Introduction to Terms Continued: Vagueness and Ambiguity

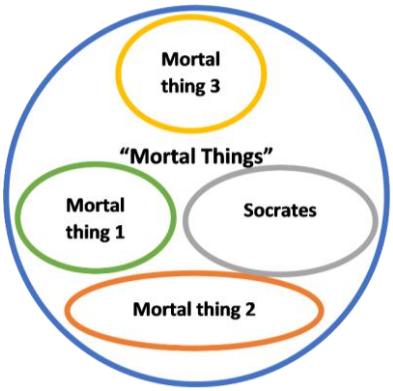
"We must determine what a premise is, what a term is, and what sort of deduction is complete and what sort incomplete.'"
(Aristotle, *Prior Analytics*, transl. Robin Smith, 2012)

I. Lesson

A few lessons ago, we distinguished between *categorematic* and *syncategorematic* terms. In this course, we will be primarily concerned with the former. To review:

- **Categorematic Term:** any term that designates a **category** of things in the world.

Remember that *categories* are roughly collections of things with a common, exclusive *property*. The properties are *exclusive* in the sense that if anything does not have a certain property, then those things are not in the *category* corresponding to that property. So, when we say that something has a certain *property*, we are saying that it *is* part of a certain *category*. Thus, when we say "Socrates is mortal", we are saying that Socrates has the *property* of being mortal, which *means* that Socrates belongs to the category "mortal things."



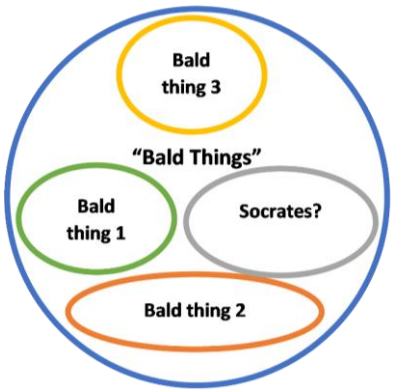
Note that if this diagram was perfect, there would be *many* more things inside of the category "mortal things".

Remember, terms themselves are never true or false. However, terms can be *vague* or *ambiguous*.

a) Vague Terms

As is often the case with language, terms can be imprecise, unclear, or confusing. We need to be especially wary of this when we do logic, since we aim for our study to be exactly the opposite. One feature that demands close attention is *vagueness*. A term, usually a predicate, is called *vague* if it has particular *borderline cases* where it is not clear whether it can be correctly predicated of the subject or not. In other words, a term is *vague* if it is unclear which things are *members* of the *category* it refers to.

Some classic examples are words like 'bald', 'short', 'tall', 'beautiful', etc. We do not have a precise height after which we consider a person a member of the category 'tall' and before which we consider them a member of the category 'short'. We do not have a precise number of hairs, say, after which we consider a person not-bald and before which we consider them bald. Suppose that Socrates is balding. When would it be true to say "Socrates is balding"? In other words, when is Socrates a member of the category "bald things"?



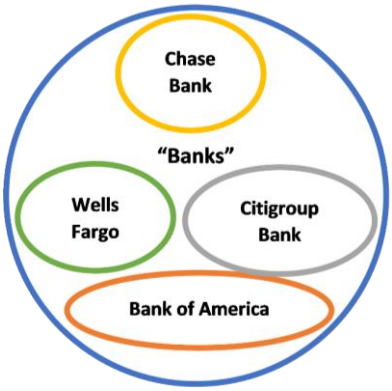
In logic, we never want to have diagrams like the one above. We need to make sure we are *clear* enough to understand *what exactly* the members of each category of the terms we use are.

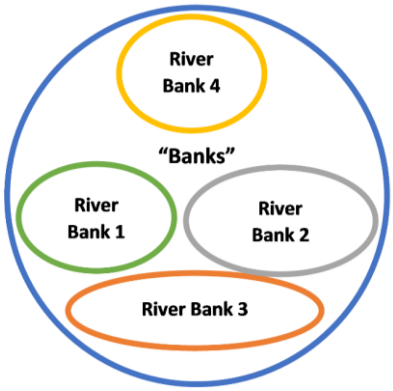
Consider the famous example of a heap of sand. How many grains of sand does it take to form a heap? If we had a thousand grains of sand in a pile, we would probably call it a "heap" of sand. But let's say we start taking away grains of sand one by one. When is it no longer a heap? When there are only 5? 3? 2? This is an example of the vagueness of the word "heap."

[Activity] Think of 3 more vague terms. Find a partner and explain to them what borderline cases each of them has.

b) Ambiguous Terms

Another problematic feature of certain words is *ambiguity*. A term is called *ambiguous* if it can have multiple meanings. In other words, a term is *ambiguous* if it can refer to multiple different *categories*. Consider the following words: 'bank', 'star', 'cold', 'ruler'. Each of them has more than one meaning. 'Bank' could designate the category of all *river* banks or it could designate the category of all of the *financial institutions* we call "banks":





Notice that both of the categories above are called "Banks", but they have *different members*! So, which category are we referring to when we say "bank" or "that is a *bank*"?

For another example, 'Star' could refer to a category of the *celestial bodies* we call 'stars' or to a category of *actors* famous enough that we call them 'stars'.

