

another, this doesn't mean it's ambiguous in the first. There's no reason to say that English *rice* is ambiguous just because it can be translated by *fan* 'rice grains for eating in the usual way' or *mi* 'rice for other purposes', like planting or making flour, in Chinese.) It seems that languages don't have two definite articles, one for a referential meaning and one for an attributive meaning. They just have one article (or none). This point tends to support Kripke. It doesn't seem right to analyze definite noun phrases as ambiguous.

It's possible that Donnellan might be right because the referential/attributive contrast is a structural ambiguity (involving different grammatical structures for the sentence), not a lexical one (involving different meanings for *the*). How plausible does this seem to you?

As mentioned in chapter 1, Kripke's solution is to say that definites have a single semantic meaning, and he claims that this semantic meaning may as well be the one proposed by Russell. The ability of definites to refer can be seen not as part of their semantics, but as part of their pragmatics, that is their speaker's meaning. Speakers may use a definite to refer to something, but this does not mean that the definite itself refers to that thing by virtue of its semantics. The situation can be seen as similar to the kind of metaphor whereby we refer to a person by virtue of an incidental property of theirs. For instance, a flight attendant might say *14B wants a coffee*, meaning that the person in seat 14B wants the coffee. Though *14B* doesn't (semantically) refer to a person, but rather to a seat (so that, literally speaking, this sentence is nonsense), it's a concise way for the flight attendant to convey a clear message.

Kripke's explicit aim in his article is to show that Donnellan is wrong in saying that Russell's analysis is inadequate when it comes to scenario no. 1. Kripke basically makes a methodological point ("we need to keep in mind the distinction between semantic and speaker's meaning") and a negative point ("your criticism of Russell isn't convincing"). Though he seems to have made his methodological and negative points quite effectively, if you read the paper it is important to keep in mind that he has not provided a positive argument for Russell's theory. Because of this, we should not take Kripke's paper as arguing that Russell's theory is better than the Fregean referential theory we worked out earlier. Indeed, what Kripke says helps to save any theory which gets scenario no. 2 right from the troubles it faces from scenario no. 1.

5.5 Plurals and Mass Terms

So far we have spent quite a while discussing a narrow range of noun phrases: names, predicate nominals, and singular definites. The world of noun phrases is a diverse one, though, and we'll continue this chapter, as well as the next one, examining other interesting types. In this section we look at plural noun phrases (like *three horses*) and mass noun phrases (like *much milk*).

Godehard Link¹³ has presented a very appealing theory of plural and mass noun phrases. He proposes that the set of individuals associated with a given noun has an internal structure which is relevant for how we talk about those individuals. As we've seen in chapter 3, the meaning of *horse* is a property, and this property can be modeled as an association between possible worlds and the set of horses in each world. This can be expressed as in (11):

- (11) $w_1 \rightarrow \{A, B\}$
 $w_2 \rightarrow \{B, C\}$
 $w_3 \rightarrow \{A, B, C\}$
 $w_4 \rightarrow \emptyset$

(In world 1, there are two horses, A and B. In world 2, there are also two, B and C. In world three, A, B, and C are all horses, and in world 4 there are no horses. Let's pretend that's all the worlds there are.)

To make things simpler, let's just focus on one world, w_3 , as we compare this meaning for *horse* to that of the plural *horses*. So (12) is the meaning for *horse*, modeled as a set, in world 3. To describe plural noun phrases, Godehard Link introduces the concept of a *sum* of individuals. Any two individuals A and B can be summed to make a plural individual A+B. This plural individual has A and B as *parts*. The meaning of the plural noun *horses* is then the set of plural individuals made up of horses, as in (13):

- (12) The meaning of *horse* in $w_3 = \{A, B, C\}$
 (13) The meaning of *horses* in $w_3 = \{A+B, B+C, A+C, A+B+C\}$

This meaning for plural *horses* can be used as a predicate nominal. (14) is true in w_3 if the plural individual Silver+Trigger is in the set indicated in (13):

(14) Silver and Trigger are horses.

