1000-Word PHILOSOPHY
AN INTRODUCTORY ANTHOLOGY

Vagueness

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How tall do you have to be to be *tall*? How much hair do you have to lose to be *bald*? How old do you have to be to be *old*?

It is an unremarkable feature of language that words such as 'tall', 'bald', and 'old' are *vague* in the sense that it may be unclear whether someone is tall, bald, or old. (Many other words are vague also). However, vagueness plays a crucial role in a range of philosophical issues, including fundamental problems in logic, metaphysics, epistemology, and philosophy of language.[1]

A heap of sand.

1. Vague terms

If Kathryn has no money, then she is clearly not rich. However, suppose $20 is deposited into her bank account every minute of every day for a year. Assuming she did not spend the money, at the end of the year she would have over 10 million dollars and would, therefore, be rich.

If she was *not rich* at the beginning of the year but is *rich* at the end of the year, at what point in the year does she become *rich*? If tasked with assigning *true* or *false* to the statement 'Kathryn is rich' after each deposit of $20, there would be easy cases very early in the year (false) and later in the year (true). But there would be many cases where there is no definitive answer.

The difficulty of specifying the point at which she becomes rich is due to the vagueness of the term 'rich'.[2] Vague terms admit of *borderline cases*.[3] A borderline case is one where it is unclear whether a statement, like 'Kathryn is rich', is true or false.

2. The Sorites Paradox

Vague terms give rise to a difficult problem known as the *Sorites Paradox*.[4] A paradox occurs when apparently sound reasoning entails a false conclusion. A version of the *Sorites Paradox* is as follows:

(1) One grain of sand is not a heap.

(2) If one grain of sand is not a heap, then two grains of sand are not a heap.

(3) Hence, two grains of sand are not a heap.

(4) If two grains of sand are not a heap, then three grains of sand are not a heap.

(5) Hence, three grains of sand are not a heap.

Continue the process of addition until we infer…

(6) 100 million grains of sand are not a heap.

(6) is false, but it follows from the preceding valid chain of inferences. The inferences in the argument exemplify *Modus Ponens*, a valid rule of inference in propositional logic with the following form:

(1) If P, then Q.

(2) P.

(3) Hence, Q

A *valid* inference is one where it is impossible for the conclusion to be false if the premises are all true. Thus, if statements (1) and (2) are true, then (3) must be true. If (3) and (4) are true, then (5) must be true. Ultimately, this means, absurdly, that (6) must be true. But are the premises true? They are if the following statement is true:

If N grains of sand are not a heap, then $N + 1$ grains of sand are not a heap.

Intuitively, adding one grain of sand to a non-heap does not create a heap, so the *Sorites* argument appears to be a valid argument with all true premises that yields a false conclusion.[5]

3. Responses to the Sorites Paradox[6]

3.1. Epistemicism

One response to the paradox, *Epistemicism*, maintains that there is a point in the *Sorites* argument where a conditional premise of the form *If N grains of sand are not a heap, then N + 1 grains of sand are not a heap* is false.[7] According to this view, it is objectively true that there are sharp lines dividing heaps and non-heaps, rich and non-rich, and so on. However, we *cannot know* where the line is, so we cannot know

which conditional premise in the *Sorites* argument is false. Thus, the *Epistemicist* argues that the paradox is a result of ignorance rather than an issue arising from the imprecision of terms.

3.2. Denying Bivalence[8]

Another strategy is to reject a principle of classical logic known as *Bivalence*. *Bivalence* states that every declarative statement has one, and only one, truth-value: *true* or *false*. One proposal of this sort is to introduce a *trivalent* account of truth-values where declarative statements have one of *three* possible truth-values: *true*, *false*, or *indeterminate*. According to this approach, the statement *N grains of sand is not a heap* is *true* or *false* in some cases, but *indeterminate* in borderline cases. If a statement employed as a premise at some stage in the *Sorites* argument is *indeterminate*, then no valid inference can be drawn since validity assumes that the premises of an inference are *true*. Thus, *indeterminate* truth-values defuse the paradox by halting the chain of inferences leading to (6).

3.3. Fuzzy Logic

Another proposal, known as *Fuzzy Logic*, posits an infinite range of possible truth-values for statements that can be expressed numerically. A statement that is completely false has a truth-value of (0) and a statement that is completely true has a truth-value of (1). However, some propositions are neither completely true nor completely false, so their truth-value would be a number between (0) and (1). These values can be calibrated to any decimal place depending on the circumstances. In the *Sorites* argument, the statement *N grains of sand is not a heap* gradually changes its truth value from clearly not a heap (0) to clearly a heap (1) as more sand is added. This maneuver attempts to disarm the paradox by representing the change from non-heap to heap in a way that tracks our level of confidence in the truth-values of the statements about whether a heap is present.

4. Conclusion

The *Sorites Paradox* is just one issue that arises in connection with vagueness. Grasping the implications of vagueness is part of the much larger and longstanding philosophical project of understanding how language relates to the world, and the world itself.

Notes

[1] With respect to logic, the central concern for scholars has been finding the correct analysis of the truth conditions for statements involving vague terms. Are statements of this sort always true or false, or might they be indeterminate or partially true in some cases? There is also the question of the source of vagueness. Is vagueness purely a feature of language? Are there vague objects in reality, or is it the case that language and reality are both vague? Vagueness poses a problem in epistemology in connection with the previous issues. Knowledge typically implies that what one knows is true. However, if vague terms or objects are involved, it might be the case that vagueness thwarts knowledge under those conditions. See Dietz and Moruzzi (2010) for articles on the full range of vagueness-related philosophical issues.

[2] Vagueness is not synonymous with ambiguity, although terms can be both vague and ambiguous. Vague terms have imprecise applications in some cases while ambiguity involves a term having two or more meanings. For example, the term 'rich' is vague in the sense that we may not know whether someone is rich in a given context. This may be the case even in very restricted domains such as "rich for a Fortune 500 CEO". The word 'rich' is ambiguous in the sense that it not only refers to wealth but it can also mean *flavorful*. We must choose the meaning that is implied based on context. See Sorensen's "Vagueness" entry in the Stanford Encyclopedia of Philosophy for a discussion of the distinction.

[3] See Bueno and Colyvan (2012) for an account of vagueness that rejects the "borderline cases" definition of vagueness.

[4] The paradox gets its name from the Greek term for "heap": *soros*.

[5] With appropriate substitutions, arguments with the same form can be constructed using other vague terms such as 'rich', 'tall', 'bald', 'old', and so on.

[6] Responses to the paradox are numerous. For a critical survey of these and other approaches to the paradox, see Sorensen's "Vagueness" entry in the Stanford Encyclopedia of Philosophy.

[7] See Williamson (1994) for a defense of *Epistemicism*.

[8] Denying Bivalence is a general strategy with many variations. For a description and critical assessment

of this strategy, see Sorensen's "Vagueness" entry in The Stanford Encyclopedia of Philosophy.

References

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