

# VAGUENESS

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**Vagueness:** an expression is vague if and only if it is possible that it give rise to a “borderline case.” A borderline case is a situation in which the application of a particular expression to a (name of) a particular object does not generate an expression with a definite TRUTH-VALUE. That is, the piece of language in question neither applies to the object nor fails to apply.

Although such a formulation leaves it open what the pieces of language might be (whole sentences, individual words, NAMES or SINGULAR TERMS, PREDICATES or GENERAL TERMS), most discussions have focussed on vague general terms and have considered other types of terms to be non-vague. (Exceptions to this have called attention to the possibility of vague objects, thereby making the designation relation for singular terms be vague). The formulation also leaves open the possible causes for the expression not to have a definite truth value. If this indeterminacy is due to there being insufficient information available to determine applicability or non-applicability of the term (that is, we’re convinced the term either does or doesn’t apply, but we just don’t have enough information to determine which), then this is sometimes called “epistemic vagueness.” It is somewhat misleading to call this vagueness, for unlike true vagueness, this epistemic vagueness disappears if more information is brought into the situation. (‘There are  $1.89 \times 10^6$  stars in the sky’ epistemically vague but is not vague in the generally accepted sense of the term). ‘Vagueness’ may also be used to characterize non-linguistic items such as CONCEPTS, MEMORIES, and OBJECTS ... as well as such semi-linguistic items as STATEMENTS and PROPOSITIONS. Many of the issues involved in discussing the topic of vagueness impinge upon other philosophical topics, such as the existence of TRUTH-VALUE GAPS (declarative sentences which are neither TRUE nor FALSE) and the plausibility of MANY-VALUED LOGIC. There are other related issues such as the nature of propositions and whether they must be either true or false. We focus here on linguistic vagueness, as it manifests itself with general terms; for it is this sort of indeterminacy which defines what most researchers call vagueness, and which has led the push in some schools of thought to “eliminate vagueness” or to construct languages that do not manifest vagueness.

Linguistic vagueness is sometimes confused with other linguistic phenomena: GENERALITY, AMBIGUITY, and OPEN TEXTURE. Statements can be general (‘Some wheel-barrows are red’, ‘All insects have antennae’) and if there is no other vagueness infecting them, they are true or are false -- and not borderline or vague. Terms can be general (‘person’, ‘dog’) without being vague.

Those general terms apply to many different objects but are not therefore vague; and furthermore, the fact that they apply to different *kinds* of objects ('person' applies to both men and women) also does not show it to be vague or ambiguous. A vague term admits of borderline cases -- a completely determinate situation in which there just is no correct answer as to whether the term applies to a certain object or not -- and this is not the case with generality. Ambiguous linguistic items, including structurally ambiguous sentences, also do not have this feature (unless they also contain vague terms). Rather, an ambiguous sentence allows there to be a completely determinate situation in which one can simultaneously correctly affirm the sentence and also deny the sentence, depending on which of the ambiguities is being affirmed or denied. Terms are considered open textured if they are precise along some dimensions of their meaning but where other possible dimensions simply have not been considered. It would therefore not be clear what the applicability of the term would be were objects to vary along these other dimensions. Although related to vagueness, open texture is a different notion. Waismann, who coined the term, put it like this: "Open texture ... is something like the possibility of vagueness".

Vagueness has long been an irritant to philosophers of logic and language. Among the oldest of the puzzles associated with vagueness is the SORITES ('heap') PARADOX reported by CICERO (*Academica* 93): One grain of sand does not make a heap, and adding a grain of sand to something which is not a heap will not create a heap; therefore there are no heaps. This type of paradox is traditionally attributed to ZENO OF ELEA, who said (*DK* A29): A single millet seed makes no sound when it falls, so a basket of millet seeds do not make a sound when it is dumped. The name 'sorites' is also applied to the entire series of paradoxes which have the same form, such as the *falakros* ('bald man', DIOGENES LAERTIUS *Grammatica* II, 1, 45): A man with no hairs is bald, and adding one hair to a bald man results in a bald man; therefore all men are bald. The original version of these sorties arguments is attributed to Eubulides (Diogenes Laertius II, 108): "Isn't it true that two are few? and also three, and also four, and so on until ten? But since two are few, ten are also few". The linchpin in all these paradoxes is the analysis of vagueness in terms of some underlying continuum along which an imperceptible or unimportant change occurs. Almost all modern accounts of the logic of vagueness have assumed this to be the correct analysis of vagueness, and have geared their logics to deal with such vagueness. But we will see below that there are other kinds of vagueness too.

The search for a solution to the sorites-type paradoxes has been the stimulus for much research into alternative semantics. Some philosophers, e.g., FREGE, view vagueness as a pervasive defect of natural language and urge the adoption of an artificial language in which each predicate was completely precise in that there would be no borderline cases. RUSSELL too thought vagueness thoroughly infected natural language, but thought it to be unavoidable -- and indeed beneficial -- for ordinary usage and discourse. Despite the occasional argument that vagueness is

PRAGMATIC rather than a SEMANTIC phenomenon, the attitude that vagueness is inextricably bound to natural language (together with the philosophical logician's self-ascribed task of formalizing natural language semantics) has led modern writers to the exploration of alternative logics which might adequately characterize vagueness -- that is, which would account for our pretheoretic beliefs concerning truth, falsity, NECESSARY TRUTH, VALIDITY, etc., of sentences containing vague predicates. Some recent writers have also argued that vague language undermines REALISM, and that it shows our concepts to be "incoherent".