The proper meaning of *horses* associates a set of plural individuals with each possible world. Convert the sample meaning for *horse* in (11) into a meaning for *horses*.
 This exercise has an answer, no. 5, in the appendix.

The part-whole relations which relate *horse* and *horses* can be illustrated as in diagram 28 (ignore the part about Chinese for now). (Some technical terms: A, B, and C are the *atoms* of this part-whole structure, a *lattice*, while the rest are *plural individuals* or perhaps *groups*. We call A+B the *join* of A and B. A and B are *parts* of A+B. The parts of A+B+C are harder to describe; A, B, and C are all parts, as are the complex individuals A+B, B+C, and A+C. How many parts A+B+C has depends on how you look at it: three ({A, B, C}) or two ({A+B, C} or {A, B+C} or {A+C, B}).¹⁴

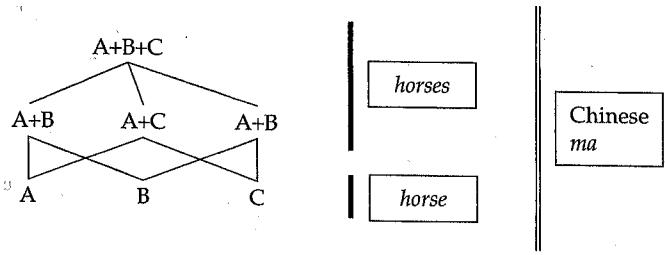


Diagram 28

Plural noun phrases are often modified by numerals, as in *the three horses*. We can make a good guess about the meaning of the numeral here based on our theory of plural noun phrases and what we know about the meaning of *the*. Recall that *the* combines with a predicate, and creates an expression which refers to the unique most salient thing described by that predicate. This tells us that *three horses* must be a predicate, since predicates are what *the* combines with. Therefore, *three* can be thought of as a kind of adjective, since as we saw earlier, adjectives combine with a noun predicate to form a larger combined predicate. More specifically, *three* combines with *horses*, and the resulting predicate describes any plural individual which is described by *horses* and which has three atomic parts. In other words, the meaning of *three horses* in world 3 is this set: {A+B+C}.

<i>horse</i>	<i>horses</i>	<i>three horses</i>	<i>the three horses</i>
A property which describes any individual horse	A property which describes any plural individual consisting of horses	A property which describes any plural individual described by <i>horses</i> with three atomic parts	Refers to the unique most salient thing described by <i>three horses</i>
In sets:			
{A, B, C}	{A+B, B+C, A+C, A+B+C}	{A+B+C}	A+B+C

Diagram 29

The three horses refers to the unique most salient thing described by *three horses*. The plural individual A+B+C is the unique thing described by *three horses* (in w3), so *the three horses* refers to it. (See diagram 29.)

Many languages, like Chinese, don't distinguish singular from plural nouns. Emmon Bach suggests that nouns in these languages cover both atomic and non-atomic individuals, gathering together everything that in English is described by *horse* and *horses*.¹⁵ That is, in Chinese the meaning of *horse* in world 3 would be {A, B, C, A+B, B+C, A+C, A+B+C}. If a language does not distinguish atomic from plural individuals, it is a bit of a mystery how a numeral like *three* would work, since the job of *three* is to count atomic individuals. Chinese, like many other languages, handles this by using *classifiers* (or *measure words*) which indicate the nature of the units that one counts by. Classifiers introduce into the semantic composition a specification of what the atoms are, allowing numerals to do their job. The measure word used with the word for horse, *ma*, is *pi*. So *three horses* is translated *san pi ma* 'three classifier horses'. Each of these words has a basic semantic function: *san* indicates we are counting three atoms, *pi* indicates that these atoms are large-animal-sized (in this case, A, B, and C), and *ma* indicates that their nature is that of horse-hood (that is, they are drawn from the set described by *horse*).

