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Chapter 5

Vagueness, Ambiguity, and the “Sound” of Meaning

Sylvain Bromberger

5.1 Introduction

Vagueness and ambiguity have been topics of interest to logicians through the ages for similar reasons: vagueness and ambiguity are both identified as possible sources of fallacies, in the case of ambiguity the fallacies of equivocation, in the case of vagueness the infamous sorites fallacies. But whereas fallacies of equivocation have been deemed to be, on the whole, relatively easy to diagnose, sorites fallacies have turned out to be more elusive. How come? Is it because we have a better grasp on the nature of ambiguity than of the nature of vagueness? And is this in turn so because the facts on which ambiguities supervene are easier to identify than the facts on which vaguenesses supervene? In this chapter I explore that conjecture. I think that it is largely sound even though it leaves unresolved vexing conceptual and empirical issues to which both vagueness and ambiguity give rise.¹

5.2 Differences Between Ambiguity and Vagueness

Whatever their similarities, ambiguity and vagueness are in many respects very different. Here are some of the more telling respects in which they differ.

¹ Equivocation can have sources other than linguistic ambiguity, and imprecision similarly can have sources other than linguistic vagueness. In this chapter, I limit myself to the linguistic sources.

This chapter was initially motivated by a footnote (mentioning me) in the challenging paper Sider and Braun (1997). The exchange mentioned in that footnote pertained to an early draft of what became their published paper.

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1. Ambiguity need not—often cannot—be preserved across meaning preserving translation. Vagueness must be preserved.

1.1. I come from the bank

- a) ✓ Je viens de la banque
- b) ✓ Je viens de la rive
- c) ✗ Je viens de la rive ou de la banque.

1.2. John is bald

- a) ✓ Jean est chauve.
- b) ✗ Jean a six cheveux.

2. Ambiguity, unlike vagueness, need not even be preserved as we switch back and forth between speech and writing.

2.1. Lead (li:d vs. led): construct (cónstruct vs. constrúct); lives (livz vs. layvz); ...

2.2. Beach/beeche; which/witch; ice cream/ I scream; oversees/overseas; euthanasia/ youth in Asia²; prince/prints (which does not even survive phonetics to phonological encoding). In some cases this may be idiolectally or dialectally restricted; e.g., science, signs; writer, rider.

3. Percolation of ambiguity and vagueness in declarative sentences have different effects: multiple possible truth conditions in the case of ambiguity, underspecification of truth conditions in the case of vagueness.^{3,4}

4. Tokens of ambiguous sentences cannot be construed until and unless disambiguated. Tokens of vague sentences can be construed without being made precise.

5. Ambiguity—at least lexical ambiguity—is a consequence of what duplications are in the lexicon, of what other sound-meaning pairings are in the lexicon.⁵ It is relational. Not so vagueness. Vagueness is intrinsic.

6. Ambiguity can be structural ambiguity, that is, pertain to syntactic or morphological structure, and thus a product of linearization.⁶ Not so vagueness. Vagueness is grounded strictly in the lexicon. It can percolate morphologically

² My wife's favorite: The cross I'd bear gladly/The cross-eyed bear Gladly.

⁴ This requires some discussion of Williamson's (1994) epistemic view. However, he does hold that we understand vague utterances even when we don't know whether they are true or false (Chapter 7).

¹ Conjecture: the procedures invoked for disambiguation are in crucial respects different from those invoked in making precise

² This is put somewhat elusively because I want to postpone talk about the difference between homophony and polysemy.

³ Linearization is the process through which hierarchical structures get mapped on a linear sequence of e.g. phonemes.

(*lionish*) or syntactically, and be encoded through modifiers (*approximately, almost, roughly, . . .*), but cannot be generated syntactically or morphologically.

- 6.1. Flying planes can be dangerous.
- 6.2. The woman chased the dog with a hat.⁷
- 6.3. Why do you believe that Bush wants to attack Iran?
- 6.4. Unbuttonable.⁸

Some structural ambiguities are even subject to "combinatorial explosion", for instance through the addition of prepositional phrases, but there is no vagueness analogue.

- 6.3 Put the book in the box on the table in the room next to the sink . . .

In short, ambiguity can be multiplied, vagueness can at best be intensified.

7. Ambiguity can be scope ambiguity, there is no such thing as scope vagueness.
 - 7.1. You can fool some of the people all of the time.
 - 7.2. Five men carried six boxes up three hills.
 - 7.3. Every student who came was not invited.
8. Ambiguity can be binding ambiguity; there is no such thing as binding vagueness.
 - 8.1. John kicked Peter because he is mean.
 - 8.2. What do you want to grow?⁹
9. Ambiguity can be a consequence of morphophonological processes that cannot generate vagueness.
 - 9.1. German final devoicing: *bund, bunt*
 - 9.2. English: *sheep (sing/pl), are (default), have (default), hit (past/present/participle)*
10. Ambiguities come under categories that have no vagueness analogues: *type/token, use/mention, verb/noun, (house/house), state/activity (works)*.
11. Vagueness can be modified with degree terms and mitigated to higher order: there are no analogous mitigations of ambiguity.
 - 11.1. John is very bald
 - 11.2. John is taller than Mary.

