

TOWARDS A COMMON SEMANTICS FOR ENGLISH
COUNT AND MASS NOUNS*

0. INTRODUCTION

The distinction between mass nouns and count nouns, first remarked upon by Jespersen (1909, vol. 2, ch. 5.2) in connection with English, is found in a number of the world's languages, including Chinese, Tamil, German and French. In English, the most common way to distinguish these two classes of words is syntactic. Cardinal numerals and quasi-cardinal numerals (e.g., "several") modify count nouns, never mass nouns. Moreover, "little" and "much" modify mass nouns, never count nouns; whereas "few" and "many" modify count nouns, never mass nouns. Count nouns admit a morphological contrast between singular and plural; mass nouns do not, being almost always singular. The pronoun "one" may have as its antecedent a count noun, not a mass noun (Baker 1978, ch. 10.1). Mass nouns with singular morphology do not tolerate the indefinite article, whereas singular count nouns do. Finally, mass nouns occur only with the plural form of those quantifiers whose singular and plural forms differ.

It has also been thought that mass nouns and count nouns can be distinguished by what they denote. The two criteria most commonly proposed are: cumulativity and divisivity of reference. Quine (1960, p. 91) observed that if a mass term such as "water" is true of each of two items then it is true of the two items taken together; and he dubbed this semantical property of mass terms "cumulative reference". This characterization, while apt, does not, however, distinguish mass nouns from count nouns; for, as Link (1991, pp. 4-5) has pointed out, cumulativity of reference also holds of plural count nouns: Just as it is the case that "If the animals in this camp are horses and the animals in that camp are horses, then the animals in the two camps are horses"; so it is the case

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that “if a is water and b is water then a and b together are water” (see also, Bunt 1985, p. 19).

The second criterion, that of the divisivity of reference, suggested by Cheng (1973, pp. 286–287), states that any part of something denoted by a mass noun is denoted by the same mass noun. However, this criterion is belied by two facts pointed out by Quine (1960, p. 99): “. . . there are parts of water, sugar and furniture too small to count as water, sugar, furniture. Moreover, what is too small to count as furniture is not too small to count as water or sugar; so the limitation needed cannot be worked into any general adaptation of ‘is’ or ‘is a part of’, but must be left rather as the separate reference-dividing business of the several mass terms”.

While some semanticists retain the divisivity of reference as a criterion to distinguish mass nouns from count nouns, in spite of the facts given above; only Bunt (1979, 1985) has attempted to justify the retention. Bunt (1985, p. 45) restates Quine’s point as follows: “For each mass noun ‘M’ there is a specific minimal size that parts of its referent may have in order to count as ‘M’”. Bunt calls this “the Minimal Parts Hypothesis” and questions its relevance to the problem of formulating the semantics of mass nouns (see also, Bunt 1979, p. 255). As he sees it, this hypothesis could be either about natural language or about the world. He maintains that insofar as it is a hypothesis about the world, it is true but irrelevant and insofar as it is a hypothesis about natural language, it is false.

Bunt (1985, pp. 45–46) goes on to claim that “mass nouns provide the possibility of talking about things *as if they do not consist of discrete parts*” and that “a linguistic semantic theory should take into account that the use of a mass noun is a way of talking about things as if they were homogeneous masses, i.e., as having some part-whole structure but without singling out any particular parts and without any commitments concerning the existence of minimal parts”. He calls this the homogeneous reference hypothesis and restates it as follows: “Mass nouns refer to entities as having a part-whole structure without singling out any particular parts and without making any commitments concerning the existence of minimal parts” (Bunt 1985, p. 46; see also, Bunt 1979, pp. 255–256).

There are, it seems, two claims which go under the heading of the homogeneous reference hypothesis. On the one hand, Bunt seems to claim that the minimal parts hypothesis has no systematic role to play in the grammar of the language: the grammar is simply mute on the question of whether or not there are minimal parts. This is how I understand the last citation in the previous paragraph and the portion of the preceding citation following the “i.e.”. I shall call this “the weak version of the homogeneous

reference hypothesis". On the other hand, Bunt claims that the divisivity of reference is a grammatical principle for the interpretation of mass nouns. This is how I understand the first citation of the previous paragraph and the part of the succeeding citation preceding the "i.e.". I shall call this "the strong version of the homogeneous reference hypothesis". These versions of the hypothesis are incompatible. That Bunt intends the strong version is borne out by the fact that he adopts the divisivity criterion as an axiom of the formal semantics of mass nouns. (See (34) in Bunt 1979, p. 262, and (14.13) and (14.15) in Bunt 1981, p. 165.) In more recent work, the strong version of the homogeneous reference hypothesis has also been adopted by ter Meulen (1981, p. 123), Roeper (1983, pp. 256–257), and Lønning (1987, section 1).

However, the strong version of the homogeneous reference hypothesis is certainly to be rejected, for reasons set out by Parsons (1970, section VI.A). Under the standard and plausible mereological assumption that two wholes are identical if and only if they have the same proper parts, it turns out that, in a world in which all furniture is made of wood and all wood has been made into furniture, the whole of wood would be identical with the whole of furniture – an implausible consequence. (However, see Bunt 1985, pp. 47–48, for a reply.)

The view adopted here is that the grammar is mute on whether or not a mass term which is true of a thing is also true of any of its proper parts. More specifically, I shall argue that the syntactic and semantic differences between mass noun phrases and count noun phrases are derivable from general syntactic and semantic principles and the two pairs of contrasting syntactic features \pm CT and \pm PL. That is to say, it is these two pairs of syntactic features and the constraints imposed by their semantic interpretation, which determine the differences between mass noun phrases and count noun phrases.

1. SYNTAX

In light of the basic role played by syntax in the proposal being propounded here, the natural place to begin its elaboration is with the underlying syntax. The task is to delineate a syntactic taxonomy of English nouns and noun phrases, which makes clear not only the domain in terms of which the proposal is to be elaborated but also certain distributional regularities which the proposal successfully captures.

For the sake of exposition, I wish to confine my account of the grammar of English common nouns to their syntactic and semantic roles in simple sentences. By the term "simple sentence", I mean a sentence of the form:

- (1)a. NP V
 b. NP V NP,

where NP is simple; and by the term “simple noun phrase”, I mean a noun phrase containing neither an S node nor any other phrasal nodes.¹

How one sees the syntactic structure of English noun phrases depends, in part at least, upon antecedent assumptions about the organization of the syntax. I shall assume, following Selkirk (1982) as well as Di Sciullo and Williams (1987), that word formation rules and phrase formation rules operate at different levels of English grammar. One advantage of this assumption is that it permits the formulation of a rather nice generalization pertaining to the syntactic structure of those elements in an English noun phrase which precede its head noun. This can be expressed in terms of the following phrase structure rule.²

- (2) NP → (NP's/DET)(AP)N.

Further dividends are paid, once one observes that, by and large, determiners in English do not iterate. Indeed the generalization is perfect, if one sets aside as idiomatic the iterations found in expressions such as “every which way” and “what a man” and if one posits that expressions such as “all the men” and “both the women” are contractions of their partitive counterparts, “all of the men” and “both of the women”, where the partitive preposition is elided. This generalization, together with the rule in (2), implies that quasi-cardinal numerals such as “several” and cardinal numerals are adjectives. It also permits a tripartite division of English determiners, depending on whether they trigger WH movement, QR movement, or no movement. These classes are interrogatives (e.g., “which” and “what”), quantifiers (e.g., “a”, “some”, “each”, “all” and “no”), and demonstratives (e.g., “the”, “this” and “that”).³

Nouns too form syntactic classes, which are distinguished by two characteristics: whether or not they occur with determiners and whether or not they admit of the contrast between singular and plural. On the one hand,

¹ X' theory and its recent developments, in which S is identified with IP and S' with CP, permits an even more succinct definition: A simple NP is one which contains no other maximal projections.

² For reasons of expository simplicity, I have collapsed the distinction between N and N' in this rule. This distinction is relevant only with respect to the syntactic structure of elements following the head noun of a noun phrase; here, I am interested in the syntactic structure only of elements preceding the head noun of a noun phrase.

³ Many lexical items fall into more than one syntactic category. There is no reason to think that determiners are any exception. One clear candidate for dual status is the indefinite article, being both a quantifier and a demonstrative (Fodor and Sag 1982). Another candidate might very well be the definite article.

Table 1.

a determiner	occurs with singular and plural	admits to contrast of
proper name	—	—
pronoun	—	+
mass noun	+	—
count noun	+	+

it is generally recognized that pronouns and count nouns admit the contrast between singular and plural, even if the morphological realization is sometimes the same (e.g., “sheep”). It is also generally recognized that proper names and mass nouns do not admit of such a contrast, being either singular alone or plural alone. On the other hand, proper names and pronouns do not admit determiners, though sometimes the definite article has come to be part of a proper name; while mass nouns and count nouns do, though need not. (See Vendler 1967, ch. 2.5–2.7, for discussion.) In short, there are four kinds of nouns (see Table 1), depending on which characteristic applies from each contrasting pair: proper names, pronouns, mass nouns and count nouns (the last two taken together comprise common nouns).

This classification does not preclude the attested fact that the same phonological shape can occur in more than one class. This is widely acknowledged in the case of nouns and verbs: “hammer” and “truck”, for example, are classified both as nouns and as verbs. (See Clark and Clark 1979 for discussion.) The same situation obtains among the sub-classifications of nouns. Thus, the same phonological shape can be associated with both a proper name and a count noun.

- (3)a. Tom is a friend.
b. Every Tom I know is away on vacation.

And similarly, the same phonological shape can be associated with both a mass noun and a count noun.

- (4)a. How many chickens are in the yard?
b. How much chicken should be served to each guest?

