Two Kinds of Universals and two Kinds of Groups

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Philosophers have long debated about two ways of conceiving of universals: as Platonic universals and as Aristotelian universals. Roughly, Aristotelian universals are inherent in the particulars that instantiate them; they can be multiply located (located just where the instances are located), and they exist only if they have at least one instance. Platonic universals, by contrast, are truly abstract objects: their existence is independent of the particulars that instantiate them, and they are not located in space and time at all. This historical distinction between two conceptions of universals, I would like to suggest, can be construed in terms of two ways of assigning properties to entities: Aristotelian universals are assigned properties only on the basis of properties of or relations among their instances (e.g. an Aristotelian universal has a locational property P just in case some instances of that universal has P). By contrast, platonic universals are assigned properties just like ordinary objects (Platonic universals thus can't be located in space and time because there is no particular from which they could inherit a location). If the distinction between Aristotelian and Platonic univerals is conceived in this way, then the view becomes plausible that both sorts of universals exist, distinguished from each other by the way their properties are fixed.

In this paper, I will argue that such a distinction in the way of assigning properties to entities plays an important role in the semantics of natural language, namely first in the semantics of nominalizations that refer to universals (*wisdom*, *the property of being wise*), and second, in an analogous way, in the semantics of plurals. Natural language, I will argue, allows reference to two kinds of universals and two kinds of groups which are distinguished from each other by the way their properties are fixed: namely either in the ordinary way (as with individuals) or on the basis of properties of or relations among instances or group members, in particular by projecting properties of instances or group members onto the entire kind or group. It is this distinction, I will argue, rather than some formal distinction among two sorts of entities, that helps explain some crucial facts about nominalizations and plurals, such as different readings of certain classes of predicates, the way existential constructions and intensional predicates are understood, and the possibility of distributive interpretation.

1. Basic assumptions

First some important basic assumptions. I will assume a Neocarlsonian acount on which bare plurals and mass nouns generally stand for kinds, triggering an existential reading of episodic predicates (1) and a universal or generic reading of individual-level predicates (2) (cf. Carlson 1977, Chierchia 1998):

(1) a. John found gold.
      b. John bought apples.
(2) a. Gold is shiny.
      b. Apples are healthy.

Moreover, bare mass nouns and plurals are acceptable with intensional verbs like *need*. With such verbs, as Chierchia (1998) (citing Carlson 1977) emphasizes, they only allow an intensional reading:

(3) a. John needs gold.
      b. John needs apples.

The intensional reading that *need* in (3) displays can be paraphrased in terms of quantification over possible objects as follows: (3a) says that John's needs are satisfied only if he has some quantity of gold and (3b) that they are satisfied only if he has some quantity of apples.
     Bare mass nouns and plurals can occur also in existential constructions, as in (4):

(4) a. Gold exists.
      b. Unicorns don't exist.

Existential constructions with bare plurals and mass nouns claim the xistence of instances and not, as one might have thought, the existence of the kind.
     Bare plurals and mass nouns finally allow for what is generally considered genuine kind predicates such as *extinct*, *rare*, and *widespread*:

(5) a. Dinosaurs are extinct.
      b. Pink diamonds are rare.
      c. Pidgins are widespread in Europe.

What is characteristic about these predicates is that they measure in some way the distribution of the instances of the kind, possibly across different times and different actual and counterfactual situations. Let me therefore call those predicates *instance distribution predicates*.

A particularly strong evidence, not previously noted, that bare plurals and mass nouns always stand for kinds is that they allow different readings of different kinds of predicates simultaneously, as in (6):

(6) a. Pink diamonds are rare, hard to get, and very expensive.
     b. John needs something that is rare, hard to get, and very expensive, namely pink diamonds.

In (6a), we have a conjunction of predicates with conjuncts that are instance-distribution predicates, episodic predicates, and individual-level predicates. In (6b), *something* is a quantifier ranging over kinds (indicated by the appositive at the end).

Such examples quite clearly show that the readings of different kinds of predicates with bare plurals or mass nouns must be a matter of the interpretation of the predicate, rather than the interpretation of the NPs.