⁷ This is actually a case of double ambiguity: there are languages in which the ambiguity cannot be preserved not simply because their syntax is different, but because they encode instrumentality and accompaniment differently. Instrumentality is expressed by the instrumental case, accompaniment by a preposition. Note that in English the above sentence cannot express the fact that the woman is identified by the hat. "with a hat" can be construed as adjoined to "chased" or to "the dog" but not to "The woman".

⁸ I.e., cannot be buttoned vs. can be unbuttoned

⁹ E.g., I want the carrots to grow, or, I want to grow carrots. The binding is to a phonologically empty PRO.

And eliminated at the superlative?

11.3. John is the tallest of the three.

12. Vagueness gives rise to sorites issues, not so ambiguity. Ambiguity gives rise to fallacies of equivocation, not so vagueness.¹⁰

5.3 What Are We to Make of These Differences?

Three obvious possibilities come to mind.

- (A) Vagueness and ambiguity are simply distinct properties, each with its own satisfaction conditions, but pertaining to the same kinds of objects, like being square and being blue.
- (B) Vagueness and ambiguity are simply distinct properties, each with its own satisfaction conditions, and pertaining to the same kinds of objects, but they are also mutually exclusive, like being square and being round.
- (C) Vagueness and ambiguity are not simply different properties with different satisfaction conditions that are mutually exclusive, but they—and their contraries—pertain to different kinds of objects altogether, or, to put it somewhat more pedantically, to arguments that belong to mutually exclusive ontological categories.

Let me spell out what I have in mind by “mutually exclusive ontological categories” with an example¹¹:

There is a category of things such that every member of that category is either prime or composite. The number seven belongs to that category, so does the number eight. Sylvain Bromberger does not belong to that category even though, like the number eight, he fails to be prime; like the number seven, he also fails to be even. There is also a category of things such that every member of that category is either alive or dead.¹² Sylvain Bromberger belongs to that category. The number seven does not, even though, like Julius Caesar, it fails to be alive. Like Sylvain Bromberger, it also fails to be dead. Natural numbers and humans belong to different *ontological categories*, as I now use the term. And, so do things that are either prime or composite on the one hand, and things that are either dead or alive on the

¹⁰ Though the difference has been equivocally denied by e.g. Sider and Braun (1997).

¹¹ Another example closer to the case at hand: natural numbers and their numerals. Natural numbers are either prime or composite, not so numerals. Numerals have either one segment or more than one segment, not so numbers. The cardinality of numerals is at best that of the natural numerals, not so the cardinality of numbers.

¹² “Is” is to be construed as indexically tensed. I could have used a less depressing example: Euclidean geometric figures can either be squared or cannot be squared. Rectangles can be squared, circles can't. I could also have used as examples numbers vs. numerals—see previous footnote—but the story would be more complicated.

other hand. Natural numbers and things that are either prime or composite belong to one category, creatures and things that are either alive or dead belong to another category.

I can spell out what I have in mind in another way, a way which, off hand, may seem to describe a different distinction, but, in the case under discussion will turn out to cut at the same joints, or so I will assume.

Positive integers, the sorts of things that can be either prime or composite, are governed principles of individuation that are different from the principles of individuation that govern creatures, the sorts of things that can be either dead or alive. What's more, the principles that apply to the former do not apply to the latter. And vice versa. Thus positive integers are the same or different depending on whether they have the same successor. Creatures cannot be so individuated. [I am not sure how they are individuated: place and time of birth?]

The third possibility can be put in the form of two theses with the help of a few terminological stipulations:

Thesis 1: Signs (the sort of things that can be either ambiguous or unambiguous) and locutions (the sort of things that can be either vague or precise) belong to different ontological categories. In other words, there is a category of "things" every member of which is either ambiguous or unambiguous. I call them signs. There is also a category of "things" every member of which is either vague or precise. I call them locutions. Thesis: **nothing is both a sign and a locution**, though, of course, many "things", including many linguistic "things" are neither.

Thesis 2: Signs (the sort of things that are either ambiguous or unambiguous) are governed by principles of individuations that are different from the principles of individuation that govern locutions (the sort of things that can be either vague or precise). Thesis: the principle of individuations that apply to signs cannot cogently be applied to locutions, and vice versa.

I think of Thesis 1 and Thesis 2 as two sides of the same coin. I would like to say that they entail each other, and will assume that they do, but I don't know how to prove this.