These words need to be 'disambiguated' — we need to specify which meaning we want to use — in a logical context. Only when we know what the word refers to can we evaluate the truth of various sentences. The sentence "That bank is beautiful", when expressed by a speaker in a city with a beautiful river and terribly unappealing buildings, could be true when said of the beautiful river bank but false when said of the financial institution.

[Activity] Write down a few more examples of ambiguous terms. Use each of the term's meanings in a sentence and share with a partner! Draw some diagrams if it helps!

[Activity] With a partner, take turns coming up with one term and decide whether it is vague or ambiguous. Then, share it with your partner and ask *them* to decide whether it is vague or ambiguous. Your partner should then explain their reasoning; if you disagree, debate!

II. Examples

Let's turn to a few examples of vague and ambiguous terms. For variety, let's look at the word 'bald' as it occurs in the following (slightly silly) context.

1. [bald]: My friend, Andrew, has a receding hairline. He has not lost all of his hair, but he has lost quite a bit of it. If Andrew found himself in a room with Tom Cruise, who has a full head of hair, the sentence "Andrew is bald." would appear true, but if he found himself in a room with John Malkovich, who is completely bald, it would appear false. Why is the same sentence true in the first case, but false in the second?

[Activity] Come up with an answer for the question above. Then, with a partner, discuss your respective answers. Try to come up with a few more examples of scenarios where the same sentence containing a vague term comes out true in one case and false in another. What do these examples have in common?

2. This cold is killing me!

Suppose a speaker who has a terrible cold expresses the above sentence in a place with below freezing temperatures. As before, without some further explanation, the meaning of this sentence is not completely clear; in other words, if we were friends with the speaker who expresses this sentence to us, we could reasonably ask if they mean that *their illness* is killing them or *the outside temperature* is killing them.

[Activity]: If the same sentence in Example 2. is expressed by a speaker with a terrible cold in a very warm place in the summer, is the word 'cold' still ambiguous?

Sometimes, syllogisms are *unsound* because of vague or ambiguous terms. This can happen even if the syllogism is *valid* and its premises are true. Consider the following argument:

1. Premise 1 (P1): All famous actors are stars.

   Premise 2 (P2): All stars are celestial bodies.

   Conclusion (C): All famous actors are celestial bodies.

[Activity]: Before we look at the explanation for why this argument is actually unsound, try to figure it out for yourself. What's going on with the term 'star'? [Hint: think of ambiguity as we discussed it in this lesson].

This argument uses two different meanings of the word 'star': one in each premise. This is an instance of *ambiguity*. The term 'star' is ambiguous because it is used to refer to *different categories* in the world during the *same* syllogism.

[Activity]: Review: Is the argument above valid? Is it sound? Discuss with a partner!

III. Exercises

1. Identify the subject and the predicate of the following declarative sentences. Is the predicate affirmed or denied of the subject?
   a) Trees are not tall.
   b) Socrates is wise.
   c) My cat is not fluffy.
   d) Glass is transparent.
   e) Logic is fun.
2. Specify whether the following terms are vague, ambiguous, both, or neither. If the term is vague, use it in a sentence and specify two different contexts – one in which it might be true, and one in which it might be false. If the term is ambiguous, use it in a sentence for each of its possible meanings.
   a) 'pipe'
   b) 'large'
   c) 'glass'
   d) 'water'
   e) 'long'
3. Can a term be both vague and ambiguous? If so, think of an example in context and provide a short explanation! [Hint: it's enough for *one* of the meanings of an ambiguous term to be vague]

IV. Conclusion

As either subjects, or predicates, terms can have a couple properties worth mentioning: *vagueness* and *ambiguity*. Evaluating whether terms are clear and unambiguous is *crucial* in deciding whether

a proposition is true and whether a syllogism is sound. Using the properties we have learned, we can now characterize specific components of arguments from a logical perspective. We understand all of this through the language of *members* and *categories*, which we lay the basis for in this lesson.

V. Lesson Goals

At the end of this lesson, students will be able to:

- define terms;
- identify vague terms and ambiguous terms;
- develop examples of vague and ambiguous terms;
- resolve vagueness cases using standards of precision;
- resolve ambiguity cases using either disambiguation, or context-dependence;
- define and identify cases of equivocation;
- grasp the notion of truth as correspondence between a proposition and states of affairs;
- evaluate propositions as true or false;

Answer Key:

Exercise 1

a) The predicate, 'tall', is denied of the subject, 'trees'. b) The predicate, 'wise', is affirmed of the subject, 'Socrates'. c) The predicate, 'fluffy', is denied of the subject, 'my cat'. d) The predicate, 'transparent', is affirmed of the subject, 'glass'. e) The predicate, 'fun', is affirmed of the subject, 'logic'.

Exercise 2

a) 'pipe' is an ambiguous term: The pipe is filled with tobacco. The pipe is leaking water. b) 'large' is a vague term. Answers may vary depending on the choice of sentence. c) 'glass' is an ambiguous term: Glass is obtained from sand. This glass is made of plastic. d) 'water' is neither vague, nor ambiguous. e) 'long' is a vague term. Answers may vary depending on the choice of sentence.

3) 'cold' is a good candidate. It's an ambiguous term: 'cold' can refer to temperature or to illness. In the case of temperature, 'cold' is also a vague term: although we can independently measure temperature, what counts as actually being a member of the category "cold things" can have borderline cases.