The analysis of bare plurals and mass nouns standing for kinds can naturally be extended from simple, underived nouns to nominalizations. There are various kinds of nominalizations all of which, it appears, trigger the same readings of predicates when occurring without determiner.

First, there are deverbal nominalizations that stand for kinds of events or kinds of states, for example *laughter*: In (7a) an episodic predicate triggers existential quantification over laughing events in, (7b) an individual-level predicate triggers generic quantification; (7c) displays the relevant readings with an intensional verb, (8d) with an existential construction; and (7e) contains an instance-diostribution predicate:

(7) a. John heard laughter.
     b. John likes laughter.
     c. John longs for laughter.
     d. There is laughter everywhere.
     e. Genuine laughter is rare.

Second, there are nominalizations of adjectives such as *beauty*, *wisdom* or *generosity*. Such nominalizations, which will be discussed in greater detail in the next section, do not stand for kinds of states, but rather for kinds of particularized properties or what philosophers nowadays call 'tropes' (cf. Stout 1952, Williams, 1954, Simons 1994, Lowe 1998). That is, the instances of beauty are things like Mary's beauty or the painting's beauty, and it is this, the particular instantiation of beauty, that is admired, compared, or compared in (8), rather than the state of being beautiful:

(8) a. John admired Mary's beauty.

   b. John described Mary's beauty.
    c. Mary's beauty exceeds Sue's beauty.

In (8a-c), *Mary's beauty* cannot be replaced by *Mary's being beautiful* (referring to Mary's state of being beautiful). Intutively, this is because tropes 'focus' on the way a particular property is instantiated, whereas states 'focus' on the mere fact that the property is instantiated. The present task, however, is not to give an account of the difference between events, states, and tropes, but to make clear that bare underived and derived nouns behave exactly alike with respect to the relevant classes of predicates and thus should all be considered kind-referring terms — whether the instances of the kind are individuals, quantities, events, states, or tropes. In what follows, let us focus on nominalizations referring to kinds of tropes.

3. the distinction among two sorts of universals

There are two ways of referring to universals: one is by using the term *the property of being ...*, for example *the property of being generous*, let's call those 'explicit property-referring terms', the other is by using a bare adjective nominalization, for example generosity. These two ways of referring to universals are not equivalent, however, but rather trigger fundamentally different readings of various kinds of predicates. Five kinds of predicates can be distinguished that display different readings or acceptabilities with explicit property-referring terms and bare nominalizations

i. episodic predicates
(9)   a. I have encountered hostility.
       b. I have encountered the property of being hostile.
(10)   a. Generosity is rarely reciprocated.
        b. The property of being generous is rarely recoprocated.

Whereas (9a) is true if I have encountered an instance of generosity, (9b) can only mean that I have never encountered the abstract object that is the property of being generous. Similarly for (10) (where (10b), unlike (10a), does not make sense in the first place).

ii. predicates of evaluation
(11)   a. Friendliness is nice.
       b. The property of being friendly is nice.
(12)   a. Ordinariness is boring.
       b. The property of being ordinary is boring.

(13)   a. Originality is interesting.
        b. The property of being original is interesting.

Whereas the application of *nice* to friendliness in (11a) must be based on the evaluation of instances of friendliness (friendly people, gestures, behavior) being nice, *nice* in (11b) evaluates the abstract object (implying e.g. that it has nice formal properties) and cannot be understood as evaluating the instances. Similarly for (12) and (13).

iii. intensional predicates
(14)   a. John is looking for honesty.
        b. John is looking for the property of being honest.
(15)   a. John needs efficiency.
        b. John needs the property of being efficient.

Whereas John's search according (14a) is satisfied if John finds an instance of honesty, the satisfaction of his search in (14b) requires him to find the abstract object. Whereas (14a) displays only what looks like an intensional reading, (14b) naturally has an existential reading, presupposing the existence of the abstract object. Similarly for (15).

iv. existential constructions
(16)   a. Generosity exists.
        b. The property of being generous exists.