5.4 A Distinction with a Difference

These two theses, which are put in what Carnap called the material mode, should NOT be confused with another thesis, a meta-linguistic thesis that requires the formal mode and constitutes a lexicographic thesis about two items in the English lexicon.

Meta-linguistic thesis: *vague* and *ambiguous* (the terms) are governed by different selectional restrictions. *Ambiguous* selects only signs, whereas *vague* selects only expressions.

The predicates *prime* and *composite*, the very English terms, have selectional restrictions distinct from the selectional restrictions of *alive* and *dead*. Thus

- 1) Seven is composite. ✓
is false but non-deviant, whereas
- 2) Seven is dead. ✗
is not merely not true, but deviant. On the other hand
- 3) Sylvain Bromberger is composite. ✗
is not only not true, it is deviant, whereas
- 4) Sylvain Bromberger is dead. ✓
though false, is not deviant.

The phenomenon of selectional restriction is real as attested by, for instance, the behavior of such verbs as *to wonder*, and *to know*. Thus

- (5) I wonder what time it is. ✓
- (6) I wonder what a dope John is. ✗
- (7) I wonder that it is five o'clock. ✗
- (8) I know what time it is. ✓
- (9) I know what a dope John is. ✓
- (10) I know that it is five o'clock. ✓

Whereas *to know* can take interrogatives, exclamatives, and declaratives as complements, *wonder* can only take interrogatives as complements.

A case could possibly be made that the contrast in deviance between

- 11) Seven is composite. ✓
- 12) Sylvain Bromberger is composite. ✗
- 13) Seven is dead. ✗
- 14) Sylvain Bromberger is dead. ✓

is traceable to selection restrictions governing on the one hand *composite*, and on the other hand *dead*.

It is unlikely that a similar case can be made about *vague* and *ambiguous* by examining differences in their distributions. A quick perusal of the literature, even the philosophic literature, quickly brings out that our usage of these terms is deeply context dependent and tolerates a wide range of idiosyncrasies. More importantly, if signs and locutions are as different as I have just suggested, then, before making the case, we need to settle whether the meta-linguistic thesis is about two signs, or about two locutions, or about items in neither category.

There may be a well motivated way of regimenting the use of *vague* and *ambiguous*, whatever their category, for purposes of analysis. But, again, this cannot be done before we get a better grasp of how signs differ from locutions and what the best theory about them requires by way of terminology.

That regimentation will ultimately be called for is obvious from even the most casual perusal of the philosophic literature. Here is a typical example. In their introduction to *Vagueness*, a Reader Keefe and Smith write:

... Certainly terms can be ambiguous *and* vague: "bank" for example has two quite different main senses (concerning financial institutions and sloping river edges) both of which are vague. (1997, p. 6)

The example is somewhat infelicitous for the authors' purpose. It is by no means obvious that "both senses" are vague, that the one concerning "financial institutions" for instance is vague. The laws, if nothing else, are fairly specific about its precise applications. But even disregarding this, even if they are both vague, they are vague along continua that are so different as to make it impossible for there to be any range within which the term bank, whatever the author means by "term", could itself be vague.

The author could have used a less problematic example, for instance:

(15) Some people are sad everywhere.

(15) does not have the shortcomings of Keefe and Smith's example. But it won't rescue their claim from confusion. They hold that *terms* are the sorts of things that are vague. But they also hold that *senses* are the sorts of things that are vague. And they also hold that *terms*, whatever they are, are not *senses* but have senses (and thus that senses are not terms either.) It seems unlikely that they also hold that there are two topics of vagueness but only one topic of ambiguity. That surely would be an unholy trinity!

Some other philosophers sort things out differently than Keefe and Smith. For example, Timothy Williamson writes

The string of letters "bank" is ambiguous because semantically different words consist of those letters. Such ambiguity has nothing to do with vagueness. An utterance of a sentence is not an utterance of any other sentence, even if the hearer is not certain which sentence has been uttered. (1994, p. 198)

Of course, Williamson does not believe that words consist of strings of letters. But what then does he believe words and sentences consist of? The rest of the paragraph from which the above is culled is unfortunately too obscure to tell how he thinks they differ from the sorts of things like "strings of letters" that can be ambiguous.

5.5 A (Not Knock Down) Argument

So let us return to Thesis 1 and Thesis 2 and forget the meta-linguistic thesis.

Consider *orange*.¹³

¹³ Some people have objected that the name of the fruit is also vague. I don't think it is. Anyone who thinks it is can substitute *even* as it applies to integers and as it applies to physical surfaces

The following three propositions seem fine and jointly true:

- 16) *orange* the name of the fruit = *orange* the name of the color.
- 17) *orange* the name of the fruit is ambiguous (since it is also the name of the color)
- 18) *orange* the name of the color is ambiguous (since it is also the name of the fruit)

16) and (17) and (18) are consistent, to say the least.