In some cases, the dual occurrence is the result of either of two productive rules, one mapping count nouns into mass nouns, sometimes referred to colorfully as the universal grinder (Pelletier 1975, pp. 5–6), another mapping mass nouns into count nouns, dubbed by Bunt (1985, p. 11) as the universal sorter. In other cases, the dual occurrence is a lexicographical

legacy of the application of such rules at an earlier point in the history of the language.⁴

Above, I adopted the view that word formation and phrase formation take place at different levels of grammar. One kind of word formation is compounding; and, one kind of compounding is where a pair of words come together to form one word. This is a very productive process in English, one of the commonest forms of compounding being a word composed of two nouns. Count nouns and mass nouns can come together to form compounds. When they do, if the head of the compound is a mass noun, then the compound is a mass noun; and if the head is a count noun, then the compound is a count noun. Thus, while "ocean" is a count noun and "water" is a mass noun, the compound "ocean water", in which "water" is the head, is a mass noun. Similarly, while "water" is a mass noun and "wheel" is a count noun, the compound "water wheel", in which "wheel" is the head, is a count noun. A common hypothesis to handle this inheritance of syntactic characteristics of a head noun by the compound of which it is a head, is to postulate a feature possessed by the head which is passed onto the whole compound, so-called percolation. (For further details pertaining to either the headedness of compounds or the percolation of features, see Selkirk (1982, ch. 2.2); Di Sciullo and Williams (1987, ch. 2); and Lieber (1992, ch. 3).) Following such an approach here, let us assume that the features +CT and -CT distinguish count nouns from mass nouns.

The syntactic principles pertaining to grammatical number in English are fairly straightforward. To begin with, a count noun in any acceptable sentence has either singular or plural morphology. It is natural to see this morphological fact as a phonological reflex of a syntactic requirement that each count noun be assigned exactly one of the two features, +PL and -PL. It is not so obvious that the noun phrase node immediately containing a count noun inherits the feature assigned to the count noun it contains. However, three generalizations pertaining to agreement in grammatical number, which are true of Indo-European languages in general and which are virtually universally thought to be true of English in particular, in spite of its morphological poverty, suggests that this is so.

The first generalization, a paradigmatic instance of what is called in current syntactic jargon "specifier-head agreement", is the agreement between the grammatical number of determiners and the grammatical

⁴ This dual classification has led some to call into question the distinction between mass nouns and count nouns. (See Pelletier and Schubert 1989, pp. 328-349 for further discussion.)

Table 2.

this table	*this tables
*these table	these tables
that dart	*that darts
*those dart	those darts
each friend	*each friends
*all friend	all friends

number of the nouns they modify. Table 2 provides some routine examples.

A second generalization, which current syntactic theory also maintains to be an instance of specifier-head agreement, is that inflected verbs agree in grammatical number with their subjects.

- (5)a. This person is always punctual.
 b. *This person are always punctual.

These two generalizations are respected, if one assumes that the features of a count noun are assigned to its first dominating noun phrase node (i.e., its maximal projection) and that the features assigned to a determiner must be consistent with the features of its first dominating noun phrase node.

English also conforms to a third generalization, namely, that pronouns agree in number with their antecedents.⁵

- (6)a. [The critic]_i admires [himself]_i.
 b. *[The critic]_i admires [themselves]_i.
 c. [The critics]_i think that [they]_i are great.
 d. *[The critics]_i think that [he]_i is great.

Moreover, the antecedence relation is defined over noun phrase nodes. Again, this generalization is respected, if one assumes that the features of a count noun (or a pronoun) are assigned to its first dominating noun

⁵ The generalization is intended, both as it is found in the traditional grammatical literature and in contemporary syntactic theory, as having for its purview sentences and sentences which have at most one unsubordinated clause. I adhere to that intention here.

Thus, this generalization is not to be construed as taking in the antecedence relation exhibited by the kind of usage of third person personal pronouns, first identified and discussed by Evans (1977 and 1980). Such usage is found in the following sentence:

- (i) Every student in the class attended the party. They had a good time.

There is a sense in which the noun phrase "every student in the class" is the antecedent of the pronoun "they"; yet the noun phrase has singular grammatical number, whereas the pronoun has plural grammatical number.

phrase node and that the features of two noun phrase nodes, one of which bears the relation of antecedence to the other, must be consistent.

Two more details must be attended to. First, pronouns with split antecedents are plural.

- (7)a. John told Mary that they should meet.
 b. *John told Mary that he/she should meet.

Second, conjoined noun phrases are plural, even if its conjuncts are singular.⁶

- (8)a. John and Mary are leaving.
 b. *John and Mary is leaving.

This can be handled by a simple rule: the feature of a pronoun with an antecedent is the sum of the features of its antecedent noun phrases and the feature of a conjoined noun phrase is the sum of the features of the conjuncts, where the sum of xPL_i is $-PL$ if $i = 1$ and $+PL$ otherwise (where x ranges over $+$ and $-$ and i enumerates the i th conjunct in the conjunction).

Usages appearing to resist these generalizations are well known, being thoroughly documented in the more complete descriptive grammars of English. (See, for example, either Jespersen 1909, vol. 2, ch. 3 or Quirk et al. 1985, ch. 10.34ff.) Since limitations of space preclude my addressing each of them, I shall confine my attention to only those usages which have been suggested by referees as counter-examples to one or more of the three generalizations just discussed.

Let me begin with a usage which challenges the third generalization. It is well known that many speakers of English prefer the second sentence below to the first.

- (9)a. Every child loves his mother.
 b. Every child loves their mother.

The first sentence conforms to the third generalization; whereas, the second does not. That is to say, while the antecedent of the third person personal pronoun is, in each case, the subject noun phrase, which is singular in grammatical number; the pronoun in the first case is singular, in conformity with the generalization, whereas the pronoun in the second is plural, contrary to the generalization.

⁶ Hoeksema (1983) has drawn attention to other forms of conjunction, including what he calls "intersective conjunction" and "appositive conjunction", whose syntax, I believe, does not so much constitute part of phrase formation, as supervene upon it, being a kind of parenthetical, in the sense of McCawley (1982).

What can be concluded from this usage? Before answering this question, let us recall some well known facts about gender in Indo-European languages. Gender, in many Indo-European languages, is a set of morpho-syntactic features, typically including masculine, feminine and neuter, which is associated with every noun and adjective. Common nouns differ from adjectives insofar as the gender of a common noun is intrinsic to the noun whereas the gender of an adjective depends on its syntactic relation to some noun, usually that of modification or predication. Pronouns, unlike common nouns, but like adjectives, do not have intrinsic gender. Like adjectives, they depend for their gender on syntactic relations with other noun phrases; but unlike adjectives, if they bear no relevant syntactic relation to other nouns, they depend for their gender assignment on certain criteria being met by their intended denotation. In the case of the third person personal pronoun, the determination of its grammatical gender correlates with the two distinct, but related, functions it serves: deixis and anaphora. When used in the latter function, its gender is determined by the gender of its antecedent; but when used in its former function, its gender is determined by the kind of object being demonstrated. Finally, when, in its deictic use, there is insufficient information to determine which criteria for gender are satisfied by the intended object, a default gender is selected, typically, the masculine gender, if the object is human.

In English, gender has no morpho-syntactic role to play: except for pronouns, there is no distinction of gender in English. And even in the case of pronouns, gender distinguishes only the singular forms of the third person personal pronouns. Their selection is not syntactically but notionally determined. Roughly, "it" is used primarily with respect to entities which are not human; "she" with respect to entities which are female, typically human; and "he" with respect to human males. This notional determination gives rise to a dilemma when the third person personal pronoun is required for an anaphoric role. In conformity with the general Indo-European pattern, its morpho-syntactic features, case and grammatical number, are determined syntactically: case is determined by what governs it and grammatical number by its antecedent. But, as was said, its gender is determined notionally. What is to be done, then, when the antecedent of the third person personal pronoun is a grammatically singular quantified noun phrase whose domain of quantification contains entities some of which satisfy the condition for the selection of one version of the third personal singular personal pronoun, say the masculine form and others satisfy the condition for the selection of another version, say the feminine form.

As is well known there are three ways of making the selection. The one

which is historically first is the one which patterns with many Indo-European languages, namely, the one where the masculine form of the pronoun is autohyponomous between a sense in which the relevant objects in the domain are considered masculine and human and a sense in which they are considered merely human.

For many speakers of English, the masculine form of the third person singular personal pronoun is not autohyponomous: it has but one sense, the narrower one. For these speakers, the sentence in (9a) entails that all the children are boys. The question arises: how can such speakers assert, in one sentence, using the word "child" in the singular, what is expressed by the following two sentences?

- (10)a. Every boy loves his mother.
- b. Every girl loves her mother.

One possibility is to conform to the requirement that a pronoun agree with its antecedent in grammatical number and to use a disjunction of singular pronouns, as exemplified below.

- (11) Every child loves his or her mother.

Many speakers, however, find such disjunctions cumbersome, especially in protracted discourse. The other possibility, then, is to use the "nearest" pronoun which neutralizes the difference in gender. The "nearest" such pronoun is the third person plural personal pronoun.

It is important to observe that those speakers who resort to the third person plural personal pronoun have not abandoned the requirement pertaining to grammatical number of pronouns with antecedents entirely. None of these speakers tolerates a singular pronoun with a plural antecedent.

- (12)a. All chairs are in their place.
- b. *All chairs are in its place.

Moreover, I have found that speakers who not only use the third person plural personal pronoun with a singular antecedent but also find (9b) acceptable to the exclusion of (9a), nonetheless conform to the generalization when notional considerations are not relevant, preferring the sentences in (a) below to the ones in (b).

- (13)a. Each cat licks its whiskers.
- b. Each cat licks their whiskers.
- (14)a. Every chair is in its place.
- b. *Every chair is in their place.

Let me now turn to the first generalization, namely, that the features of determiners and of the nouns they modify be consistent with one another. A usage which might be thought to counter-exemplify it is found in some dialects of English, though not in mine. It appears that, in noun phrases such as "those kind of people", the determiner "those" has plural grammatical number, while the head "kind" has singular.

This usage, observed by Jespersen (1909, vol. 2, ch. 3.8) for example, has, I believe, a simple account which preserves the requirement in question: for speakers who accept such expressions, the head noun is not "kind" but "people". In other words, "kind of" is an adjectival modifier of "people".

This account might seem implausible, since one does not usually think of a sequence of words comprising a noun and a preposition, in that order, as a single word. Yet, this very same sequence is known to have an adverbial function, illustrated below.

- (15)a. Bill kind of liked the book.
b. Bill liked the book, kind of.

Thus, if "kind of" is a word, why not an ambiguous one, one being an adverb, the other an adjective? (Compare words like "fast" which are both adverbs and adjectives.)