(16a) is true just in case there is an instances of generosity; by contrast, (16b) is true just in case the abstract object as such exists, regardless of its instantiations.

v. instance distribution predicates
(17)   a. Honesty is rare.
        b. Sloppiness is widespread.
(18)   a. ?? The property of being honest is rare.
        b. ?? The property of being sloppy is widespread.

(17) shows that instance-distribution predicates are perfectly acceptable with bare adjective nominalizations. By contrast, many speakers dislike them with explicit property-referring terms as in (18).[1]
   Generally, these data show that whereas predicates apply as with ordinary individuals in the case of explicit property-referring terms, they apply with bare nominalizations only in some way by targeting the instances first and only derivatively the kind. Thus, an episodic predicate applies to a kind on the basis of

some instance fulfilling the property that is the 'literal meaning' of the predicate; an eval,uative, that is, individual-level predicate applies to a kind on the basis of all instances (or rather suitable, typical instances under suitable circumstances) fulfilling the property that is the 'literal meaning' of the predicate. An intensional predicate applies to a kind with the kind of meaning the predicate has when it acts as an intensional verb taking an indefinite NP complement. The existential verb *exist* applies to a kind in the way it would apply to an individual concept, claiming a nonempty extension at the relevant index. Finally, instance-distribution predicates semantically select only kinds, not properties.

Explicit property-referring terms and bare nominalizations thus differ with respect to the basis for the application of a predicate, in the reading of a predicate displays, as well as in the acceptability of a predicate. How should one account for these differences?

One way might be by separating the content of a predicate from the way a predicate says something about an argument — that is, to not identify the 'attribution' of the predicate to an argument with the ascription of the property expressed by the predicate. For example, the predicate *is reciprocated* in (9a) would be attributed to the kind 'generosity' not because the kind has the property expressed by the predicate, but because some instance fulfills it; and *nice* in (11a) would be attributed to the kind 'friendliness' not because the kind is nice, but because the instances of the kind generally are.

This strategy works, however, only for the first two kinds of predicates (i and ii). It is not applicable to the others (iii-v): when an intensional predicate takes a kind as argument, it fails to display an extensional reading, and in fact the extensional meaning cannot be taken to be fulfilled by instances of the kind. Moreover, *exist* when it applies to a kind does not apply to any particular instance in the way it would apply with a definite NP. Finally, the acceptance and resistance of instance-distribution predicates by explicit property-referring terms and by bare nominalization cannot be explained by reinterpreting the semantic relation between predicate and argument.

I will pursue an account that rests on a fundamental distinction between semantic structure on the one hand and ontological or metaphysical structure on the other hand and a corresponding distinction among two sorts of entities. The semantic structure of a sentence imposes one notion of an entity, namely an entity is whatever can be referred to by a referential NP (Frege) or act as the value of a variable (Quine). I will call such entities semantic objects. The notion of a semantic object, however, is to be contrasted with that of an ontological object.

Objects in the ontological sense are not characterized in terms of any semantic criteria, but rather in terms of purely metaphysicial conditions. Both kinds and properties are semantic objects. But only properties are ontological objects. I will also say, more simply, that properties are *objects*, whereas kinds are *nonobjects*.

The metaphysical criterion that distinguishes objects from nonobjects is not, as one might expect, having particular identity and existence conditions (both properties and kinds may or may not do) or having a boundary. Rather objects in the ontological sense are those entities that can fulfill what I call *basic properties*. Nonobjects, by contrast, are objects that can fulfill nonbasic or *derived properties*. Objects, moreover, cannot fulfil derived properties, and nonobjects cannot fulfil basic properties.

Basic properties are the kinds of (simple or complex) properties we are best familiar with: being encountered by me, being located at a particular place, and being nice are basic properties. Being rare, widespread, extinct, by contrast, are not: they are properties that are to be understood on the basis of basic properties or relations, such as the property of existing at time t at place l. Roughly, basic properties (and relations) are properties not reducible to properies of or relations among lower-order entities. Thus, whereas 'being interesting' is a property that evaluates an entity as a whole, 'being rare' is a property of kinds obviously reducible to relations among instances (and numbers measuring instances). A kind is rare in case, roughly, the spatial and/or temporal distance among the (spatially and/or temporally) closest instances is greater than expected (or greater than some given norm). In first approximation, the notions of a basic and a non-basic or derived property can be charatcetrized as follows:

(19) a. A property P is a *basic property* iff it cannot be reduced to properties of
          or relations among lower-order entities (for instance if P is a property
          of kinds).
      b. A property is a *derived property* iff it is not a basic property.

