilar, the paradox holds (i.e. the conclusion is false). It seems therefore that the context sensitivity of the truth conditions of vague predicates is actually a property of the sorites paradox.

Therefore, the remainder of this article will focus on two general properties: the sorites paradox and borderline cases. Section 2 will briefly overview various theories of vagueness, namely focusing on epistemic uncertainty and semantic indecision/uncertainty; section 3 will re-examine borderline cases and the sorites paradox in light of these theories in order to arrive at a proper characterisation of vagueness, which will be elaborated in section 4. Finally, section 5 will discuss the nuance of scalar versus non-scalar predicates and argue that these represent two fundamentally different types of uncertainty. The former will be termed true vagueness, while the latter is simply a case of epistemic uncertainty.

2.   (Brief) Review of Theories on Vagueness

Theories on vagueness roughly fit into two broad categories. On the one hand, vagueness is seen as part of epistemic uncertainty about the universe. For instance, *Mount Everest* is vague because no one has ever taken the trouble to calculate with absolute precision when and where the mountain starts and stops. In other words, we have a gap in our knowledge with respect to the precise definition of Mount Everest. It may even be the case that such a gap could never be filled, i.e. such precise measurements may be in principle impossible. Nevertheless, an omniscient god would presumably be aware of the precise definition of Mount Everest. That is, there would be a fact of

the matter with respect to when and where Mount Everest begins and ends, even if we may never know for sure.

Williamson (1994) develops the idea of epistemic uncertainty in order to account for vagueness as a phenomenon that exists in our knowledge about the universe. In this view, there may not be any actual semantic vagueness at all, since our language can always adjust depending on how much we learn. For instance, if we somehow discovered the fact of the matter regarding the exact description of Mount Everest, then our language would automatically incorporate this new knowledge into its definition.

Williamson develops the principle that vague knowledge requires a margin for error. Specifically, "for a given way of measuring differences in measurements relevant to the application of property P, there will be a small but non-zero constant c such that if x and y differ in those measurements by less than c and x is known to be P, then y is known to be P." (Williamson 1994, cited from Kennedy 2011:526). In these terms, c is the margin of error such that if x and y differ by less than c, then their difference is trivial with respect to P.

Opposing the epistemicist is the linguist who argues in favour of semantic uncertainty. Whereas the epistemicist claims that our knowledge of the universe is incomplete and therefore vague, the linguist maintains that vagueness is actually a feature of language itself. For instance, no one has defined Mount Everest precisely enough such that it would determine its exact boundaries. The same is true of other vague predicates. If, for instance, *bald* were defined as the presence of fewer than 10 strands of hair, it would be a simple empirical question as to whether it applied to anyone in particular. Vagueness therefore has to do with the imprecision of our words and concepts.

Fine (1975) demonstrates that, although a particular vague proposition might lack a clear truth value, logical relations such as the law of the Excluded Middle can still hold between such sentences. For instance, although the sentences in (1)-(4) are vague and therefore their truth values are unclear, we still have strong intuitions about the following:

(7)   Jean is old or Jean is not old.
(8)   Jean is old and Jean is not old.

Although sentence (1) has a missing truth value (insofar as it is not easily determined), (7) is clearly true whereas (8) is clearly false. In fact, no matter how the context changes or how many stipulations are made, the truth values of (7) and (8) remain unaffected.

Fine proposes that vagueness represents truth value gaps in our semantic knowledge. Depending on how old Jean is, for instance, the sentence *Jean is old* might be neither true nor false. Fine observes that the truth value of a vague predicate can change depending on how precise the context is. For instance, *Jean is old* becomes more precise if we stipulate that Jean is 60 years old, human, exists in a peer group with an average age of 56, etc. Eventually the precisification of the context will entail that *Jean is old* is determined to be true. Similarly, it is trivially easy to imagine a world where Jean is actually not old.