Long ago it was seen that the attempt to introduce a third truth value value, "indeterminate", solved nothing -- replacing, as it were, the sharp cutoff between a predicate's applying and not applying with two sharp cutoffs. Similar remarks could be made against the adoption of *any* finitely-many-valued logic as a characterization of vagueness. In the late 1960s and early 70s, FUZZY LOGIC was introduced into the philosophic world. Actually a restatement of the TARSKI/Lukasiewicz infinite-valued logics of the 1930s, one of the side benefits of fuzzy logics was claimed to be an adequate logic for vagueness. In contrast to classical logic in which there are two truth values (True and False), in fuzzy logic, a sentence is allowed take any real number between 0 and 1 as a truth value ... intuitively, the closer to 1 the value is, the "more true" the sentence is. The value of a negated sentence is one minus the value of the unnegated sentence; conjunction is viewed as a minimum function and disjunction as a maximum function. (Thus, a conjunction takes the value of the "least true" conjunct, while a disjunction takes the value of the "most true" disjunct). Since vague sentences are maximally neither true nor false, they will be valued at approximately 0.5. It follows that if  $\Phi$  is maximally vague, so is the negation  $\sim\Phi$ ; and so are the conjunction  $(\Phi \& \sim\Phi)$  and the disjunction  $(\Phi \vee \sim\Phi)$ . Some theorists object to this, but defenders of fuzzy logic have argued in favor of them.

Other theorists have attempted to capture the elusive logic of vagueness by employing MODAL LOGIC, having the operators  $[ ]\Phi$  (meaning ' $\Phi$  is definite') and  $\diamond\Phi$  (meaning ' $\Phi$  is vague'). The logic generated in this way is peculiar in that  $[ ](\Phi \& \Psi) \supset ([ ]\Phi \& [ ]\Psi)$  is not a theorem. E.g.,  $(p \& \sim p)$  is definitely false, hence definite; hence  $[ ](p \& \sim p)$ . Yet neither  $p$  nor  $\sim p$  need be definite. (Technically, it is non-normal). Some other peculiarities are that  $([ ]\Phi \times [ ]\sim\Phi)$  is a theorem, and that  $([ ]\Phi \supset \diamond\Phi)$  is not. There are also puzzles about whether  $(\diamond\Phi \rightarrow [ ]\diamond\Phi)$  should be a theorem, and about iterated modalities in general. Modal logic treatments of vagueness have not attracted many advocates, except as a portion of a general epistemic logic (i.e., modal logics might be seen as an account of so-called epistemic vagueness).

A third direction that has been advocated as a logical account of vagueness has been the method of supervaluations (sometimes called "supertruth"). The underlying idea here is to allow the vague predicate in a sentence to be "precisified" in an arbitrary manner. Thus, for the sentence *Friar Tuck is bald*, we arbitrarily choose a precise number of hairs on the head which will

demarcate the bald/not-bald border. In this valuation Friar Tuck is either definitely bald or definitely not bald, and the sentence either is true or is false. Next, we alter the valuation so that there is some other 'bald' borderline, etc. A sentence which is true in all such valuations is deemed to be "really true" or "supertrue"; one which is false in all such valuations is "really false" or "superfalse". All others are vague. Note that, in this conception of vagueness, if  $\Phi$  is vague, so is  $\sim\Phi$ . However, unlike fuzzy logic,  $(\Phi \& \sim\Phi)$  is not evaluated as vague – it is false in every valuation and hence is superfalse. And  $(\Phi \vee \sim\Phi)$  is supertrue. These are seen by some as positive features of the method of supervaluations, and as an argument against the whole fuzzy logic enterprise.

In fact there seems to be a least two distinct types of (linguistic) vagueness, and it is not at all clear that any of the previously-mentioned logical approaches can deal with both. Without going into the details, we can just point out that the "sorites vagueness" discussed above presumes an ordering on a continuous underlying scale; and it is the indistinguishability of adjacent points on this scale which gives rise to borderline cases. But there are examples of vague terms for which there is no such scale. A classic example is 'religion': there are a number of factors which are relevant to determining whether a social practice is a religion. Having none of these properties guarantees failing to be a religion, and having all of them guarantees being one. However, there is no continuum of the sorites variety here; for example, it is easy to distinguish possessing four from possessing five of the properties, unlike the sorites case where such a change is imperceptible. In the present type of vagueness, although we can tell these different cases apart, we just don't know whether to call the latter a religion or not. Furthermore, some of the properties (or combinations of properties) are more important or salient in determining whether the practice is a religion than are other properties or combinations. We might call this FAMILY RESEMBLANCE vagueness: there are a number of clearly distinguishable conditions of varying degrees of importance, and family resemblance vagueness is attributed to there being no definite answer to the question, "How many of which conditions are necessary for the term to apply?" Other examples of family resemblance vagueness are 'schizophrenia sufferer', 'sexual perversion', and the venerable 'game'. A special subclass of family resemblance vagueness occurs when there are pairs of underlying properties which normally co-occur, but occasionally apply to different objects. Consider for example 'tributary'. When two rivers meet, one is usually considered a tributary of the other. Among the properties relevant to being a tributary vs. main river are: relative volume of water and relative length. Normally, the shorter of the two rivers has a lesser volume, and in that case it is the tributary of the other. But occasionally the two properties do not co-occur and then there is a conflict, giving rise to a kind of vagueness we might call "conflict vagueness". The term 'tributary' is vague because its background conditions admit of such conflicts: there are borderline cases when these two properties apply to different objects.

To conclude: the fundamental philosophical problems involving vagueness are (1) to give an adequate characterization of what the phenomenon is, and (2) to characterize our ability to reason with these terms. These were the problems for the ancient philosophers, and they remain the problems for modern philosophers.

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