With the help of such a (as yet to be further explained) notion of basic property, we can give the following definition of an object:

(20) a. An entity d is an *object* (OBJECT(d)) iff for some basic property P, P(d)
          or not-P(d) and for no derived property Q, Q(d) or non-Q(d).
      b. An entity d is a *nonobject* (NON-OBJECT(d)) iff for no basic property
P,
          P(d) or not-P(d) and for some derived property Q, Q(d) or non-Q(d).

Thus, objects are entities of which a given basic property may be either true or false, whereas nonobjects are entities of which a basic property is never true nor false.

Properties differ from kinds just in that they are objects in the sense of being potential bearers of basic properties. Kinds cannot fulfill basic properties, which is why predicates like *is reciprocated* and *nice* cannot be predicated of kinds by evaluating the kind as an object in itself as interesting or nice. However,

predicates like *is reciprocated* and *nice* can be predicated of kinds. But when they are predicated of kinds, then, I argue, they have an *extended meaning*, namely a meaning on which the property of being reciprocated or the property of being nice is to be fulfilled only by instances of the kind in order for the predicate to be made true.

A predicate that expresses a basic property (i.e. not an instance-distribution predicate) applies to a property with its literal meaning, requiring the property as an abstract object to fulfil the basic property. But when such a predicate applies to a kind, it will apply with an extended meaning, a meaning that is now a derived property which is construed on the basis of the basic property. For example, the derived property of being reciprocated holds of a kind just in case some instance of the kind fulfils the basic property of being reciprocated, and the derived property of being nice holds of a kind just in case generally any instance fulfils the basic property of being nice. Thus, the extended meaning of an episodic predicate whose original meaning was a property P will be $\lambda x[\exists x \, (x'Ix \, \& \, P(x'))]$, where I is the instantiation relation. Moreover, the extended meaning of an individual-level predicate whose original meaning was P will, roughly, be $\lambda x[Gn \, x'(x'Ix \, \text{-->} \, P(x'))]$, where 'Gn' is a generic quantifier.

The readings the predicates in (iii-v) display when applying to kinds require yet other kinds of extended meanings. Concerning intensional predicate taking kinds as arguments as in (15a) and (16a), first recall that they display only an intensional reading. That is, (15a) could not possible mean 'there is an instance of honesty x and John is looking for x'. I take this to mean the following: when *look for* takes a kind as an argument, it is in fact extensional, just as when it takes an individual as argument (*John is looking for Mary*). The apparent intensional reading arises then because with kind arguments *look for* has an extended meaning which is based on the literal meaning *look for* has when it occurs intensionally, rather than extensionally. The 'extension' of the meaning of *look for* to kind arguments consists in understanding the look for-relation as a relation between individuals and kinds in the way the look for-relation in the intensional sense is understood when look for takes properties (or intensional quantifiers) as arguments.[2] Thus, *look for* with an extended meaning, *look for*$_{ext}$, can be defined as follows, where look for$_{int}$ is the intensional look for-relation and int is the function mapping a kind onto its intension, that is, the function mapping a world w and time t onto the set of instances of the kind at w and t:

(21)   For an object d and a kind k, look for$_{ext}$(d, k) iff look for$_{int}$(d, int(k))

Let us turn to *exist* as in (iv). *Exist* when taking a kind as an argument can be given an extended meaning exist$_{ext}$ on the basis of its literal meaning as follows:

(22) $\text{exist}_{\text{ext}}(k)$ iff $\text{exist}(\text{int}(k))$.

That is, *exist* in the extended sense applies to a kind on the basis of its literal meaning applying, in the familiar way, to the intension associated with the kind. The literal meaning of *exist* is of course the one we find in *the kind exists*, where, following common assumptions, *the kind* stands for the intension of *the kind*, an individual concept (a function from world-time pairs to individuals).