However the following argument is also clearly valid:

- 19) *orange* the name of the fruit is precise (i.e., not vague).
- 20) *orange* the name of the color is vague (i.e., not precise).
- 21) *orange* the name of the fruit \neq *orange* the name of the color.

19) and (20) (together with the principle of indiscernibility of identicals) entail 21), the negation of (16).

To dehorn the dilemma, we have three options:

Primacy of ambiguity option: there is such a thing as *orange* tout court. It is ambiguous. But it is neither vague nor precise.

Problem: But what are we to make of the terms in the referring positions in (19) and (20)?

Primacy of vagueness option: there is no such thing as *orange* tout court. There is such a thing as *orange^f* (the name of the fruit) and there is such a thing as *orange^c* (the name of the color). The former is precise, the latter is vague, neither is ambiguous or unambiguous.⁴

Problem: What are we to make of the term in the referring positions (17) and (18)? What is the nature relationship between those and the referring positions in (19) and (20)?

The no primacy option: Theses 1 and Thesis 2 are each true. There are two mutually exclusive categories. Let us call them (as we already have) signs and locutions. No sign is a locution, and no locution is a sign. (17) and (18) are about the sign; (19) and (20) are about the locution.

or my *orange* (or *odd* as it applies to numbers and how it applies to behavior; or *work* as used in mechanics versus how it is used about tasks, etc.).

⁴ I skip the option that one might be ambiguous and the other not, as of no real interest. It would raise the issue as to which is what, for which no motivated answer is forthcoming.

Problem: Where does that leave "orange" (the metalinguistic display term)? More to the point, how do signs and locutions differ from each other? How are the members of each category individuated?

Well, fortunately there is a list of *prima facie* plausible candidates for individuation.

- (A) Things individuated by their *phonological* features and structure.
- (B) Things individuated by their *phonetic* features and their structure.
- (C) Things individuated by their *semantic/pragmatic* features and their structure.
- (D) Things individuated by the combination of their *phonological and semantic/pragmatic* features and their structures.
- (E) Things individuated by the combination of their *phonetic and semantic/pragmatic* features and their structure.

I could add more candidates to this list,¹⁵ but let us stop for a while with what we already have on our plate here.

The distinction between phonological features and phonetic ones may not be familiar to everyone. Since I will want to return to it later on, here, painted with very broad strokes, is the core of the difference.

When we speak, we perform complicated sequences of articulatory gestures in the course of which we push an air stream out of our lungs with our abdominal muscles and then modulate that air stream by configuring our vocal folds, velum, root of the tongue, dorsum of the tongue, blade of the tongue, lips, in certain ways. This produces airwaves with nomologically determined acoustic characteristics, analyzable, for instance, in terms of the pattern of their resonances, and processed through the filters in our ears and then parts of our mind/brains dedicated to speech recognition. These gestures, and their acoustic/auditory outcomes constitute the domain of phonetics. It is a vast field in which physics (especially acoustics), physiology, particularly anatomy and neurology, contribute crucial information. By "phonetic features" I meant *grosso modo* the properties that constitute the domain of phonetics.

Phonological features constitute the domain of a different, though closely related field of theorizing. Phonology is part of what, for a lack of more perspicuous words, I will call analytic grammar. Syntax is a familiar branch of grammar to which we have all been probably explicitly exposed in one way or another. It is concerned with regularities that can presumably be modeled as systems of rules and/or constraints.¹⁶ It is only indirectly related to spatio-temporal

¹⁵ For instance, things individuated by their spelling. They form a very interesting category, but I want to pretend it does not exist for the purpose of this chapter. Writing is very different ontologically from speech: it results in enduring spatial items whose essential properties are parasitic on those of speech since they pertain to language only as scores performable as speech sometimes supplemented with morphophonological clues. Spelling this out will not be possible until the problem raised at the end of this chapter is solved.

¹⁶ Though there is a wide range of views about the character of those rules or constraints.

processes such as the production of utterances. The same is true of phonology. And it too is concerned with regularities that can presumably be modeled as systems of rules and/or constraints. There are, for instance phonotactic rules/regularities. For instance, in English no syllable can start with a string of consonants /ps/, or /ts/, or /ks/, and if it starts with a string of three consonants, the first must be /s/. So, for instance, though we spell PSYCHOLOGY, we pronounce /saykolodji/. And whereas *split* is an English word, and *splot* as far as I know, is not, but could be, *psit* is not even a possible word.¹⁷ There are rules governing vowel shift, the kind of alternations exemplified by *profane/profanity*, *serene/serenity*, *Christ/Christian*. I will come back to those shortly. There are rules of stress placement as attested by the differences among e.g. *black board*, *blackboard*, *black board eraser*, *black boarder*, *blackboard eraser*. And so on, and so on. And so on. By "phonological features" I meant grosso modo the properties that constitute the domain of phonology.