Further corroboration of the view that "people" and not "kind", is the head of the noun phrase "those kind of people" comes from the fact that those who countenance such usage make the verb plural and not singular, when the noun phrase serves as a subject to a non-finite clause.⁷

- (16)a. Those kind of people are a nuisance.
b. *Those kind of people is a nuisance.

A challenge to the second generalization, namely, that inflected verbs agree with their subjects, comes from sentences such as the following.

- (17) Twenty-five cents does not buy a cup of coffee anymore.

It appears here that the head noun of the subject noun phrase, "cents", has plural grammatical number, while the verb, "does buy", has singular grammatical number.

In my view, better theoretical results are obtained, if one retains the generalization in the face of the usage. This implies that either the subject

⁷ I owe the sentence in (16a) and its judgment to an anonymous referee; I owe the judgment of the sentence in (16b) to a non-linguistic colleague who finds the sentence in (16a) acceptable.

noun phrase has singular grammatical number or the verb has plural grammatical number. As it happens, there is good independent evidence supporting the former alternative.

To begin with, the usage in question has nothing to do with the choice of verb. It depends entirely on the choice of lexical item for the head of the subject noun phrase: the head noun must denote a unit of measurement. The two sentences below differ only in the grammatical number of the verb. At the same time, the head noun of the subject noun phrase is treated as a unit of measure. Yet, they differ in acceptability.

- (18)a. *Twenty-five marbles is on the floor.
 b. Twenty-five marbles are on the floor.

In addition, noun phrases of this kind, when they occur without overt determiners, have different interpretations. The difference correlates with whether they are the subjects of verbs with singular or plural grammatical number.

- (19)a. Twenty-five cents is on the floor.
 b. Twenty-five cents are on the floor.

The former sentence can be truly used in any situation where the monetary total of the coins on the floor adds up to twenty-five cents, whether there are twenty-five coins, three coins, or just one; whereas, the latter sentence can be truly used only in situations where there are twenty-five pennies on the floor.

Moreover, the very same kind of noun phrases, when outfitted with determiners, tolerate only verbs whose grammatical number matches that of the noun phrase's determiner.

- (20)a. That twenty-five cents was on the floor.
 b. *That twenty-five cents were on the floor.

- (21)a. *These five dollars is now worth ten.
 b. These five dollars are now worth ten.

If, as the evidence suggests, the noun phrase in (17) has singular grammatical number, what is the syntactic status of the "s" suffix? It is, I suggest, a phonological reflex, not of the morpho-syntactic feature +PL, but of a derivational suffix of limited productivity:⁸ it creates an invariably singular noun (compare "news").

⁸ It is worth remarking in this connection that, according to Jespersen (1924, p. 208), the counterparts of these noun phrases show up in German and Danish as singular noun phrases: "drei mark" (two marks) and "fem daler" (five dollars).

It has been suggested that the usage discussed here goes beyond nouns denoting units of measurement. One finds, for examples, sentences such as this:

- (22) Twenty-five marbles is a lot to lose in one game.

It may well be that the lexical rule I hypothesize has greater lexical scope than what I have posited. But I am inclined to see such examples as instances of another challenge to the generalization that inflected verbs agree with their subject noun phrases in grammatical number.

This challenge comes from copular sentences whose copulas are flanked by noun phrases of different grammatical number. In such cases, there is often a toleration and sometimes even a requirement, that the copula agree with the grammatical number of the predicate noun phrase.⁹

- (23)a. The only thing George respects is money and power.
b. The only thing George respects are money and power.

It is this usage, I suspect, which is evinced in the sentence in (22). For, just as the difference in the grammatical number of the copula in the sentences in (23) makes no difference in their meaning or acceptability, neither does the difference in the grammatical number of the copula in the sentences in (22) and (24) make any difference in theirs.

- (24) Twenty-five marbles are a lot to lose in one game.

However, a difference in the grammatical number of the copula in the sentences in (21) does make a difference in their acceptability.

Another challenge to the second generalization is thought to arise from partitive noun phrases. A partitive noun phrase, for example “a majority of voters”, is one containing a prepositional phrase, whose head is the preposition “of” and in which the denotation of the head of the noun phrase, in this case “majority”, is delimited by the denotation of the head of the preposition’s noun phrase complement, here “voters”. It is not unusual to find that the grammatical number of the verb is that of the

⁹ In some cases, agreement with the apparent predicate is to the exclusion of agreement with the apparent subject:

- (i) The majority are men.
(ii) *The majority is men.

But notice:

- (iii) Men are the majority.
(iv) *Men is the majority.

noun contained in the complement of the prepositional phrase and not that of the subject noun phrase's head noun.

- (25) A majority of eligible voters prefer not to vote.

While there is no question that such usage is relevant to the generalization that an inflected verb agrees with its subject in grammatical number; the exact nature of its relevance is not obvious. To begin with, such usage is a counter-example to this generalization, only under the additional assumptions that the sentence has the syntactic structure it appears to have and the feature of the head's grammatical number is the same as that of its projection. In other words, this usage is a counter-example to the generalization that an inflected verb agrees in grammatical number, not with the subject noun phrase, but the head noun of the subject noun phrase – under the syntactic analysis assumed in the description of the example. Thus, if it turns out that expressions such as “majority of” are to be re-analyzed along the lines of the expression “kind of”;¹⁰ or, if it turns out that grammatical number can percolate to the subject noun phrase from one of its complement noun phrases; then this usage would not challenge, but rather would conform to, the generalization about subject verb agreement.

Second, the usage evinces idiosyncrasies. For example, whether or not an inflected verb agrees in grammatical number with the head noun of the subject noun phrase is sensitive to the choice of determiner preceding the head noun. This sensitivity is especially evident in the case of “a number of”.

- (26)a. A number of candidates have withdrawn.
 b. *A number of candidates has withdrawn.

- (27)a. The number of candidates exceeds the number of voters.
 b. *The number of candidates exceed the number of voters.

Moreover, such usage clearly falls within the ambit of proximity effects, a phenomenon widely remarked upon by traditional grammarians with regard to many different Indo-European languages. Usage which is problematic to the generalization that inflected verbs agree with their subjects in grammatical number, is not confined to partitive noun phrases. Surely, for example, the following usage (taken from Follett 1966, p. 231) is equally problematic.

¹⁰ Indeed, Akmajian and Lehrer (1976) have made just such a proposal, citing as their evidence facts pertaining to PP extraposition. For further discussion of the syntactic facts relevant to partitive noun phrases, see Jackendoff (1977, ch. 5.3) and Selkirk (1977).

- (28)a. Among those attending were George M. Humphrey, former Secretary of the Treasury.
 b. What purpose has all his objections served?

What seems to be relevant here and what is equally true of partitive noun phrases in the configuration exemplified above, is that the inflected verb seems to be agreeing with the smallest immediately preceding noun phrase. At the same time, it cannot be an accident that the exact analog of the determination of agreement in grammatical number found in the usages under discussion surface in the determination of overt case for pronouns. Thus, in addition to the unproblematic usage found immediately below,

- (29)a. Janet accompanied me to the opera.
 b. *Janet accompanied I to the opera.

there is also this commonly attested problematic usage.

- (30)a. Janet accompanied Bill and I to the opera.
 b. Janet accompanied me and Bill to the opera.
 c. *Janet accompanied I and Bill to the opera.

What seems to be true here is that oblique case is being assigned only to the smallest noun phrase immediately following the case assigner.

The fact of the matter is that none of the usages discussed in the foregoing digression warrants that any of the three generalizations pertaining to agreement in grammatical number be abandoned. For these usages turn out, on closer scrutiny, either to conform to the generalizations or to have no known satisfactory analysis. Ill-understood English usage is not a sound source of counter-examples for generalizations recognized to hold otherwise not only of English, but also of most Indo-European languages and even of many non-Indo-European languages.

The generalizations just discussed are true, not just of count nouns, but also of mass nouns. Thus, a verb whose subject contains only one (morphologically singular) mass noun is singular.

- (31)a. This gold is heavy.
 b. *This gold are heavy.

However, a verb whose subject is a conjoined noun phrase, each conjunct of which contains at least one mass noun, is plural.

- (32)a. The wiring and the piping are in the storeroom.
 b. *The wiring and the piping is in the storeroom.

Moreover, if the antecedent of a pronoun is a non-conjunctive mass noun phrase, the pronoun is singular, not plural.

- (33)a. This equipment here maintains itself.
 b. *This equipment maintains themselves.

But if the antecedent is split, the pronoun is plural.

- (34)a. The livestock told the poultry that they should meet.
 b. *The livestock told the poultry that it should meet.

(English seems to lack mass nouns which denote paradigmatic cognitive agents; the sentences above should be considered in the context of something like Orwell's *Animal Farm*, say.)

Though the preponderance of mass nouns in English have invariable singular grammatical number, some do have invariable plural grammatical number: for example, "annals", "bowels", "brains", "dues", "earnings", "effects", "goods" and "spirits". Not only do they have plural morphology, but so do the determiners which modify them, the verbs of which they are subjects and the pronouns of which they are antecedents.

- (35)a. The club requires these dues to be paid immediately.
 b. *The club requires this dues to be paid immediately.

- (36)a. Dues are to be paid upon joining.
 b. *Dues is to be paid upon joining.

- (37)a. The person who collects dues knows how much they are.
 b. *The person who collects dues knows how much it is.

Yet, like their singular brothers, they resist contrast between singular and

plural grammatical number¹¹ and they do not tolerate modification by cardinal numerals.¹²

In light of the foregoing, the two pairs of features, \pm CT and \pm PL, are interrelated as follows: Any noun associated the feature +CT must be assigned exactly one of the features, \pm PL, modulo the constraints on agreement outlined above; and any noun with the feature -CT must be assigned the feature -PL, unless it is marked in its lexical entry as taking the feature +PL - which, presumably, each plural mass noun is. Finally, nouns assigned +PL require plural morphology, while nouns assigned -PL require singular morphology.