Now that we have identified four ways of extending predicate meanings for kind arguments, the important question raises itself, what is the status of such predicate extensions? Should they constitute separate predicates or a disjunct of a a broadened disjunctive lexical meaning of the same predicate?

In the case of kind predicates, there is strong evidence for the latter: a question such as (23a) can be answered either by (23b) (mentioning an object) or (23c) (mentioning a kind), and thus the occurrence of *buy* in (23a) should include both the object-oriented and the kind-oriented meaning:

(23) a. What did John buy?
      b. Apples.
      c. My painting.

Thus, I will assume that the general meaning of a predicate is a disjunction consisting of a basic property as one disjunct (the 'literal meaning') and a suitable extension for kinds (in one of the four ways of extending meanings). There is one exception to this, however, and that is instance-distribution predicates.

Instance-distribution predicates as in (17) cannot be handled in terms of predicate extensions. What goes on with instance-distribution predicates rather is this: instance-distribution predicates inherently have a meaning which is derived from basic properties holding of objects; they do not express basic properties in the first place — as they are inapplicable to objects such as properties. The property expressed by *widespread*, for example can be described as follows: the property that holds of a kind k iff for a sufficiently number of regions r, there are instances i such that I is located at r. That is, *widespread* expresses a derived, nonbasic property, based on the basic relation of 'being located at'.

Derived properties that can be fulfilled by kinds thus need not always constitute a *derived lexical meaning* of a predicate, but may be the *basic lexical meaning* of a predicate (they are in this case derived properties, but basic, rather than derived meanings). Again, this shows a discrepancy between metaphysical structure and semantic (lexical) structure.

It may certainly have already occurred to the reader that the characterization of basic and derived property is rather problematic. Many properties, one might

argue, are reducible to properties of or relations among instances, without counting as a derived property for current purposes. This is readily conceded. The proper way of understanding derived property instead should be as follows. Basic properties will be taken as primitive and a derived property is a property constructed from basic properties either by one of the four ways of extending predicate meaings or else by the particular way the meaning of instance distribution predicates is constructed from locational and measurement properties.

Let me conclude the discussion of NPs referring to universals with some remarks concerning the formation and compositional semantics of explicit property-referring terms. Explicit property-referring terms are generally obtained syntactically from a reifying noun (e.g. *property*) and a kind-referring NP complement that refers either to a kind of trope (as in *the property of honesty*) or to kinds of states (as in *the property of being honest*). Semantically this means that the expression *the property of* (or for that matter *the attribute of, the virtue of*, or *the quality of*) acts as a reifying expression mapping a nonobject, a kind, onto the corresponding object. Thus, the semantics of *property (of)* when taking a complement will be roughly as follows:

(24)   For a kind-referring term X, [*property of* X] = [*property of*]([X])
        = {reif([X])}, where reif([X]) is the entity o such that o is like [X], except
        that OBJECT(o).

There is one class of exeptions to the generalization that (basic) properties cannot be attributed to kinds. These are sortal predicates with head nouns like *virtue*, *attribute*, or *property*. (25) shows that such predicates allow kind-referring terms as subjects:

(25)   a. Friendliness is my favorite attribute.
        b. Courage is an admirable property.
        c. Honesty is a virtue.

There are several possible ways of accounting for such cases.

First, nouns like *virtue. attribute*, and *property* might have an extended meaning on which they also apply to kinds.

One problem with this proposal is that in this way, *property* should be able to occur without its reifying force when taking a complement, which it cannot. Another problem is that further attributes modifying the predicate have the reading on which they apply to an abstract object, not a kind, for example *interesting* in (26):

(26)   Ordinariness is a property that is interesting.

Second, the copula might be the *is* of constitution, rather than the *is* of predication: a kind of trope, after all, in a way constitutes a property.

This account might work for (25a), but it won't work not for (25b, c). For the account to work for (25b), the NP *an admirable property* would have to be understood as a quantificational, not a predicative NP. That is, (25b) would be interpreted as: for some admirable property P, courage constitutes P. But then the problem arises that when the sentence is negated as below in (27a), *an admirable property* cannot take scope over the negation, with the reading in (27b):

(27)   a.   Courage is not an admirable property.
         b.   For an admirable property P, courage is P.