In order to capture this intuition, Fine suggests that truth values can only be calculated for sentences whose truth values remain unchanged no matter how precise the context is made. Under this *supervaluationist* approach (see also Keefe 2008), a sentence which remains true under all possible precisifications such as (7) is considered *supertrue*, whereas a sentence which remains false under the same conditions (8) is *superfalse*. Sentences which fail these criteria are neither true nor false, thus abandoning the concept of bivalence (whereby all propositions are either true or false).

The supervaluationist and the epistemicist have in common the idea that vagueness represents gaps in truth values: the former locates those gaps in our language whereas the latter argues that our knowledge of the universe is incomplete. If we conceive of truth as a line spanning from true to false, vague statements constitute broken lines where, at any given point, we are not guaranteed to know whether we are dealing with a true or false statement.

The logical opposite of this 'gappy' approach to truth values is one where statements can be both true and false at the same time. 'Glutty' truth values would resemble a bumpy line (instead of one covered in holes) where each bump represented a supersaturation of truth values. One consequence of such a view would be that the Excluded Middle is rejected.

Hyde (1997) advances the theory of *subvaluation* whereby a statement is judged to be true if it holds true under at least one possible precisification. This school of thought proposes three possible truth values for a given statement: true, false, and both true and false. Much of the theoretical framework is the logical opposite of supervaluationism and, for lack of space, I leave it to the reader to consider the more subtle details of Hyde's proposal. The main concern of the current paper is to derive a precise definition of the phenomenon of vagueness without begging the question against any one of these major lines of thought. In the next section, we will consider characterising vagueness in terms of borderline cases and explore some of the difficulties that this presents.

3. Borderline Cases

In characterising vagueness, it is common to invoke the notion of borderline cases. Of course, this requires us to arrive at a (pre-theoretic) definition of borderline case. The trouble, as Raffman (2005) observes, is that borderline cases are often defined as truth value gaps. The goal is therefore to conceptualise (if possible) borderline cases in terms that do not beg the question against the subvaluationist.

Such an endeavour turns out to be unfeasible. Intuitively, we might suggest that a borderline case of predicate P is one whose truth value cannot be determined with certainty. On this view, a borderline case is one where the predicate in question neither determinately applies nor does its complement. Unfortunately, this view excludes the subvaluationist by fiat. On the other hand, the inverse definition (where a borderline case can hold multiple truth values at the same time) is problematic for similar reasons. One further attempt might conceive of borderline cases as cases where there are no facts of the matter regarding the application of the predicate in question. This seems to satisfy both sub- and supervaluationist, but now excludes the epistemicist. The latter contends that there are indeed facts of the matter regarding the application of all predicates, only that these facts are unknown to us and potentially unknowable.

Fundamentally, however, characterising vagueness in terms of the appearance of borderline cases raises an interesting question: are all borderline cases the result of vagueness? If we discovered a borderline case that fell out of a predicate that was not vague, this would call into question the logic of basing vagueness on these cases in the first place. Such non-vague borderline cases in fact do exist.

Take for example the predicate GOOD as defined in (9) which spans over the natural numbers:

(9) a. Given $n \in \{1, 2, 3, \ldots\}$, If $n > 14$, n is good.
     b.   ´´ If $n < 14$, n is not good.

At n=14, the predicate is undefined. Fine (1975) proposes that GOOD, as defined above, is vague since GOOD(n=14) is a borderline case owing to the fact that the truth value cannot be determined. It is a case where the predicate neither applies nor does its complement.

However, the assertion by Fine that the predicate GOOD is vague based on the presence of a borderline case seems suspect. If we define a borderline case as one where the truth value is undeterminable or missing, then indeed n=14 satisfies this criterion. It seems though that n=14 is a different kind of borderline case than the ones created by the predicate *old*, for instance. At n=14, there is a pure epistemic uncertainty with respect to the application of the predicate, but the borderline cases we have encountered thus far could conceivably be true or not depending on certain precisifications. A change in the context should influence the truth value of the statement. Here, however, there is no conceivable context which would render n=14 to be good or not. In other words, it will always remain undefined. Surely it is desirable to distinguish between general epistemic uncertainty, on the one hand, and true vagueness, on the other. For instance, we can be epistemically uncertain about the truth value of the following statement:

(10) *An adult unicorn's horn measures up to 40 cm*.