2. THE SEMANTICS OF ENGLISH COMMON NOUN PHRASES

Above, attention has been confined to the morpho-syntactic consequences of the pair of syntactic features, \pm CT and \pm PL. It is now time to advert to their semantic import and consequences. The best expository strategy to be followed here is that of divide and conquer. A division is provided by the syntactic classification of determiners and nouns discussed above. Earlier, it was observed that one characteristic which distinguishes pronouns and proper names on the one hand from common nouns on the other is that the former do not admit determiners whereas the latter do. The fact that common nouns admit determiners does not mean they require them. Indeed, mass nouns and plural count nouns are known for

¹¹ Clearly, some plural mass noun have singular counterparts; but these counterparts have a sense different from that of the plural. Thus, there are the words "brain" and "brains". But "brains" is ambiguous between the plural of the singular count noun "brain" and the plural mass noun, an ambiguity found in the following sentence:

(i) These animals have brains.

¹² It seems as though neither "many" (or "few") nor "much" (or "little") fare well with plural mass nouns. Informants I have asked find either selection awkward. My judgments with respect to modification of plural by either "many" (or "few") or "much" (or "little") vary. In some instances, I prefer "much" (or "little") to "many" (or "few"):

(i)a. *How many brains does Bill have?
b. How much brains does Bill have?

(ii)a. *How few brains does Bill have?
b. How little brains does Bill have?

In others, I prefer "many" (or "few") to "much" (or "little"):

(iii)a. How many effects did Mary bring with her?
b. *How much effects did Mary bring with her?

(iv)a. How few effects did Mary bring with her?
b. *How little effects did Mary bring with her?

being able to occur without determiners. Common noun phrases can be bifurcated into those without determiners, bare (common) noun phrases (BNPs), and those with determiners. Since determiners are of three kinds, common noun phrases with determiners can be divided into three kinds: interrogative (common) noun phrases (INPs), quantifier (common) noun phrases (QNP), and demonstrative (common) noun phrases (DNPs). Below, I shall treat the semantics of DNPs, QNPs and BNPs, alternating between the case of the count noun phrase and the case of the mass noun phrase. The treatment of INPs must be postponed to another occasion.

3. THE SEMANTICS OF DEMONSTRATIVE NOUN PHRASES

Michael Bennett (1979, p. 264) once conjectured that the key to the semantics of mass nouns is the semantics of plural count nouns. The key to the semantics of plural count nouns is, in my view, demonstrative plural count nouns. For these reasons, I shall dwell first and longest on the semantics of demonstrative count noun phrases.

3.1. *Demonstrative Count Noun Phrases*¹³

It has long been thought that plural DCNPs (demonstrative count noun phrases) introduce ambiguity into the sentences in which they occur. Such a noun phrase can accommodate a collective reading as well as a distributive one. Consider this sentence:

(38) These men wrote operas.

If “these men” denotes Mozart and Handel, then the only reading on which it is true is the distributive one: Mozart wrote operas, Handel wrote operas, but they never collaborated to write even one opera. If “these men” denotes Gilbert and Sullivan, then the only reading on which it is true is the collective one: Gilbert and Sullivan collaborated to write operas, but it is not the case that each wrote an opera on his own.

The collectivity and distributivity of collective and distributive readings should not be identified with collaboration or a lack thereof, respectively. While the notion of collaboration helps to highlight the difference between collective and distributive readings of plural noun phrases, it does not

¹³ This section is essentially section 2 of Gillon (1989), modified only slightly to bring the grammar of MNPs within the purview of the grammar of plural CNPs, as developed in Gillon (1989). The views presented here and in Gillon (1989) make more precise those found in Gillon (1987). For a criticism of Gillon (1987), see Lasersohn (1990). A reply to these criticisms is found in Gillon (1990).

characterize the difference between them. For plural DCNPs retain this ambiguity even in cases where no sense can be made of collaboration and failure to collaborate. These examples from Copi (1953, p. 125) make the point.

- (39)a. The buses in this town consume more gasoline than the cars.
 b. The conventional bombs dropped in World War II did more damage than the nuclear bombs dropped.

The first sentence is true when “the buses in this town” and “the cars (in this town)” are each read distributively, but false when each is read collectively; conversely, the second sentence is false when “the conventional bombs dropped in World War II” and “the nuclear bombs dropped (in World War II)” are each read distributively, but true when each is read collectively.

How, then, are collective and distributive readings to be understood? In general, the collective reading of a plural noun phrase is one where the objects in the set associated with the noun phrase (i.e., the denotation of the noun phrase) are treated as a unit, or an aggregate object; the distributive is one where it is not the case that any two distinct members of the denotation of the noun phrase are treated as a unit, or an aggregate object. So, consider a (simple) sentence of this form: [_S NP_{+PL} VP]. Such a sentence is true on the collective reading of the subject noun phrase just in case the verb phrase is true of the aggregate object made up of all the members of the denotation of the subject noun phrase; otherwise, it is false (on the collective reading). It is true on the distributive reading just in case the verb phrase is true of each member of the denotation of the subject noun phrase.

Moreover, it should not be thought that collective and distributive readings are occasioned only by plural DCNP in subject position. Such ambiguities surface in other argument positions as well. Consider a variant of the sentence in (39a), where an ambiguity analogous to the one there surfaces for the same noun phrases, now objects of prepositions.

- (40) The attendant put more gasoline in the buses than into the cars.

At the same time, the existence of these readings for DCNPs in non-subject argument positions may not always be evident. Consider this sentence:

- (41) Bill drove through the trees.

One might be inclined to think that no distributive reading is available

here: after all, how can one drive a car through a tree? But, in fact, in California one can drive a car through a tree: Some Californian redwood trees have tunnels through them.

In addition, a moment's reflection shows that the collective and distributive readings are not the only readings to which a plural noun phrase is susceptible. For suppose that "the men" denotes Mozart and Handel, as well as Gilbert and Sullivan. Surely (38) is true then as well. However, it is not true on the collective reading, since the four did not collaborate on any opera; and it is not true on the distributive reading, since neither Gilbert nor Sullivan ever wrote an opera on his own. So, there must be other readings; but what are they? Consider again the denotation of "the men" and the division imparted to the denotation by the situation verifying (38).

- (42)a. {Mozart, Handel, Gilbert, Sullivan}
 b. {{Mozart}, {Handel}, {Gilbert, Sullivan}}

The latter is a partition of the former.¹⁴ Note that the collective and distributive readings of a plural noun phrase correspond to two partitions of the noun phrase's denotation, namely, the greatest and least partition of the denotation respectively. So, there are at least as many readings of a plural noun phrase as there are partitions of its denotation.

This conclusion is supported by the syntax and semantics of sentences with reciprocal pronouns. There are two desiderata on such sentences: first, that these sentences be special cases of sentences which have plural noun phrases in lieu of reciprocal pronouns; and second, that the reciprocal relation be symmetric and connected over distinct pairs. Now Langendoen (1978) has shown that no analysis can both respect the second desideratum and define the reciprocal relation over individual objects in the denotation of the antecedent noun phrase to the reciprocal pronoun. Higginbotham (1981) has shown that both can be respected, if the reciprocal relation is defined over some partition of the denotation of the reciprocal pronoun's antecedent. These points are illustrated by this sentence:

- (43) [Those grandparents]_i hate[each other]_i.

¹⁴ A partition is a family of sets, each of which is a non-empty subset of a given set, distinct sets in which family are disjoint and the union of which family is the given set. This can be put more formally as follows:

(i) X partitions Y iff $X \subseteq P(Y) \wedge \emptyset \notin X \wedge \cup X = Y \wedge \forall x, y \in X (x \cap y \neq \emptyset \rightarrow x = y)$

(where "P(Y)" means "the power set of X").

As has been pointed out by Lauri Carlson (1980, Part I, section 12), this sentence is true even if the reciprocal hatred is only between the maternal grandparents on the one hand and the paternal grandparents on the other. In this case, there is no symmetric, connected relation of hatred definable over the four grandparents, but there is one definable over a partition of the grandparents into the paternal ones and the maternal ones.

Although the partitions of the denotation of a plural DCNPs provide many of the readings to which the plural noun phrase is susceptible, they do not provide all of them. This is shown by a variant of the sentence in (38).

(44) These men wrote musicals.

Let "these men" denote Rodgers, Hammerstein and Hart. This sentence is true when these men are the denotation of its subject noun phrase. Yet there is no partition of the set containing these three men in which the verb phrase "wrote musicals" is true of the unit corresponding to each element of the partition. Rather, the sentence is true because Rodgers and Hammerstein collaborated to write musicals and Rodgers and Hart collaborated to write musicals. Thus, the number of readings to which a plural noun phrase is liable is not the number of partitions, but the number of minimal covers, to which its denotation is liable.¹⁵ In the case just considered, the set consisting of Rodgers and Hammerstein as well as the set consisting of Rodgers and Hart together form a set which minimally covers the set consisting in Rodgers, Hammerstein and Hart. I shall assume henceforth that the minimal covers correctly characterize the range of readings to which subject plural noun phrases are liable.

In light of the foregoing remarks on the range of readings for plural noun phrases, it will prove convenient to introduce some terms to simplify discussion. Let an object formed from one or more members of a given background set be an aggregate. For example, let the background set have exactly three distinct elements: *a*, *b* and *c*. Then, exactly seven aggregates can be formed from its elements: *a*, *b*, *c*, *ab*, *ac*, *bc* and *abc*.

If *a*, *b* and *c* are concrete particulars, then so are *ab*, *ac*, *bc* and *abc*. Moreover, if *a*, *b* and *c* are concrete individuals, then *ab*, *ac*, *bc* and

¹⁵ A cover is just like a partition except it is not restricted to disjoint sets.

(i) X covers Y iff $X \subseteq P(Y) \wedge \emptyset \notin X \wedge \cup X = Y$.

A minimal cover of a set is a smallest family of non-empty subsets of a set which still manage to cover it.