A third alternative is to take sortal predicates to trigger a slight reference shift in the subject, triggering a switch from referring to a kind to referring to the reification of the kind, the property. Thus, (25b) would be analysed as in (28):

(28)   admirable property (reif([*courage*]))

Thus, *courage* in (25b) would be a 'concealed property', to use Grimshaw's (1979) terminology.

There are several difficulties or at least implausibilities arising for this proposal. First, on the analysis in (28) it would be quite strange why other predicates, such as *interesting*, do not allow for the same reference shift for its subject. Second, it is implausible that such reference shift takes place in the first place. Thus, a nonrestrictive relative clauses as in (29a) requires the head noun to still refer to a kind, rather than a property, which makes it hard to reconcile with the alleged reference shift triggered by the predicate. Similarly for (29b), where the pronoun must refer back to a kind, rather than a property::

(29)   a.   True courage, which one sees only rarely, is an admirable property.
         b.   True courage is an adnmirable property, even though one sees it only
               rarely.

The fourth alternative, which I will endorse, assimilates (25b) to the construction in (30):

(30)   the property of courage

The expression *the property of*, given (24), expresses the function of reification reif, applying to kinds of tropes. Reification, on this analysis, is also involved in (25b), which will be analysed as 'courage is something such that when reification applies to it, the result is an object that is admirable'. More formally:

(31) [*is an admirable property*] = λx[admirable([*property of*](x))] =
      λx[admirable (reif(x)))]

4. Plurals

4.1. *pluralities and groups*

As is well-known, there are two ways of referring to group-like entities: with a plural NP as in (32a) and with a collective NP, as in (34b):

(32)   a.   The children are asleep.
        b.   The group of children is asleep.

Let me call the kind of entity referred to by a plural a *plurality* and the kind of object referred to by a collective NP a *group*.

I here follow the tradition of Link (1983) and others according to which definite plural and singular NPs have an analogous semantics: *the child* stands for the only child in the context, *the children* stands for the maximal group of children in the context.[3]

In the majority of cases when a plural NP refers to a plurality composed of the same individuals as the group referred to by a collective NP, the plurality and the group seem to count as distinct entities. Thus, the referent of *the orchestra* has different identity and existence conditions from the referent of *the members of the orchestra*. If members of the orchestra are replaced, the orchestra may remain the same, but not what would be referred to as *the orchestra members*, and the orchestra members may still exist even if the orchestra has ceased to be. The difference shows up also in the way the objects are counted. There is one orchestra, but several orchestra members. Referents of collective NPs, groups, generally are counted as one, but referents of plurals, pluralities as many.

In what follows, I will argue that the underlying difference between pluralities and groups is exactly the same as what distinguishes kinds from properties: pluralities pattern together with Aristotelian universals, whereas properties pattern together with Platonic universals; that is, pluralities have their properties fixed on the basis of properties of or relations among group members, whereas groups have their properties fixed in the ordinary way.

4.2. analogous facts

The crucial observations are that plural and collective NPs differ in ways strikingly similar to the ways bare nominalizations and explicit property-referring terms differ from each other, that is, with respect to their behavior with different kinds of predicates.

These are the classes of predicates or readings of predicates with which plurals and collective NPs behave differently:

i. distributivity

Generally only definite plurals, not definite collective NPs allow for distributive interpretations of predicates (that is, of predicates that would allow both a collective and a distributive interpretation) (cf. Moltmann 1997a):

(33) a. The things are heavy.
      b. The collection of things is heavy.
(34) a. The team lifted the piano.
      b. The team members lifted the piano.

(33a) and (34a) allow for both a collective and a distributive interpretation, whereas(33b) and (34b) allows only for a collective interpretation.