So phonetic and phonological features are profoundly different. But they are closely related, theoretically and empirically. For a while let us disregard this difference. Any utterance will have intimately related phonetic and phonological features. Let's refer to phonetic features and phonological features and their mix indifferently as *pho-features*. So our list of candidates now reduces to three:

- I Things individuated by their pho-features (and their structure). Call them **sounds**, a very misleading misnomer—as I shall try to argue—but mnemonically and traditionally handy.
- II Things individuated by their semantic/pragmatic features (and their structure). Let's call them **contents**.
- III Things individuated by the combination of their pho-features and their semantic/pragmatic features. Let us call them **expressions**.¹⁸

And now let us return to the question raised by the **no primacy option**:

Sounds are either polysemous or monosemous. Polysemous if the grammar or the lexicon pairs them with more than one content. Monosemous if the grammar or the lexicon pairs them with only one content.

Sounds can also have what, for lack of a better expression, I will call full rhymes. A sound has a full rhyme iff there are two or more expressions whose individuating pho-features (and their structure) are identical¹⁹ to those of that sound. Each of those expressions has then a homophone (see below).

¹⁷ I am obviously not talking about the string of letters

¹⁸ I do not mention syntactic features and structures for reasons that I cannot go into here. For present purposes it is sufficient to note that these manifests themselves as, and can to some extent be retraced to pho-features and semantic/pragmatic features and their arrangement.

¹⁹ Such "sounds" are qualitatively but not numerically identical since their relational properties (to the other features) are different. A fuller discussion of the difference between polysemy and possession of rhyme requires issues pertaining to the structure of the lexicon as well as of the exact nature of the sound-meaning pairings of phrases created by each language.

Since sounds have no intrinsic semantic/pragmatic features, they cannot be vague or precise.

Contents, on the other hand, can be either vague or precise.²⁰ But, since they have no intrinsic pho-features, they cannot be either polysemous or monosemous. Nor, obviously, can they have full rhymes (as I use the term).

Expressions can be vague or precise by virtue of their semantic/pragmatic features, but they cannot be polysemous or monosemous, since neither the lexicon nor the grammar pairs them with any semantic/pragmatic features, they are the product of such pairing, they are constituted of such pairings.

However, expressions can, and many do have homophones. Two expressions constitute a pair of homophones iff they have identical pho-features, i.e., if their pho-features are a pair of full rhymes.

We can summarize all this in a table:

	Can "sounds"	Can contents	Can expressions
be polysemous or have full rhymes?	Yes	No	No
be vague?	No	Yes	Yes
have homophones?	No	No	Yes

Unfortunately, I have now created a terminological mare's nest. If by "signs" we mean sounds, and by "ambiguous" we mean polysemous, and by "locution" we mean expression, then indeed signs can be ambiguous but not vague, whereas locutions can be vague but cannot be polysemous, though they can have homophones. If by "sign" we mean . . . I don't want to go through all the plausible permutations and combinations.²¹ Clearly what is called for at this point is regimentation of our terms.

But before doing this, we ought to consider whether the distinction between polysemy and homophony (i.e., the having of a full rhyme) is merely a terminological one, or whether it has a deeper reality. Is there a fact of the matter as to whether the sound <bank>, for instance, is polysemous or whether the expressions *bank* each has a homophone? Is there a fact of the matter of whether the sound <orange> is polysemous, or there are two expressions *orange*, each of which has a homophone? More interestingly, whether the sound <Flying planes can be dangerous> is polysemous, or whether there are two expressions, one about planes that fly and one about the activity of flying them, each of which has a homophone. The topic is a tricky one, as attested for instance by Quine's giving up on it in *Words and Objects* (1960, chapter 5, #27) The best argument against the claim that there is a fact of the matter is that no one, so far, has been able to come up with a satisfactory analysis of the distinction. On the other hand, there seems to be strong empirical evidence for its

²⁰ I hesitate to say that they must be either vague or precise.

²¹ Anyone willing to go through the boring exercise can see that each of the possibilities mentioned at the outset and every option mentioned after the dilemma is true under appropriate reformulation.

ality. Open any half decent dictionary, and it is evident that lexicographers have relatively little trouble deciding. So for instance, the authors of *Webster* unhesitatingly list the various "senses" of *left* (as polysemously assigned to the sound) without including the past tense of *to leave*, which they enter as a different expression altogether, though it is a full rhyme. There is also fascinating evidence of very different nature from the cognitive sciences. So, for instance, Pytkäinen et al. raise the question: "Is polysemy just homonymy or a qualitatively different phenomenon?" (2006, p. 97). And they mean something that covers the following question:

(22) Is *paper* stored in the brain as one word with different meanings whereas *bank* is stored in the brain as two different words?