(ii) X minimally covers Y iff $X \text{ covers } Y \wedge (\forall Z)((Z \text{ covers } Y \wedge X \text{ covers } Z) \rightarrow Z = X)$.

abc are what Russell (1903) called “classes as many”, Lesniewski called “distributive classes” and Simons calls “plural classes”, or more simply, “pluralities”.¹⁶ Moreover, the concrete individuals *a*, *b* and *c* can be seen as *a*, *b* and *c*, the limiting cases of the aggregates formed from *a*, *b* and *c*. In general, a concrete individual is a concrete aggregate comprising just one individual. Russell (1903, pp. 43, 55n) called such aggregates “classes as one”; and Simons (1987, ch. 4.3–4.4) calls them “singular classes”.¹⁷

A plurality is not the same as a collective, or a group: a plurality is nothing more than the sum of its atomic parts, whereas a collective is more than the sum of its atomic parts.¹⁸ The constituency of a collective can change without the collective changing. As is well known, not only can the members of a collective come and go with the collective remaining intact, but the very same people may make up two distinct collectives.¹⁹ What is crucial to collectives is that they are subject to constituting conditions which determine how the members of the collective constitute the collective of which they are members; whereas pluralities do not have such constituting conditions. Indeed, as Simons (1987, ch. 4.4) has pointed out, a plurality can be seen as the limiting case of a collective: a plurality is a collective without conditions governing its constitution. (For further insightful discussion, see Simons 1982a, 1982b and 1987, ch. 4.4.)

The set of aggregates accruing to the formation of aggregates from elements of a background set has the algebraic structure of a complete join semi-lattice with a unit and without a zero.²⁰ The relation of being a sub-aggregate is a partial ordering on the set of all aggregates formed from the background set. The elements of the background set are the minimal aggregates in the set of all aggregates; while the aggregate formed from all of the background set’s elements is the unique maximal aggregate, that is, the greatest aggregate or unit aggregate.

¹⁶ In earlier work, Simons (1982a, b) refers to pluralities as manifolds.

¹⁷ “Class”, as used by these authors, is to be distinguished from “set”, as used in set theory. For a careful discussion of the difference between these two concepts and their role in the development of set theory, see Simons (1982a).

¹⁸ I am using the terms “collective” and “group” as synonyms here.

¹⁹ Simons (1982b, section 2) reports that it once happened that the same musicians made up the Chapel Orchestra, the Court Opera Orchestra and the Vienna Philharmonic. A point similar to the one made by Simons is ascribed by Bennett (1979, p. 275) to David Kaplan.

²⁰ Aggregates are more general than classes. In the case where the background set is determined by the extension of a count noun, the set of aggregates accruing to that background set forms an atomic complete join semi-lattice with a unit and without a zero. The canonical, isomorphic representative for the lattice in question is the set of non-empty subsets of the background set, where the join operation is set theoretic union and the unit is the background set.

In addition, an aggregation is defined to be a set of aggregates with the requirement that their join yields the greatest aggregate (that is, the unit aggregate) and that it is minimal, in the sense that, no aggregate in the set is a proper sub-aggregate of any other aggregate in the set.²¹ Below are given all the aggregations which can be formed from the background set: $\{a, b, c\}$.

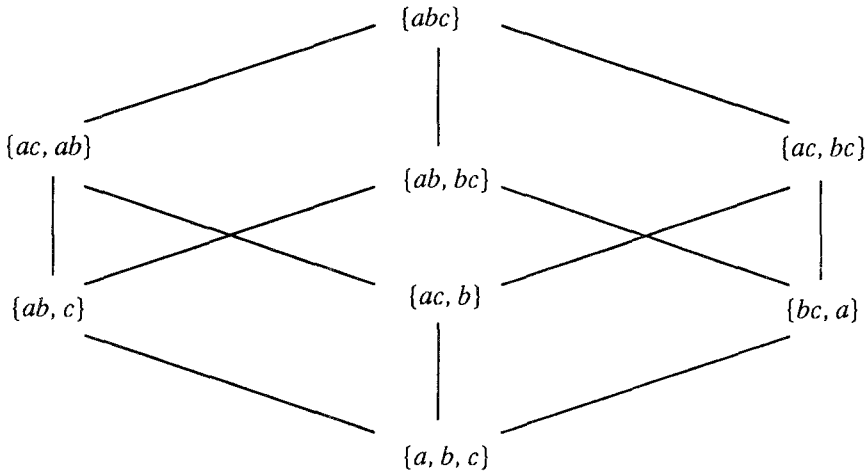


Fig. 1.

Notice that the collective reading of a plural noun phrase whose denotation is $\{a, b, c\}$ corresponds to the aggregation $\{abc\}$ and its distributive reading corresponds to the aggregation $\{a, b, c\}$.²²

²¹ Under the canonical isomorphism with the canonical set theoretic representative of the join semi-lattice with a unit, an aggregation is a minimal cover.

²² The terms "collective" and "plurality", used in Gillon (1989), are replaced by the terms "aggregate" and "aggregation", respectively, since the latter are connotatively more congenial to the intended generalization here than the former.

A referee has wondered "whether shifting to talk of aggregates and aggregation instead of sets and covers is a mere terminological change or plays a substantive role". To begin with, misgivings about the appropriateness of sets as the interpretations of plural count nouns go back to Russell (1903) and Lesniewski, among others. (See Simons 1982a, for discussion.) Simons (1982a) himself develops these misgivings into very convincing arguments, some of which are echoed by Link (1984). Now recently, Link's arguments have come under criticism from Landman (1989), who uses sets to interpret plural count nouns. But even Landman (1989), who has no proposal concerning the semantics of mass nouns, concedes that "the analogies between mass terms and count terms form a forceful argument" (p. 568) for such a shift.

In my view, it is not the analogies between the two kinds of nouns that is important, but the fact that they interact and overlap in so many ways that it seems manifestly wrong to give these nouns semantic interpretations which are not, in some fundamental way, the same. Thus, quantified mass noun phrases are liable to the same relativity of construal of

The main idea is that a predicate whose argument is a DCNP is evaluated, not with respect to the DCNP's denotation, but with respect to the elements in an aggregation constructed from its denotation, where the choice of aggregation is determined pragmatically. The denotation associated with the DCNP is the extension of its constituent N which satisfies the constraints imposed by the demonstrative adjective. This extension consists only of individuals. Indeed, this is the semantic import of the feature +CT, namely, that denotations associated with such nouns and their projections consist only of individuals in the domain of interpretation. I shall call such denotations atomic.

In addition to the feature +CT, DCNPs also have one of the features \pm PL. The semantic import of the features +PL and -PL assigned to a noun phrase node is to constrain the size, or cardinality, of the denotation of the noun phrase. The feature -PL requires the size of the denotation to be one; whereas the feature +PL permits the size of the denotation to be greater than one. In other words, if the noun phrase node, NP, is assigned the feature -PL, then $|[\text{NP}]^D| = 1$; if the noun phrase node, NP, is assigned +PL, then $|[\text{NP}]^D| \geq 1$.²³ Next, the denotation of the noun phrase makes available to the predicate of which it is an argument aggregations any of which the predicate can be evaluated with respect to.

To get a better idea of how these semantic principles apply, let us consider a simple sentence, whose subject noun phrase denotes, say, Tom, Dick and Jerry.

scope as their count noun counterparts. Moreover, quantified mass and count noun phrases interact scopally. And indeed, within a fixed context of use, a mass noun and a count noun can be synonymous. Suppose, for example, I have a pair of curtains hanging in my window: it seems clear that in the context of use "this drapery" (a mass noun phrase) and "these drapes" (a count noun phrase) refer to the very same thing. It is not clear to me how this is going to be captured, unless the interpretational domains are unified; and while it is clear how it can be done with mereological concepts such as aggregates, it is not at all clear how it is to be done with set theoretic concepts, as Landman (1989, p. 568) himself points out.

²³ It might seem odd that the feature +PL permits, rather than requires, the denotation of the noun phrase to which it is assigned to be greater than or equal to one. After all, the supposition one usually makes when a plural noun phrase is used is that more than one individual in the domain of discourse is involved. This supposition, however, cannot be based in grammar, for there are just too many unimpeachable sentences where a plural noun phrase has a singleton for a denotation.

- (i) Although it was the ancient Babylonians who first observed [The Morning Star and The Evening Star]_i; nonetheless, it was the ancient Greeks who first discovered [them]_i to be the same planet.
- (ii) These men, Mark Twain and Samuel Clemens, are the same man.

Rather, the supposition is based on extra-grammatical considerations, like conversational implicature.

- (45) These men rowed.

The denotation of the subject noun phrase certainly satisfies the constraint placed on it by the +PL feature assigned to the node phrase node. Moreover, there are exactly eight aggregations which can be constituted from this denotation of three elements. (See Fig. 1 above.) Now consider these situations:

- (46)a. Tom, Dick and Jerry were in one boat, each pulling an oar.
 b. Tom and Jerry were in one boat, at some point, each pulling an oar; and, Tom and Dick were in one boat, at some other time, each pulling an oar.
 c. Tom and Dick were in one boat, each pulling an oar; while Jerry was in another boat rowing.
 d. Tom was in one boat rowing; Dick was in another boat rowing; Jerry was in still another boat rowing.

These situations render the sentence in (45) true on the readings of its plural noun phrase subject corresponding to the following aggregations of the noun phrase's denotation:

- (47)a. {*Tom–Dick–Jerry*}
 b. {*Tom–Jerry, Tom–Dick*}
 c. {*Tom–Dick, Jerry*}
 d. {*Tom, Dick, Jerry*}

where the first and the last aggregations correspond to the collective and the distributive readings respectively.

The principles outlined and illustrated above apply equally as well to sentences with transitive verbs and with plural demonstrative noun phrases for subject and object. In the sentence,

- (48) Those men endorsed these women,

suppose "those men" denotes Rick and Randy and "these women" denotes Diane and Lillian. Certainly the sentence in (48) would be true if Rick and Randy collectively endorsed Diane and Lillian taken collectively; that is, Rick and Randy make up a committee and decide as a committee to endorse the slate made up of Diane and Lillian. The sentence would also be true if Rick endorsed the slate of Diane and Lillian and Randy endorsed the same slate. If Rick and Randy as a committee endorsed Diane and also endorsed Lillian, the sentence would still be true. And finally, if Rick endorsed Diane and Randy endorsed Lillian, or if Rick endorsed Lillian and Randy endorsed Diane, the sentence would be true.

In other words, there are two choices of aggregations for each of the noun phrases.