In (10), since it's impossible in principle to measure the length of a unicorn's horn, such information is forever outside of our grasp. Hence, (10) is neither true nor false. Yet, this epistemic uncertainty stems from the fact that unicorns don't actually exist. The epistemicist would not see this as vagueness, since there is no gap in our knowledge of the universe. There just is no fact of the matter when it comes to the length of a unicorn's horn. It seems clear then that lacking a truth value does not necessarily entail vagueness.

The problem with borderline cases thus is twofold: first, in order not to beg the question against any particular theoretical approach to vagueness, a formulation of borderline cases needs to be general enough not to exclude gappy and glutty truth values; second, it is not clear that borderline cases are always the result of vagueness. If so, more work would be needed to distinguish pure epistemic uncertainty from true vagueness.

4.   The Sorites Paradox

A second approach to characterising vagueness is in terms of its propensity toward paradoxes. Bueno and Colyvan (2012) maintain that a vague predicate is simply a predicate that is susceptible to a sorites paradox. They suggest the following definition of vagueness (p. 29):

(11) Definition of vagueness: A predicate is vague just in case it can be employed to generate a sorites argument.

This definition has several advantages. First, it does not exclude any account of vagueness since both the linguist and epistemicist agree that vague predicates lead to the sorites paradox. Furthermore, recall that one of the primary concerns of accounting for vagueness is that it leads to paradoxes. By emphasising the paradoxical nature of vagueness, the definition ensures that any serious account must tackle as one of its primary goals the sorites.

The burden now is clear—to spell out precisely what we mean by *sorites paradox* in such a way as to apply to all and only vague predicates. Of course, once established, the definition would also serve as a metric for detecting vagueness in the first place. Still, care must be taken in order

not to define a sorites too broadly to avoid including predicates that are not actually vague (such as underdetermined predicates as in (9)).

To begin, let us consider one further example of vagueness which will help us tease apart the nature of the sorites and how it can serve as a metric. Thus far, the vague predicates that have figured in the current discussion have been of a similar type. Specifically, these predicates exhibit a natural numbering from themselves to their complements. In other words, these type of predicates are countable and gradable. To illustrate this point, let us reconsider *red*. The dimension along which this predicate lies (let's say the red-orange dimension) can be divided up into discrete wavelengths. These discrete wavelengths have an inherent ordering from (categorically) red to (categorically) orange. Since these are discrete and bound on both ends, they are countable. The same goes for other predicates such as *pile of rice*. If we count rice in terms of grains, the scale is discrete, starts at zero grains and ends at some sufficiently high number (say 10,000). The countability and gradability of these vague predicates allows us to construct a sorites paradox: the first premise chooses a dimension along which to measure the predicate, as well as a starting point along that dimension for which the predicate categorically applies (e.g. X wavelength is red); the second premise sets a marginal increment by which we move along the dimension. The importance is to choose an increment small enough as to be within the tolerance of the predicate (e.g. if n wavelength is red, then n+1 wavelength is red). These two premises rely on the fact that red is countable and gradable. Let us label these countable and gradable predicates the red-pile type. *Bald, tall, expensive, rich,* and *old* are all examples of red-pile type predicates.

Even though vague predicates exhibit the problem of fuzzy boundaries (e.g. we can easily identify the colours red and orange, but it is impossible to tell exactly where one starts and the other stops on a continuous spectrum), the red-pile type predicates still exhibit a fairly straightforward path from their application to their complements (e.g. it is straightforward to draw a line from red to non-red). On the other hand, some predicates do not behave this way. Bueno and Colyvan offer the example of *religion* as one of these where the path from truth to falsehood is opaque. Other examples would include *feud, funny,* and *flirting*. The problem with religion type predicates is that they are not countable or gradable and therefore it is unclear how to construct a sorites paradox. On the other hand, Bueno and Colyvan maintain that these are indeed vague and therefore offer a solution to the problem.