The comparison between Chinese and English reveals something about how languages express meaning that would not be clear by looking at either language alone. On the one hand, Chinese reveals that a simple phrase like *three horses* has three meaning components, not just two as English leads us to expect. In this respect, languages that use classifiers have a much more straightforward relationship between syntax and

semantics than languages like English which do not. In English, two distinct semantic functions are condensed into nouns: *horse(s)* indicates both that we are talking about horse-sized things (corresponding to a classifier) and that the nature of these things is horse-hood (corresponding to the Chinese noun). On the other hand, English reveals that there is a fundamental difference between plural and atomic individuals, a point which is not clear in a language like Chinese which doesn't distinguish singular from plural. There is no sense in which either language's system is superior; there are simply different ways in which a given language can combine and express the deeper, fundamental components of meaning which all languages share.

Mass nouns (sometimes called "uncountable nouns") like *gold* present an interesting variation on this way of thinking about plurality. Mass nouns are associated with lattice structures like diagram 28. However, as far as our linguistic conception of things goes, one can always theoretically divide a piece of gold into two smaller pieces. There are no basic units, or atoms, of gold. (In reality, of course, there are atoms, but this knowledge isn't built into language.) Thus, the lattice has no bottom atomic layer, but goes on downward forever.

An English mass noun like *gold* is somewhat like the Chinese *ma*. The lattice for *gold*, like Chinese *ma*, does not categorize the totality of individuals in the lattice into atomic vs. non-atomic units. However, the two are not exactly the same, since the lattice for *ma* in Chinese does have atoms (it's not that the Chinese don't know that horses come in basic units – these atoms are simply not relevant to the meaning of *ma*). More similar to Chinese *ma* is a word like *furniture*, which is a mass noun even though we clearly understand what basic units of furniture are. This can be seen from the fact that combinations like *three furnitures* are obviously ungrammatical. To count furniture, we have to use a classifier-like word such as *piece*: *three pieces of furniture*.

There are relationships between the count and mass domains. Consider an example from Link's paper: the connections between *gold* and *ring*. *Gold* is a mass noun and *ring* is a count noun. Each gold ring is made up of some gold, so there is a connection, or "mapping," between the gold and the rings. This mapping preserves the internal structure of the ring domain, so that if we have two rings R1 and R2, made up of gold G1 and G2, the plural individual R1+R2 (i.e., *those rings*) is made up of G1+G2 (i.e., *that gold*). See diagram 30. As Link points out, it is necessary to distinguish the ring R1 from the gold G1, since the two have different properties – the ring can be new, but the gold old, for instance. But they have a very intimate relationship: the gold comprises the ring.

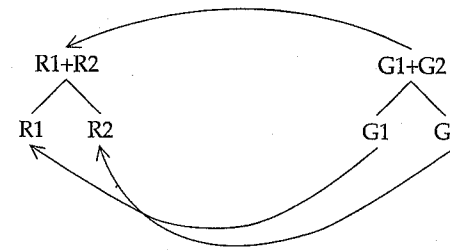


Diagram 30

Think about the relationships between the count and mass domains suggested by *pig/pork*, *bottle (of beer)/beer*, *thing/stuff*, *(a) thought/(much) thought*.

5.6 Kinds

A bare plural noun phrase is a plural lacking a determiner like *the*, *all*, etc. Languages use bare plurals, and bare nouns more generally, to differing extents. English uses bare plurals pretty much, and they present a puzzle for semantic theory, since they appear to be radically ambiguous:

- (15) Horses are rare. (= as a group)
- (16) Horses are mammals. (= all)
- (17) Horses have tails. (= almost all)
- (18) Horses give birth to their foals in the spring.
(= many of the females)
- (19) Horses were galloping across the plain. (= some)