- (49) $M_1: \{\text{Rick-Randy}\}$ $W_1: \{\text{Diane-Lillian}\}$
 $M_2: \{\text{Rick, Randy}\}$ $W_2: \{\text{Diane, Lillian}\}$

The sentence in (48) is true on any given choice, just in case, on that choice each aggregate in the subject's aggregation bears the relation expressed by the verb to some aggregate in the object's aggregation and each aggregate of the object's aggregation has the same relation borne to it by some aggregate in the subject's aggregation. Such situations are depicted below in Fig. 2 by means of directed bipartite graphs.

Notice that each graph is complete. The first three choices of aggregations admit of only one complete directed bipartite graph each; the last choice admits of five of which only two, which are shown above, are minimal. The point is that non-minimal ones are superfluous. If Rick's endorsing of Diane and Randy's endorsing of Lillian are together sufficient for the sentence in (48) to be true, then it is still sufficient even if, in addition, either Rick endorses Lillian or Randy endorses Diane.

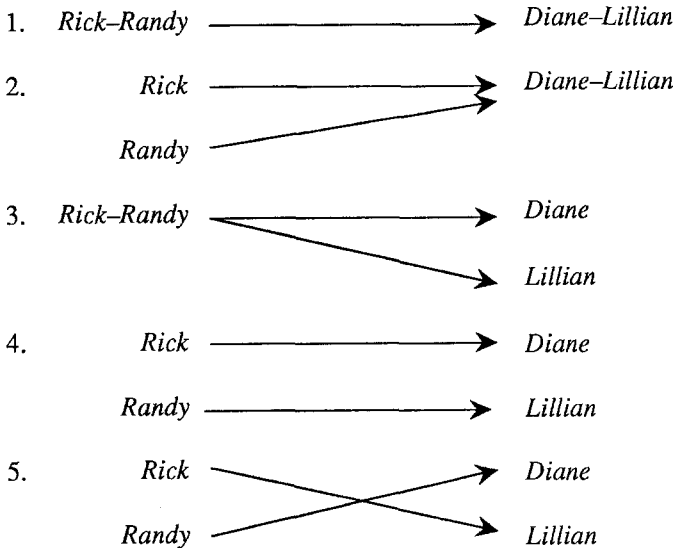


Fig. 2.

Let the previously adduced principles governing grammatical number be supplemented with the following principle governing the interpretation

of a noun phrase which contains only a pronoun and has an antecedent within the sentence.²⁴

(50) If NP₁ is the antecedent of NP₂, then the denotation of NP₂ is the denotation of NP₁ (i.e., [NP₁]^D = [NP₂]^D).

So, the semantic import of the relation of antecedence is merely to guarantee identity of denotation in the interpretation of the relata of the relation of antecedence; it places no restriction on the aggregations with respect to which the predicates having the noun phrases related by antecedence for arguments are to be evaluated. This is exemplified by the following variant of (48).

(51) [These candidates]_i endorsed[themselves]_i.

Suppose that “these candidates” denotes Rick and Randy. The available readings of (51) are essentially those of (18), except that Rick and Randy have replaced Diane and Lillian as the denotation of the object noun phrase. (See Fig. 3).

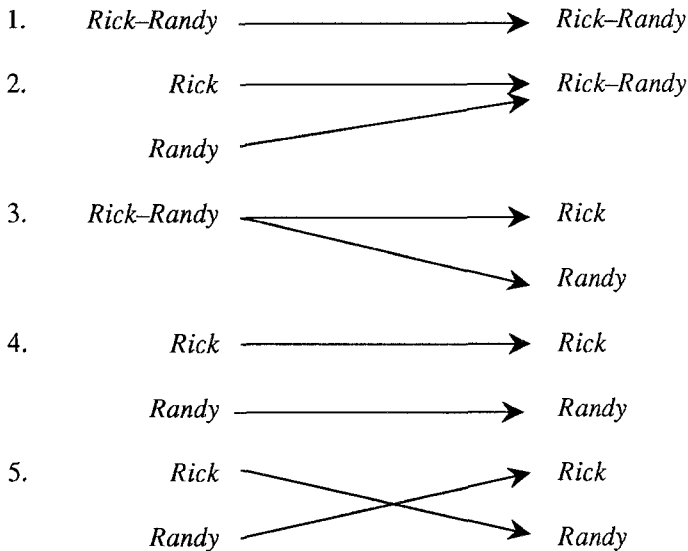


Fig. 3.

The reciprocal pronoun differs from the third person personal pronouns which are not used deictically and the reflexive pronouns in two ways.

²⁴ For the sake of ease of exposition, attention is confined to simple cases of sentences containing referentially dependent pronouns. The treatment is based on Higginbotham (1983).

First, the reciprocal pronoun requires an antecedent which has plural grammatical number.

- (52)a. *[Eliza]_i saw[each other]_i.
 b. [The women]_i saw[each other]_i.

Nor should this distribution be viewed as a matter of common sense, that is an extra-grammatical matter, for collective nouns which denote collections of objects, are never acceptable antecedents of reciprocal pronouns, unless they have plural grammatical number.

- (53)a. *[The army]_i shot at[each other]_i.
 b. [The armies]_i shot at[each other]_i.

Second, the reciprocal pronoun requires that the predicate to which it and its antecedent are arguments express a relation which is symmetric and connected over distinct pairs. Adapting a proposal put forth by Higginbotham (1981),²⁵ one can capture the intuition as follows:

- (54) Let NP₂ be the first noun phrase node dominating the reciprocal pronoun. Let NP₁ be the antecedent of NP₂. Let NP₁ be a demonstrative noun phrase. The predicate which has NP₁ and NP₂ for arguments is to be evaluated with respect to every pair of distinct elements in an aggregation corresponding to a partition of the denotation of the antecedent NP₁.

This²⁶ and earlier semantic principles also serve to capture readings

²⁵ Heim et al. (1988) have criticized this approach, maintaining that it cannot properly distinguish some readings which arise in sentences such as:

- (i) [John and Mary]_i told [each other]_i that [they]_i should leave.

I believe that this criticism cannot be sustained, though I do not have the space to show it here. In any event, the analysis of reciprocal pronouns presented by Heim et al. (1988) cannot, by their own admission, capture well known readings of reciprocal pronouns such as the one mentioned in connection with the sentence in (43).

²⁶ A referee has suggested that an observation due to Fiengo and Lasnik (1973, p. 455) undermines this principle. He observes that, in a situation where there are, say, four trays and the first one is on top of the second, the second on the third and the third on the fourth, the sentence,

- (i) The trays are stacked on top of each other,

is true, though no reciprocal (i.e., symmetric and connected) relation of stacking can be defined over any aggregation corresponding to a partition of the subject noun phrase's denotation.

Langendoen (1978, section 7) has pointed out that such usage of the reciprocal pronoun is confined to predicates expressing strict, immediate precedence and moreover, expressing it from a particular point of view. If the non-reciprocal interpretation were a generally available interpretation, one would expect that the following sentence would be equally

pointed out by Lauri Carlson (1980, Part I, section 9) in connection with this pair of sentences:

- (55)a. [These men]_i pulled[themselves]_i up.
 b. [These men]_i pulled[each other]_i up.

He observed that, in circumstances in which two window washers, who are standing on a window-washing platform, pull on ropes on opposite sides of the platform thereby raising the platform, both sentences in the pair below are true when "these men" denotes the two window washers. The first sentence is true on the reading in which the aggregation selected for the subject noun phrase and object noun phrase is the one whose sole member is the aggregate made up of both men. The second sentence is true on its only available reading in which the aggregation selected for the subject noun phrase is the one which contains the two minimal aggregates, each made up of one of the window washers.

In closing this section on the semantics of plural DCNPs, let me advert to a broader range of sentences which, though falling outside the stated purview of the paper, nonetheless warrant attention, since not only do they yield to fairly evident additions to the syntax and semantic principles already stated, but in doing so, they illustrate important differences between the approach adopted here and the approaches adopted by others.

The first kind of sentence is what Link (1984) has dubbed a hydra sentence. A hydra sentence is one which has a conjoined noun phrase and hence is, as it were, multiply headed. Here is one such sentence:

- (56) [The maternal grandparents and the paternal grandparents]_i
 hate [each other]_i.

This sentence is liable to all of the readings the sentence in (43) is liable to, though of course certain ones are more salient than others as a result

acceptable vis-à-vis the circumstances stipulated above:

- (ii) The trays are stacked under each other.

But, according to Langendoen's judgement and mine, it is not.

In fact, there is independent evidence that the problem lies, not with the reciprocal pronoun, but with the expression "on top of", as the following attested sentence makes clear (Lobel 1981, p. 49):

- (iii) Uncle Elephant was wearing everything on top of everything.

Here there is neither a reciprocal pronoun nor an intended reciprocal reading of the expression "wear *x* on top of *y*"; yet the expression is presumably to be interpreted as a case of strict immediate precedence, which cannot be a universal relation over a finite set, contra what the universally quantified noun phrases require.

of the subject noun phrase containing two noun phrases, instead of just one. Among the salient readings are (i) the one where each grandparent hates every other grandparent, (ii) the one where the maternal grandparents hate the paternal grandparents and the paternal grandparents hate the maternal ones, and (iii) the one where the maternal grandparents hate each other and the paternal grandparents hate each other. Each of these correspond to a reciprocal relation defined over the aggregates obtained from a partition of the noun phrase's denotation.²⁷ These interpretations result, provided that the preceding syntactic and semantic principles are supplemented with the further, self-evident semantic principle that the denotation of a conjoined noun phrase is the union of the denotations of its conjuncts.

- (57) Let NP be a conjunction of NPs, NP_1 through NP_j . Then,
 $[NP]^D = U[NP_i]^D$ (where $1 \leq i \leq j$).

A second kind of sentence is any sentence involving inter-clausal and inter-sentential anaphora. Such sentences can easily be cases where a referentially dependent pronoun has one reading, say a collective one, while its antecedent has another, say a distributive one.

- (58) [The men]_{*i*} each believe that[they]_{*i*} should meet.