According to Bueno and Colyvan (2012), non-countability and non-gradability per se do not entail that a sorites is impossible. All that is required to construct a sorites argument is partially ordered set of cases. The problem posed by *religion*, for example, is that there are many directions (potentially infinitely many) to go from it to its complement. For instance, assuming that Christianity is a categorical example of religion and that schoolyard play is categorically not a religion, the dimension Christianity-schoolyard-play is but one of countless dimensions one might measure activities on the religion scale. Another such dimension would be Christianity-wine-tasting. Following this idea to its logical extension, we have to imagine a multi-dimensional space where every possible vector might describe a potential path from some activity which counts as religion to another which does not.

A sorites argument can be described abstractly as "an argument by degrees with premises that appear to be true, but with a conclusion that appears to be false" (Bueno and Colyvan 2012:29). Bueno and Colyvan suggest that *following Brazilian soccer* is a borderline case for the predicate *religion*. They construct the following partially-ordered set of cases along the Christianity-schoolyard play dimension: *Christianity, Buddhism, Brazilian soccer, English rugby, minor league baseball, and schoolyard play*. Each member of the set would represent a small incremental jump along the dimension. The first iteration of the sorites would state that if Christianity is a religion,

then Buddhism is a religion, and so on. Eventually the errant conclusion states that schoolyard play is a religion.

In general, Bueno and Colyvan conclude that as long as a sorites can be constructed from a partially ordered set, the predicate in question is vague. This definition includes both red-pile type as well as religion type predicates. It should be noted however under its pure form, the sorites would potentially exclude religion type predicates since they are not countable/gradable and therefore premise II would be impossible to construct. The following section elaborates on this problem and argues that in fact religion type predicates are fundamentally different from red-pile type predicates.

5.   Scalar versus non-Scalar Vagueness

The following issues can be raised with Bueno and Colyvan's suggestion that *religion* is in fact vague and that we should treat it similarly to the red-pile type vague predicates. The first and most obvious question is thus: is *religion* vague? Surely we can find examples of activities that count as religion such as Christianity, Islam, and so on, just as easily as we can list activities that certainly would not be considered religions. The question remains though as to whether *following Brazilian soccer* is a borderline case of religion. Although this activity may share many of the same aspects as categorical religions (e.g. worship of deities, superstitious rituals, regular gathering of followers, etc.) it still seems to lack some inherent property necessary to be a religion. For instance, the following statement strikes me as true:

(12)   Following Brazilian soccer is a religion but it is not actually a religion.

At first, this statement may seem incoherent if we assume that *religion* is vague in the same way as red-pile type vague predicates. For instance, how can something be red and not actually red at the same time? On further inspection, however, this statement demonstrates that the use of the predicate *religion* in order to refer to *following Brazilian soccer* is rather a metaphorical extension of the predicate. On the one hand, *following Brazilian soccer* seems like a religion because it shares many properties of religion. On the other, it seems to lack a crucial property that belongs to all (and only) religions. Even if that crucial property is undetermined (and I would argue that it is), we still know that it belongs to activities such as Christianity and does not belong to activities such as *following Brazilian soccer*. Viewed in this light, *following Brazilian soccer* is only a borderline case of religion the same way that *a bird flying into the mouth of a hippopotamus* is a borderline case of *flirting (with death)*. The case of religion seems to be one of pure epistemic ignorance: religion is not defined sufficiently precisely so as to always exclude *following Brazilian soccer*.