But the thesis that the differences in meaning seen in (15)–(19) are due to an ambiguity of *horses* is a bad one. In the first place, it is hardly plausible that *horses* is five-ways ambiguous (at least), on some occasions meaning "all horses," on others meaning "some horses," and so forth. But more importantly, if *horses* were ambiguous, we would expect each sentence in (15)–(19) to be ambiguous. If *horses* can mean *all horses*, we'd expect (19)

to be able to mean "all horses were galloping across the plain," (18) to mean "all horses give birth to their foals in the spring," and (15) to mean "all horses are rare" (something which doesn't even make sense). We don't find individual sentences to be radically ambiguous in this way, however. This suggests that the meaning differences in (15)–(19) don't arise from an ambiguity in the subject *horses*, but rather from differences between the predicates. In order to explain the pattern, then, we will embark on another foray into the sub-atomic semantics of predicates.

Greg Carlson¹⁶ has proposed a theory of bare plurals which gives them a single meaning. But to accomplish this, he needs to think of the individuals which language talks about as having a certain kind of internal structure (this structure would be in addition to that proposed by Link). Carlson suggests that we distinguish the species of horse, an abstract entity which he calls the *kind*, from the regular *objects* typically known as horses. For Carlson, the term *individual* is a general term covering both kinds and objects. In addition to the distinction between kinds and objects, we have *stages*, or spatiotemporal "slices" of individual horses. For example, the horse Silver may have lived for 40 years, but we can focus on just the part of his existence which begins at 7:00 a.m. on a certain day, and ends at 7:00 p.m. that night. This 12-hour stage can be made more concrete by thinking of time as a spatial dimension. With Silver stretching for a 40-year length of this dimension, the stage is a 12-hour slice taken out of the overall length. Stages are not individuals, and we have no words to refer to them in natural language, but as we'll see below, according to Carlson they play an important hidden role in solving the puzzle of (15)–(19).

In diagram 31, S1 is a stage of the first horse H1; it also counts as a stage of the kind. We can say that S1 "realizes" H1 and K.

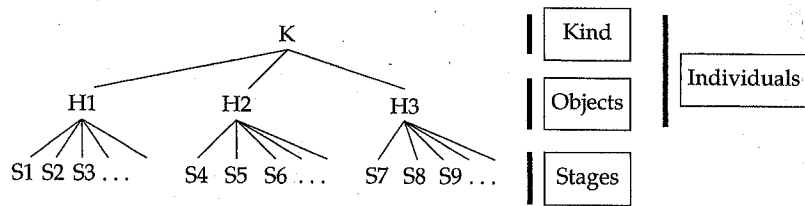


Diagram 31

The bare plurals *horses* always refers to the kind. However, predicates differ in whether they pertain to kinds, objects, or stages. A predicate like *rare* is naturally seen as kind-level; only kinds can be rare, single objects

or stages cannot be. Thus the semantics of (15) is simple. The property of being rare is predicated of the kind "horses." We can symbolize this as follows:

(20) rare(horses)

The predicate *have tails*, in contrast, is object-level. Kinds are abstract, and do not have tails. Object-level predicates express permanent, or nearly permanent, properties of things. Thus, they apply to objects, rather than stages, which are mere temporal segments. For this reason, we can straightforwardly say something like (21):

(21) Silver and Trigger have tails.
have-tails(Silver+Trigger) (ignoring the internal structure of *have tails*)

Since *have tails* is object-level, but *horses* refers to a kind, (17) above contains a mismatch. Carlson proposes that the species of horses can be said to have tails because, as a general rule, the individual horses do. This means that a basically object-level property like *have tails* can become kind-level. The operator Gn, for "generic," accomplishes this shift, as seen in diagram 32. If we start with an object-level predicate P, Gn(P) is a new property which is true of a kind *k* if (and only if) P is true of typical instances of *k*.