The adverb "each" forces the distributive reading with respect to the matrix predicate "believe"; but such a reading is impossible for the referentially dependent third person plural pronoun, since "meet" is predicated of it. Any theory which must assess the two predicates with respect to one and the same value founders on such sentences. The theory advocated here does not: though the denotation of "the men" and "they" is the same, the predicates can be assessed with respect to different aggregations. A similar point holds for sentences where the anaphoric element is a relative pronoun: the predicate of the relative clause can be taken collectively, say, with respect to a relative pronoun; while the predicate of the

²⁷ Hydra sentences lead Link (1984) to countenance the semantic association with plural noun phrases, not only of pluralities, but also of groups (or collectives). This admission of groups to the semantics of plural noun phrases has the effect of re-insinuating into the semantics types of groups parallel to the types of sets which Link had hoped to eliminate in the first place by elimination of sets in favor of pluralities in his earlier work (Link 1983). This point is made by Landman (1989, section 1.4). Unconvinced by the considerations adduced by Link (1983) to replace sets with pluralities, Landman (1989) reverts to sets and avails himself of both types and type-lifting.

principal clause may be taken distributively with respect to the relative pronoun's antecedent.²⁸

- (59) [The men]_i[who]_i met this morning weigh less than fifty kilograms.

3.2. *Demonstrative Mass Noun Phrases*

Mass nouns have the feature $-CT$. According to the syntactic rule connecting the features $-CT$ and $\pm PL$, mass nouns must be assigned the feature $-PL$, unless its lexical entry requires that it have the feature $+PL$. When applied to count nouns, the semantic import of this feature is to confine the cardinality of the denotation to one. Assuming a uniform interpretation of the feature, one must conclude that the denotation associated with the DMNP has a cardinality of one. The obvious candidate is the greatest aggregate of which its constituent N is true, while satisfying the constraints imposed by the demonstrative adjective.

Predicates of DMNPs, like those of DCNPs, are evaluated, not with respect to their denotations, but with respect to the elements of an aggregation, which is a set of sub-aggregates of the DMNP's denotation, with the requirement that their join yields the greatest aggregate, or the unit aggregate (that is, the DMNP's denotation) and that it is minimal, in the sense that, no aggregate in the set is a proper sub-aggregate of any other aggregate in the set. This principle of evaluation permits the capturing of a range of interpretations, associated usually with DCNPs, but clearly also true of DMNPs. Consider the range illustrated by the following examples. On the one hand, there are collective readings. Suppose that there is a pile of leaves and a bundle of wires. As remarked by Lauri Carlson (1980),

²⁸ Lasersohn (1989), objecting to earlier work of mine, has asserted that my approach to the semantics of plural common nouns founders on an analogous kind of sentence.

- (i) John and Mary met in a bar and had a beer.

But, as I pointed out in my rejoinder (Gillon 1990, p. 482), there are at least two ways to accommodate such a sentence on my view. On the one hand, one might hypothesize that the second conjunct of a conjoined verb phrase is, in fact, a clause with a phonetically null pronoun whose antecedent is the phonetically overt subject noun phrase. In other words, this sentence would yield to the same analysis as

- (ii) [John and Mary]_i met in a bar; and [they]_i had a beer,

which is subject to the same semantic principles as the sentence in (58).

On the other hand, one might hypothesize the different conjuncts of a conjoined verb phrase are evaluated separately, thereby permitting different aggregations of the relevant subject noun phrase to be invoked on each evaluation.

even if only one leaf is touching one wire, both of the following sentences can be construed as true in the situation.

- (60)a. This foliage is touching that wiring.
- b. These leaves are touching those wires.

On the other hand, there are distributive readings. Suppose that there are five oranges, each of which had been wrapped in a paper wrapper. Both of the following sentences can be construed as true in the situation.

- (61)a. This fruit was wrapped in that paper.
- b. These oranges were enclosed in those wrappers.

Note that, in the context, “this fruit” denotes the greatest aggregate which comprises the denotation of “those oranges”; and similarly, in the context, “that paper” denotes the greatest aggregate which comprises the denotation of “those wrappers”.

Moreover, even if general world knowledge does not provide the non-linguistic information whereby atomic sub-aggregates can be associated with mass nouns such as “foliage” and “wiring”, nonetheless context can provide sufficient non-linguistic information whereby appropriate sub-aggregates can be associated with a mass term so that a distributive reading can be found. Suppose that there is a jewelry store which displays and sells its jewelry according to the quantities of precious metal in it. Suppose further that a certain customer, aware of the store’s arrangement and practice, is in the store shopping for jewelry. Suppose finally that the salesman has shown the customer a display containing jewelry with an ounce and a half of gold, but that the customer, finding the price of such jewelry too high, asks to see gold jewelry which is less expensive. It seems that the salesman might say, turning around and pointing to a display case,

- (62) This jewelry contains just one ounce of gold,

where the pieces of jewelry in the display have just one ounce of gold each. Now, if the pieces of jewelry were rings, then it would be that each ring has just one ounce of gold; but if the pieces of jewelry were earrings, then it would be that each pair of earrings has one ounce of gold.²⁹

²⁹ It has been asked by a referee how this reading is to be distinguished from the readings which Greg Carlson (1977a, b) calls a generic reading. I have urged elsewhere (Gillon 1989, section 3.3) that one needs to distinguish generic readings where characteristics of varying degrees of intrinsicness, including tendencies, dispositions and habits, are ascribed to something and generic readings in which a property is attributed to a kind of object through reference to an instance of it. The situation satisfying the sentence in question need not be

This approach circumvents problems which plague the other standard approaches to mass nouns. If the subject NP is assigned the set of quantities of jewelry in the display, there are quantities for which the predicate fails, as a result of which the sentence must be false. If the subject NP is assigned the mereological whole, the sentence will again be false. (For discussion of this problem in connection with the definite article, see Bunt 1981, pp. 41–43; Pelletier and Schubert 1989; and Lønning 1987.)

In light of the earlier discussion of hydra sentences, it is important to note that nothing special needs to be said to provide for the semantics of such sentences where the heads of the conjoined noun phrases are mass nouns. Under the assumption that a DMNP has a denotation comprising a single entity, namely the greatest aggregate of things of which it is true and under the assumption that the reciprocal pronoun requires the predicate to be true of all pairs of distinct collectives corresponding to a partition of the denotation of the antecedent, then it follows that a non-conjunctive DMNP cannot be the antecedent of a reciprocal pronoun, though a conjunctive one can be.

- (63)a. *[The drapery]_i resembles[each other]_i.
 b. *[The carpeting]_i resembles[each other]_i.
 c. [The drapery and the carpeting]_i resemble[each other]_i.

Moreover, these very same principles imply that the sentence in (63c) and the sentence below,

- (64) The drapes and the carpets resemble each other.

form a minimal pair; for the sentence in (63c) has only one reading, namely, the one in which the drapery resembles the carpeting and the carpeting resembles the drapery; whereas the one in (64) has additional ones, including the one in which the carpets resemble each other and the drapes resemble each other. In particular, consider a situation in which there are two drapes and two carpets. Suppose further that neither drape resembles either carpet but the drapes resemble each other and the carpets resemble each other. The sentence in (63c) is false in such a situation; whereas the sentence in (64) has a reading in which it is true.

envisaged as involving either the ascription of a characteristic of some degree of intrinsicness or the ascription of a property to a kind of object through reference to an instance of it.

4. THE SEMANTICS OF QUANTIFIED NOUN PHRASES

4.1. *Count Noun Phrases*

Having stated and illustrated the principles governing plural demonstrative noun phrases, I turn to those governing plural quantified noun phrases. As always, a denotation is associated with a count noun, namely, the set of individuals in the domain of discourse of which the noun is true. But the quantifier is restricted, not to the count noun's denotation, but to an aggregation built from that denotation. The choice of aggregation is partially constrained by the features +PL. If the feature assigned to the noun phrase node of the quantified noun phrase is +PL, then the choice of the aggregation is unconstrained; but if it is -PL, then the choice is constrained to the least aggregation, that is, the set of all the minimal aggregates of the count noun's denotation – which is, of course, just the count noun's denotation. Notice that this is analogous to the constraint imposed by these features on the denotation of demonstrative noun phrases. Next, if the quantifier is universal, then the predicate must be true of each aggregate in the aggregation to which the quantifier is restricted; and, if it is existential, then the predicate must be true of at least one aggregate in the aggregation to which the quantifier is restricted.³⁰

To see how the principles work, consider this sentence with plural quantified noun phrases.

(65) All men endorsed some women.

Suppose the denotation of “men” is $m_1, m_2, m_3, m_4, m_5, w_6, m_7$ and the denotation of “women” is w_1, w_2, w_3, w_4, w_5 . Suppose further that the men form committees of various sizes (including committees of one), say, $m_7, m_1m_2m_3, m_1m_2m_4$ and $m_4m_5m_6$ and that the women too form committees, say, w_1w_2, w_1w_3 , and w_4w_5 . Finally, suppose that there is an endorsement of the female committees by the male committees, as depicted in Fig. 4.

³⁰ Under this account, it is, in principle, possible for the plural universal quantifier and the plural existential quantifier to share a reading, namely where the aggregation to which each is restricted is the aggregation containing the greatest aggregate, since that aggregation has only one aggregate. But “all” and “some” do not share a reading. I assume that this is a peculiarity of the plural existential quantifier “some”, which is handled in its lexical entry by a stipulation to the effect that, say, its domain of quantification does not contain the greatest aggregate (unless, of course, it is the least aggregate as well).

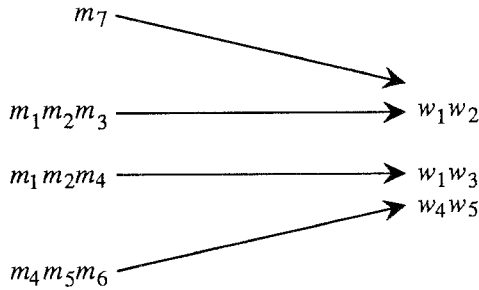


Fig. 4.

The situation certainly renders the sentence in (65) true and that it is so can be derived by any rule which assigns clausal scope to quantified noun phrases. First, the quantified noun phrases in the sentence in (65) can be assigned the scopal configuration shown in (66).

- (66) $[_S[_{NP} \text{ All men}]_x[_S[_{NP} \text{ some women}]_y[_S[_{NP} x] [_{NP} \text{ endorsed } [_{NP} y]]]]]$.

Next, the following two sets are aggregations formed from the denotation of “men” and “women” respectively.