and their answer, based on a number of observations and MEG reading is a clear "Yes".²²

So where does this leave us? Let us drop the terms "sign" and "locution" altogether. An expression may be precise, and have a homophone that is vague, and a sound may have different contents assigned to it, some of which may be vague and some of which are precise. <*orange*> the sound, is polysemous, one of its contents is vague, another of its contents is precise. *Even*, the predicate expression pertaining to numbers, is precise; it has a homonym *even* the predicate of physical surfaces, which is vague. But vagueness pertains essentially to contents, is intrinsic to content, is only inherited from contents by expressions, whereas ambiguity, whether polysemy or homophony is intrinsic neither to sounds, nor to expressions, nor even to contents. It is a relational property. More pedantically still: ambiguity hinges on reception, vagueness hinges on conception.

The moral that I draw from this is that the distinction between vagueness and ambiguity, whatever its significance for logic and formal semantics, should ultimately be explicated in a unified field in which philosophy, linguistics and the cognitive sciences, including their physiological branches, come together.

Where does this leave us in the meantime? First, with a sharper awareness that the discussions about the relationship between vagueness and ambiguity are somewhat muddled in much of the philosophic literature.

So for instance, Sider and Braun (1997) argue that for all intents and purposes, vagueness is but a special case of ambiguity, and that the fallacy underlying the Sorites problem is a special case of the fallacy of equivocation.²³ They offer as a typical case of ambiguity *bat* used, on the one hand, to refer to the baseball stick

²² Though the answer may vary across idiolects.

²³ "The leading idea is that vagueness is a lot like ambiguity. To be either true or false, a sentence must have a unique meaning. Ambiguous sentences do not have unique meanings. Therefore, they are neither true nor false. Similarly, sentences containing vague expressions do not have unique meanings; therefore, they too are neither true nor false" (1997, p. 135). Unfortunately they equivocate throughout the paper about what they have in mind by "sentence". This does not do full justice to the subtlety of their analysis, which recognizes important differences between the availability of explicit disambiguation in standard "bank" like cases and non-availability in "red" type cases. The core of their thesis is that ambiguous and vague sentence share not being true.

and on the other hand to the flying mammal. But <bat> the "sound" is clearly not a case of a polysemous sound. The expression signifying the baseball stick does have a homophone, and the sound happens to have a full rhyme, but this is an accidental relational property. The same is true of the homophonous expression pertaining to the flying mammal. Vagueness is an intrinsic property of expressions. Some instances might perhaps be construed as a consequence of a special type of polysemy, depending on one's views of the lexicon, though off hand such view does not seem very plausible or even coherent on any reasonable conception of polysemy. Viewed as a consequence of homophony, vagueness would entail—at least in the case of color terms—that the cardinality of the lexicon is at least that of the reals, whereas there is good reason to think that its cardinality is that of the natural numbers.²⁴

Kit Fine (1975), in a paper to which I think he no longer subscribes, speaks of ambiguity as a surplus of meaning and of vagueness as a deficiency of meaning. Polysemous sounds may perhaps meaningfully be said to "suffer" from surplus of meaning, since they "suffer" from multiple assignments. But they cannot ever "suffer" from a deficiency in meaning.²⁵ So he must have had in mind polysemous sounds on the one hand and vague expressions on the other. But these belong to very different, I would even say "incommensurable" categories! He may have had a plausible third option in mind. Sounds that have what I have called full rhymes. Let us call such sounds equivocal sounds. So equivocal sounds and polysemous sounds can sensibly be said to "suffer" from surplus of meaning. However, they cannot also sensibly be said to ever suffer from deficiency of meaning. What could that possibly mean? One can perhaps make sense of the notion that some sounds are assigned (associated with) deficient meanings, meanings, for instance, reflected in underspecification of truth conditions. But that leaves the locus of ambiguity and the locus of vagueness still in distinct mutually exclusive domains.

I suspect that Sider and Braun, and Fine, and others²⁶ who have confidently meshed vagueness and ambiguity would dismiss what I have just said as hairsplitting quibbling, quibbling that calls at best for careful rephrasings but not for serious rethinking. However much more than mere careful rephrasing is called for. What is at stake is getting a solid grasp of what we are talking and thinking about when we talk and think about vagueness and ambiguity, whether in the course of doing semantics or pragmatics, or in the course of evaluating choices among available logics. And that does require new research. Let me mention one problem among many that will have to be solved.

²⁴ There would have to be at least as many unproductively related lexical items as there are shades in the spectrum.

²⁵ One of the meanings assigned to a polysemous sound may be a deficient meaning, but that does not save the view.

²⁶ For instance M. Pinkal in *Logic and Lexicon* writes: "If the precisification spectrum of an expression is perceived as discrete, we may call it ambiguous; if it is perceived as continuous, we may call it vague" (1995, p. 76).