(22) Gn(have-tail)(horses)

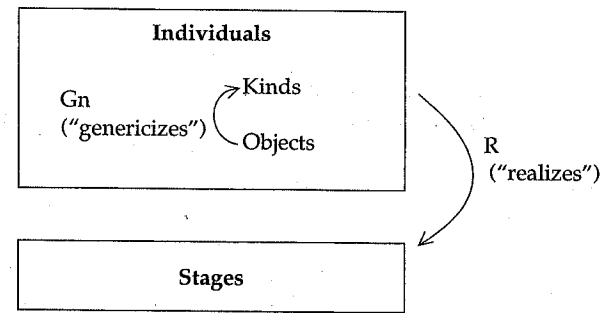


Diagram 32

The predicate *be galloping across the plain* is stage-level. Stage-level predicates express a temporary property of an individual. If we want to say something like *Silver was galloping across the plain*, we must turn this

stage-level predicate into something that can apply to the individual Silver. Carlson shifts the predicate to an individual-level one that says something like "has a stage which is galloping across the plain."

- (23) Basic stage-level predicate:
Gallop-across-the-plain

Shifted individual-level predicate:

"has a stage x such that Gallop-across-the-plain(x)"

Silver was galloping across the plain. →

"Silver has a stage x such that Gallop-across-the-plain(x)"

This says that there is a stage of Silver that had the property of galloping across the plain; in other words, for some temporary period of time, Silver was doing that.

The individual-level predicate can also be applied to a kind, as in (19):

- (24) Horses were galloping across the plain. →
"The kind horses has a stage x such that x is Gallop-across-the-plain"

(24) says that there is a stage of the kind "horses" that had the property of galloping across the plain. Since any stage of a kind is a stage of one of the individuals which make up the kind, this correctly implies that some horses (not necessarily most or all) have stages which galloped. Notice the use of *some* in this paraphrase. We have explained why *horses* in (19) seems to mean "some horses."¹⁷

The overall picture here is that *horses* always refers to the same thing, the kind. It has a very simple semantics. The predicates that combine with it either directly describe the kind (*rare*), or indirectly use the kind to say something about the individuals or stages which realize it. The semantic complexity in the pattern (15)–(19) arises from different classes of predicates, not the bare plural.

5.7 Pronouns and Anaphora

Pronouns are another kind of word that can refer. For example, in the second sentence of (25), we would naturally say that *he* refers to Shelby, and therefore Shelby saturates the property described by *is a Keeshond*.

- (25) Shelby is cute. He is a Keeshond.

Pronouns are like definites in that they can refer to different things in different situations. In (25), *he* refers to Shelby, but if I had mentioned Bucky instead, it would have referred to Bucky. However, pronouns seem a bit different from definites in that it seems not enough just to say that *he* refers to the unique most salient individual which is described by its descriptive part. The only descriptive part of *he* is that we are talking about a male thing, and examples like (26) show that there need not be a unique most salient male thing for *he* to work.¹⁸

- (26) Shelby met Bucky. He sniffed him.

If Shelby is most salient, then both *he* and *him* should refer to Shelby – or if Bucky is most salient, to Bucky. It's not so clear how to work this out so that Shelby is most salient when *he* is read while *Bucky* is most salient when *him* is read. (Note that, for grammatical reasons, *he* and *him* cannot refer to the same thing.)

In fact the very same issue arises for definites, though it's a bit harder to see. For example:

- (27) Shelby met another male dog and a female cat. He sniffed the dog and bit the cat.

We can't really say that *the dog* refers to the unique most salient dog here, since Shelby is intuitively more salient than the other dog. So there are also problems for the semantics of definites we need to worry about, and what we say in this chapter about pronouns applies to definites as well. Nevertheless, much of the discussion of definites you'll find in linguistics and philosophy doesn't really get into these matters (although much of it does), and the way of thinking about definites discussed earlier in the chapter is good enough for many purposes.

The evidence from (26) and (27) shows that a simple notion like salience in combination with the obvious semantically descriptive quality of a pronoun does not give us enough information to resolve its reference. This means either that the situation of use provides us with richer information than just salience, or that the pronoun has more descriptive quality than it seems. Linguists have pursued both of these ideas.

5.7.1 The assignment function

The most common way of thinking about the meaning of pronouns says that context provides the pronoun's reference directly, only subject to the