Religion is a non-scalar/non-numerical predicate. According to Bueno and Colyvan, we can still construct a sorites argument using a partially ordered set of cases. This leads to a second question: do sorites arguments constructed from partially ordered sets entail vagueness? For instance, the predicate *bird* does not strike one as particularly vague. Yet, imagine the following partially ordered set along the sparrow-tennis ball dimension: *sparrow, chicken, penguin, ostrich, stuffed (dead) bald eagle, toy stuffed parrot, tennis ball*. This entails that *bird* is indeed vague according to the metric set up by Bueno and Colyvan and that *toy stuffed parrot* might count as a borderline case for *bird*. Yet, it appears that we are dealing with a similar case of epistemic ignorance as we were with religion. Of course a toy stuffed parrot is not an actual bird and we could easily construct a true sentence such as (12) using these terms in place of *following Brazilian soccer* and *religion*.

Sauerland and Stateva (2007) distinguish two types of vague predicates, scalar and epistemic. Scalar vagueness is related to expressions that denote a point on a scale. *5 meters*, for example, could be vague in that it denotes a range from 4.5m to 5.5m. Predicates which exhibit epistemic vagueness, on the other hand, do not have a precise meaning or at least the meaning is not fully known. *Bird* and *religion* seem to belong to this second category of vagueness—they do not lie on a scale, but rather suffer from imprecision in their definitions. It remains an open question as to whether the term "vague" properly applies to this second category of uncertainty. If we reserve it for only those predicates that are sorites susceptible and gradable/countable, predicates such as *bird* and *religion* might be more properly termed epistemically uncertain rather than vague. On the other hand, Sauerland and Stateva's label of epistemic vagueness might be appropriate as well, provided we do not obscure the fact that vagueness in this sense does not necessarily mean a propensity towards the sorites. I would argue for the former approach, i.e. distinguish between epistemic uncertainty and scalar vagueness, in order to avoid confusing two phenomena that are not necessarily in the same category. In this sense, sorites susceptibility can be used to tease apart these two forms of uncertainty. Hence, truth vagueness can be defined as in (11) above, where a sorites paradox is constructed from a fully ordered set.

6.   Conclusion

The goal of this paper was to arrive at a precise characterisation of vague predicates without begging the question against a particular theoretical account on the matter. Such a characterisation should allow for a theory that exploits the notion of gappy or glutty truth values. Furthermore, it should be neutral with respect to locating vagueness in epistemology or language. Following Bueno and Colyvan (2012), I argue in favour of characterising vagueness purely in terms of sorites susceptibility. However, I caution that the sorites argument can also be used to diagnose epistemic uncertainty (or epistemic vagueness, according to Sauerland and Stateva 2007) if we allow the use of partially ordered sets. This seems like an undesirable result as it captures phenomena which are fundamentally different than pure (scalar) vagueness.

It seems pertinent to make one final point regarding the characterisation of vagueness in terms of sorites susceptibility argued for in this paper. Paradoxes are psychological phenomena— through our flawed reasoning and logic as humans, as well as our incomplete understanding of the universe, we fall victim to paradoxical conclusions. However, paradoxes don't actually occur in nature. By their very nature, they are the result of some form of incomplete understanding about the actual mechanisms that govern a particular phenomenon. Fara (2000) acknowledges the psychological nature of paradoxes and poses three general questions (cited in and adapted from Kennedy 2011) that must be addressed by any serious account of vagueness:

(13) a.   The Semantic Question
            If the inductive premise of a sorites argument is false, then is the sharp boundaries claim true?
            (i)   If yes, how is this compatible with borderline cases?
            (ii)   If no, what revision of classical logic and semantics must be made to accommodate this fact?

      b.   The Epistemological Question
            If the inductive premise is false, why are we not able to state which iteration is errant?

c. The Psychological Question
   If the inductive premise is false, why are we so inclined to accept it? Why does a vague predicate seem not to have any boundaries?

If we accept that vagueness is nothing more than sorites susceptibility, it would seem to imply that we are dealing with a purely psychological phenomenon. As such, we should in principle always be able to construct a sorites argument for a vague predicate since the paradox is also within the realm of our own psychology. Fara's questions remain compelling and underscore the importance of research into vagueness.

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