5.6 A Real Problem: What Are “Sounds”?

A lot of attention has been given to the question: what are meanings? Whether there are such things or properties at all, or whether there are only sounds/signs (and maybe inscriptions) and things to which these sounds/signs are made to refer, etc. or whether there are only sounds/signs and their uses, whatever that means. Not that these questions have been answered to everyone's satisfaction, or even to anyone's satisfaction, but at least we know what the conceptual problems are and where the rubber hits the road, so to speak. Not so for sounds. Among philosophers of language at least, the question “what are sounds?” has been almost completely neglected, and for at least three reasons: a historical reason, which I have sketched in Halle's and my “The Ontology of Phonology”²⁷; a cultural one, that philosophers think in terms of types encoded orthographically, and sounds, in so far as they are considered at all, are thought of as aspects of spoken tokens best left to physicists to study; and, finally, the question does not seem particularly interesting.

Actually the question “What are sounds?” when posed about linguistic sounds, raises deeply vexing conceptual issues, and in the time that remains I want to sketch one such fundamental issue.

The very term “sound”, as I have already suggested, is misleading. It brings to mind events with acoustic and auditory properties. But acoustic and auditory properties are not essential to the identity of words or phrases or sentences, not even to that of most of their tokens.²⁸ Most of the linguistic tokens that most of us produce most of the time, are subvocal, belong to inner speech, and have no acoustic properties at all.²⁹ Nor do they have articulatory properties available to proprioception. More crucially, the regularities that constitute the domain of phonology, unlike many of the regularities that constitute the domain of phonetics, are not expressed in terms of acoustic features. They are expressed in terms of features that are only very indirectly related to acoustic features. They are expressed in a terminology that connotes articulatory gestures—I say “connotes” and not “refer” for reasons that will become clear in a moment—and whose connection with acoustic features is remote. And there is evidence that perception of language is very different from perception of what we normally think of as sounds in the sense of noises.³⁰

A word of caution. Phonology is currently in great turmoil. It underwent a revolution in the sixties marked by the publication of Chomsky and Halle's *Sound Pattern of English* and the broad acceptance of so-called generative phonology. That

²⁷ Briefly: Philosophers come to an interest in language from an interest in logic and theoretical physics, areas that rely on notational devices bereft of phonology.

²⁸ This discussion is embarrassingly sloppy about whether it is about types or about tokens. Ultimately, it is only about tokens. I have tried to argue elsewhere that the notion of types is dispensable, though at the cost of hideous circumlocutions.

²⁹ Clarification: To say that it has no acoustic properties is simply to say that it is not realized as wave forms or produced through movement of the articulators. It is not to deny that it consists of events in real time, sequenced in real time, marked by pauses, intonations, etc.

³⁰ See A. Liberman's work.

framework is now sometimes only in part, and sometimes completely, rejected by many researchers in the field, and so the question of how phonology and phonetics are related is a topic of intense debate. So the issue that I am about to illustrate must be taken with spoonfuls of salt. Some phonologist would deny that it arises under their approach. I think, however that very similar issues will necessarily arise under any promising approach. I wish more philosophers, more philosophers of science, would get interested. The issues are the kind that arise whenever two or more disparate fields of inquiry clamor for unification, unification that requires reconceptualizations of the phenomena.

So here is a bit of toy phonology.

Vowel shift is a familiar phenomenon. The following two alternations are paradigmatic examples.

(23) *serene serenity*

(24) *sane sanity*

Linguists use "alternations" on the obvious presumption that the members of each pair are closely related not just in meaning but also in constitution: that they are built on a common core lexical item.

The two pairs are similar in a number of respects. The second members each have the affix *-ity*, and the vowel immediately preceding that affix is short there, whereas the "corresponding" vowel in the first member is long. And though the spelling does not reflect this fact, these vowels "shift". In the first example they alternate between [i] and [e], and the second between [e] and [a].³¹

Let us focus on the first of these pairs, and concentrate our attention on the two vowels that alternate.

Both members share not only being vowels (which corresponds to a certain broad opening of the oral cavity), but are being produced (when produced) by moving the dorsum of the tongue forward. They are what are called "front vowels". In that respect they differ from, for instance, [u] and [o], which are "back vowels" and produced (when produced) by pulling the dorsum of the tongue back. Both members have a number of other features in common. When produced, the dorsum of the tongue does not go all the way down, as it does, when one produces for instance the [a] in *sanity*, they are not "low vowels".³²

How do they differ? They differ in one main respect: the [i] is produced by raising the dorsum quite high, the [e] is produced by not raising the dorsum quite that high.

Let us summarize this, using so-called feature notation, which should be fairly transparent now.

³¹ I am oversimplifying by overlooking the difference between [e] and [ɛ]! Root of the tongue is implicated, but that can be disregarded for present purposes.