- (67)a. $m_7, m_1m_2m_3, m_1m_2m_4,$ and $m_4m_5m_6$
 b. $w_1w_2, w_1w_3,$ and w_4w_5

Finally, each aggregate in (67a) bears the relation of endorsing to some aggregate in (67b).

No illustration of sentences with singular quantified noun phrases is required, since the semantic principles adduced here reduce to those for restricted quantifiers ranging over the denotation of the noun of the quantified noun phrase. For the quantifier ranges over the aggregation of minimal aggregates, that is, the count noun’s denotation.

4.2. Mass Noun Phrases

Before spelling out the semantic principles governing QMNPs, it may be worthwhile seeing that QMNPs are every bit as much quantified noun phrases as QCNPs. To begin with, they exhibit weak cross-over effects.

- (68)a. $[\text{All fruit}]_i$ is hidden by $[\text{its}]_i$ foliage.
 b. $[\text{Some fruit}]_i$ is hidden by $[\text{its}]_i$ foliage.
 c. $[\text{Each orange}]_i$ is hidden by $[\text{its}]_i$ foliage.

- (69)a. $*[\text{Its}]_i$ foliage hides $[\text{all fruit}]_i$.

- (69)b. *[Its]_i foliage hides[some fruit]_i.
- c. *[Its]_i foliage hides[each orange]_i.

Second, as observed by Roeper (1983, pp. 252–253, 263), QMNPs interact with one another scopally.

- (70)a. All fruit is enclosed in some paper.
- b. Each orange is enclosed in some wrapper.
- (71)a. Some foliage grows on all shrubbery.
- b. Some leaf grows on each tree.

Third, QMNPs typically have their scope confined to the clauses in which they occur.

- (72)a. Some inspector made the statement that all fruit was destroyed.
- b. Some inspector made the statement that each pear was destroyed.
- (73)a. Some inspector thinks that for all fruit to be destroyed is absurd.
- b. Some inspector thinks that for each pear to be destroyed is absurd.

If QMNPs are truly quantified noun phrases, then what do the quantifiers range over? In the case of QCNPs, they range over elements in the aggregation formed from elements in the denotation of the noun phrase's count noun. In the case of QMNPs, they also range over elements in the aggregation formed from the denotation of the noun phrase's mass noun, which is the greatest aggregate in the domain of discourse of which the mass noun is true. In many cases, the choice of aggregation is virtually arbitrary.

- (74)a. All water is wet.
- b. All information is valuable.

In other cases, the choice is constrained by common knowledge.

- (75)a. All regular mail in Canada is 38 cents.
- b. Some footwear in this store is size 13.
- c. No furniture on this floor has four legs.
- d. All phosphorus is either red or black.

(This last sentence is due to Roeper 1983.)

One other facet of QMNPs and QCNPs should be noted: they interact

scopally, that is, a QMNP can be assigned scope wider than QCNP and vice versa.

- (76)a. All fruit is enclosed in some wrapper.
- b. Each orange is enclosed in some paper.
- (77)a. Some foliage grows on each tree.
- b. Some leaf grows on all shrubbery.

On the view urged here, nothing special needs to be said to handle such facts.

5. BARE COMMON NOUN PHRASES

Bare common noun phrases exhibit a remarkable similarity, not only to one another, but also to the indefinite singular noun phrases. First, they occur in free variation in the NP position of a so-called “there existential”.

- (78)a. There is a shoe behind the door.
- b. There are shoes behind the door.
- c. There is footwear behind the door.

Second, they occur in free variation in the subject position of copular sentences, uniformly carrying a universal-like construal,

- (79)a. A dog is a mammal.
- b. Dogs are mammals.
- c. Gold is a metal.

or uniformly carrying an existential-like construal:

- (80)a. A dog is on the lawn.
- b. Dogs are on the lawn.
- c. Gold is on the lawn.

Third, they occur in free variation in the predicate position of a copular sentence,

- (81)a. This is a shoe.
- b. These are shoes.
- c. This is footwear.

carrying uniformly no existential import, as is shown by the infelicity of following up any of the preceding sentences with the following respective questions.

- (82)a. *Which shoe is it?

- (82)b. *Which shoes are they?
 c. *Which footwear is it?

Fourth, all three admit of both appositive and restrictive relative clauses:

- (83)a. A pot which had belonged to China's last emperor was auctioned off.
 b. A pot, whose value I do not know, was sold for ten dollars.
 (84)a. Pots which had belonged to China's last emperor were auctioned off.
 b. Pots, whose value I do not know, were sold for ten dollars.
 (85)a. Pottery which had belonged to China's last emperor was auctioned off.
 b. Pottery, whose value I do not know, was sold for twenty dollars.

Fifth, each licenses so-called donkey-anaphora:

- (86)a. Every man who owns[a donkey]_i beats[it]_i.
 b. Every man who owns[donkeys]_i beats[them]_i.
 c. Every man who owns[livestock]_i beats[it]_i.

In addition to these parallels in syntactic distribution, there are also ones in semantic interpretation, remarked on by Cartwright (1975a) and documented by Carlson (1980, ch. 7.6.0). As Carlson (1980, p. 295) points out with respect to the latter parallels: "any analysis which fails to account for these overwhelming distributional parallelisms in some principled way is not adequate". In fact, there is a simple analysis for both types of parallels.

To see what this analysis is, first consider these facts about the syntactic distribution and morphology of English determiners. Every English determiner has a plural form, be it the same form as the singular form or a special plural counterpart, except the English indefinite article, which has no plural counterpart (see Table 3).

The supposition that the indefinite article has a plural form which is phonetically null yields two generalizations. The first is that every English determiner has both a singular and plural form, though in some cases, the forms do not differ phonetically. The second is that mass nouns, for some unknown reason, tolerate only the plural form of quantifiers. For, mass nouns do not tolerate either "every" or "each" as determiners; nor do they tolerate the (singular) indefinite article. This very same supposition provides a syntactic and lexical basis, when coupled with the semantic

Table 3.

	Singular	Plural
Interrogatives	which	which
	what	what
Demonstratives	the	the
	this	these
	that	those
Quantifiers	some	some
	any	any
	no	no
	every	all
	each	all
	a	-

theory of mass nouns and count nouns given above, for the interpretational parallels between bare singular MNPs and bare plural CNP, remarked on by Carlson and Cartwright.

Militating against this simple hypothesis is an argument by Carlson against the view that bare plural CNPs are plural indefinite noun phrases. In his pioneering work on bare plural CNPs, Carlson (1977a, 1977b, 1980) argued that if bare plurals are in fact plural indefinite noun phrases then any difference between two sentences which differ only insofar as one has a (singular) indefinite noun phrase where the other has its bare plural version is merely the difference in grammatical number (Carlson 1977a, pp. 415–416). He proceeded to adduce pairs of sentences in which the difference between the construals of the sentences appears to exceed any difference ascribable to their difference in grammatical number. To show such a discrepancy, Carlson introduced two auxiliary hypotheses. First, he supposed that the grammatically available interpretation of the indefinite article is that of the existential quantifier; and second, he supposed that the semantic import of grammatical number is to determine whether a noun phrase denotes one object or more than one object (Carlson 1977a, p. 416).

Recently, I have argued that the analysis of bare plurals which Carlson rejects does not suffer from the inadequacy which he ascribes to it. I pointed out that work subsequent to Carlson's has shown that, independently of any considerations of the facts pertaining to bare plurals, both of the auxiliary hypotheses he adopts are empirically inadequate: the indefinite article does not have simply the semantics of the existential quantifier (see Fodor and Sag 1982, among others); and the semantic import of grammatical number is not simply to determine whether or not a noun phrase denotes one or more than one object (see Langendoen

1978 and Higginbotham 1981, which have served as a starting point for the view developed above). Modifying his auxiliary hypotheses along the lines of this subsequent work, I showed the analysis of bare plurals which Carlson rejects does not entail the discrepancies in construal which he ascribes to it. (See Gillon 1989, for details.)

6. CONCLUSION

In the foregoing, I have argued, in effect, that MNPs and CNPs differ only minimally grammatically. The basis for this minimal difference has been ascribed to a difference in the features \pm CT. On the syntactic side of the grammatical coin, these features determine the available options for the assignment of grammatical number, itself determined by the features \pm PL: +CT places no restriction on the available options, while -CT, in the unmarked case, restricts the available options to -PL. On the semantic side of the same coin, these features of \pm CT determine the sort of denotation which can be associated with DNPs and QNPs. The feature -CT requires that the associated denotation be the set whose sole member is the greatest aggregate of which the noun phrase (in the case of DNPs), or noun (in the case of QNPs), is true; while the feature +CT requires that the associated denotation be the set whose members are all and only those minimal aggregates of which the noun phrase (in the case of DNPs), or noun (in the case of QNPs), is true. At the same time, neither MNPs nor QNPs which are arguments of a predicate have their predicate evaluated with respect to their denotations. Rather the predicate is evaluated with respect to an aggregation, a set of aggregates constructed from the denotation of the noun phrase which is an argument of the predicate.

As we have seen above, not only do demonstrative and quantified noun phrases fall within the purview of this approach to the grammar of English mass and count noun phrases, but so do determinerless noun phrases, so-called bare plurals and bare singulars.

The single most important implication of this approach is that two sentences which differ only in that one has a plural count noun where the other has a synonymous mass noun, should have the same construals, modulo differences in the implicatures attributable either to the grammaticalization of the atomicity of the denotation, in the former case, or to the lack of it, in the latter case. Indeed, this synonymy has been exploited in the discussion above of demonstrative, quantified and bare noun phrases. Interestingly, this same synonymy occurs in the case of interrogative noun phrases, as is illustrated by the examples below:

- (87)a. Which drapery did you buy?
 b. Which drapes did you buy?
- (88)a. Which drapery goes with which carpeting?
 b. Which drapery goes with which carpets?
 c. Which drapes go with which carpeting?
 d. Which drapes go with which carpets?

This fact bodes well for the prospect of the syntactic and semantic principles stated above encompassing interrogative noun phrases and thereby encompassing all simple common noun phrases.

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Department of Linguistics
McGill University
Montreal, Quebec
H3A 1G5 Canada
CXBG@MUSICA. MCGILL. CA