³² They are similar in a number of other respects. For instance in neither case are lips rounded, in both cases vocal cords are allowed to vibrate, etc. Note that doctors never ask you to say "u" or "ee" when they want to see your throat, but "a".

- e]: [+ vowel]
 [+front]
 [-low]
 [-high]
- i] [+vowel]
 [+front]
 [-low]
 [+high]

In fact we can now forget the terms "[e]" and "[i]" and think of these symbols as simply abbreviations for the combination of features (now used in a somewhat technical sense) indicated on their right.

The two vowels also differ in another respect besides height: the "[i]", when produced, is of longer duration than the "[e]" when produced. So we add [- long] after the [-high] of "[e]" and [+long] after the [+high] of "[i]".³³

Do notice the nature of the notation used to characterize these features. It can be construed as a sort of score, a set of instructions on how to move a particular articulatory organ (in this case the dorsum of the tongue) to produce the "sound".

So how does a generative phonologist account for the alternation and, more importantly, for the regularity represented not only by that pair, but similar pairs such as pairs *obscenelobscenity*, *severelseverity*, etc? By viewing both members of the pair as derived from a common "underlying" **lexical form**, orthographically perhaps encodable as ser[e:n], where the colon indicates [+long]. In somewhat bastardly notation the underlying lexical form is:

- (25) ser{[+ vowel]}n
 [+front]
 [-low]
 [-high]
 [+long]

The derivation of *serenity* proceeds in two steps:

First affixation of '-ity'

- ser{[+ vowel]}nity
 [+front]
 [-low]
 [-high]
 [+long]

³³ This calls for much qualification. [i] can be either [+long] or [-long]. Actually the very treatment of length as a feature is probably mistaken. Length is better viewed as gemination, but we better not go there in this chapter, and nothing crucial for the present discussion is at stake.

Then conversion of [+long] to [-long].

The derivation of *serene* requires only one step: Conversion of [-high] to [+high].

Lets us now turn to (24) (*sane/sanity*). The account, as expected, is very similar. The two vowels in feature notation are:

[a] [+vowel]
 [+front]
 [+low]
 [-high]
 [-long]

[e] [+ vowel]
 [+front]
 [-low]
 [-high]
 [+long]

The underlying lexical representation is:

s{[+vowel]}n
 [+front]
 [+low]
 [-high]
 [+long]

The derivation of *sanity* involves two steps identical to the derivation of "serenity" but for the initial input.

The derivation of *sane* involves: conversion of [-low] to [+low].

So where are we?

- The features in these derivations are articulatory features, they pertain to the positioning of articulators in the vocal tract.
- They are not acoustic features, though their execution, when executed under conditions of overt speech, does have nomologically determined acoustic effects.
- **Fact:** The feature combinations in the **lexical forms** are never executed in either of these two examples, at least not in normal canonical speech.³⁴ Nevertheless they presumably constitute one crucial aspect of what we have mastered when we have mastered the words they underly, and that we do produce or hear.
- **Fact:** Neither the lexical forms nor the derived (i.e., produced) forms are openly executed in inner speech, which has neither acoustic nor articulatory qualities.

³⁴ Whether inner or overt speech.

- Conclusion: So “sounds”, the locus of ambiguity, are not sounds at all. They are not, after all, individuated by a combination of phonological and phonetic features. The very notion of such a combination is deeply problematic.

How then are they individuated? Help!

5.7 A Very Tentative and Vulnerable Concluding Conjecture

In my opening remarks I raised the conjecture that the facts on which ambiguities supervene are easier to identify than the facts on which vaguenesses supervene. The facts about “sounds” are relatively open to inspection, very indirect inspection modulated by problematic presumptions once we start theorizing, but nevertheless relatively open to inspection. Their tokens are displayed to our awareness as intended gestures.³⁵ They have a phenomenology. We are even in a position to form plausible ideas about their general ontological nature, namely that of plans to perform gestural acts monitored by expected perceptual effects. The facts about contents are utterly beyond inspection and we flounder all over the place as we try to get a hold of them. They have no phenomenology.³⁶ We have no perceptually or introspectively grounded ideas about their ontological status.³⁷ But we seem able nevertheless to process similarities and differences among contents.³⁸ The content that goes with cat is not the same as the content that goes with dog. So we are in a relatively good position to identify the ingredients of ambiguity (be it of homophony or of polysemy). Not so when it comes to the ingredients of vagueness.

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³⁵ To the speaker. To the hearer (or reader) with the appropriate perceptual competence as well, though the process has some additional twists.

³⁶ Talk of “cognitive phenomenology” only labels the problem.

³⁷ Linguistic sounds have a phenomenology that constrains our views of their ontology, linguistic meanings don't have a phenomenology and their ontology is up for grabs.

³⁸ See Quine (1951).

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