2. predicates making reference to group members

Collective predicates whose content makes reference to group members, but not to the group as a whole allow only for plural NPs as complement, not for collective NPs. These are predicates such as *compare*, *distinguish* (w.r.t. the object argument position), *like each other*, and *similar*, whose content is based on binary relations among group members. They also include predicates like *count* or *numerous*, whose content is based on a function applied to all the group members. The generalization that such predicates (on the 'internal reading') take only pluralities as arguments is what I in Moltmann (1997) called the 'Accessibility Requirement':

(35) a. John compared the students.
      b. # John compared the class.
(36) a. The students like each other.
      b. # The class likes each other.
(37) a. John cannot distinguish the students.
      b. # John cannot distinguish the class.
(38) a. The students are similar.
      b. # The class is similar.
(39) a. John counts the students.
      b. John counted the group of students. (means: he counted one)
(40) a. The students are numerous.
      b. # The class is numerous.

3. predicates of existence

With definite plurals, the verb *exist* can claim only the existence of group members. It cannot, unlike with collective NPs, claim the existence of the group as such (for example as a reply to a sceptic concerning the existence of groups, sums, etc. as entities above individuals):

(41) a. The students do not exist.
     b. The class does not exists.
     c. The sum / collection / group of students does not exists.

(41a) denies the existence of the individual students; (41b) denies the existence of the class, independently of the existence of the students; as does (41c) with respect to entities like sums, collections, or groups.

It should be obvious what approach I will take to explain the difference in behavior of plural and collective NPs. Pluralities are nonobjects, that is, they cannot have basic properties, but only derived ones. Groups, by contrast, are objects and thus can fulfil basic properties, but not derived ones.

This means that the operation of sum formation involved in the semantics of plurals will always map a set of more than one individuals or other sums onto a nonobject. Thus, if the domain of entities E divides into two subdomains, the domain D of objects and the domain N of nonobjects, we will have the following conditions on the operation sum, which will apply in the case of definite plurals as in (42b):

(42) a. For a nonempty set $X \subseteq E$, $|X| > 1$, $sum(X) \in N$.
     b. [*the children*] = sum([*children*])

The expression *group of*, when followed by a definite plural (e.g. *the group of the children*) will map a plurality onto the corresponding kind, by the same operation of reification reif used in the case of kinds:

(43) For an entity $d \in N$, [*group of*](d) = reif(d) = the object o that is just like d except that $o \in D$.

When followed by a bare plural (*the group of children*), reif maps a kind onto the reification of the sum of its extension at the relevant world and time (int(k)(w, t)):

(44) For a kind k, [*group of*](k) = reif(k) = the object o that is just like sum(int(k)(w, t)) except that $o \in O$.

The account of predicates that I have given when they apply to the two kinds of universals cannot simply be carried over to groups and pluralities. The kinds of meaning extensions with which predicates can apply to kinds do not as such apply to pluralities. It is necessary therefore to go in detail through the different kinds of predicates and the way they can apply to groups or pluralities.

First distributivity. Obviously, distributive interpretation consists in applying a predicate to a plurality on the basis of all members of the plurality fulfilling the literal meaning of the predicate (a basic property) — just as in the case of applying individual-level predicates to kinds. However, the facts are not as straightforward as in the case of predicates taking kinds as arguments.

In analogy with how individual-level predicates apply to kinds, we would expect predicates expressing basic properties to apply to a plurality only in a distributive way. However, it appears that this expectation is not quite borne out. Pluralities allow for a wide range of predicates with collective interpretations (other than those in (ii)). These are some rather familiar examples:

(45) a. The children surrounded the palace.
        b. The men lifted the piano.
(46) a. The stones weigh 10 kilo.
        b. The picures take up a lot of space.

The examples in (45-46) display both distributive and collective readings.

On the other hand, there are also predicates that cannot apply to pluralities in a collective way, even though their content should in principle be applicable in the same way as with groups:

(47) a. The children are big. (no collective reading)
        b. The group of children is big. (collective reading)
(48) a. The pictures are large. (no collective reading)
        b. The collection of pictures is large. (collective reading)

The different behavior of the predicates in (45-46) from those in (47-48) must reside in their particular descriptive content. What is crucial about the predicates in (45) seems to be that they describe the participation of a plurality in an event, whereas the predicates in (47-48) don't. In order for (45a) and (45b) to be true, a significant number of the group members each will have to contribute to the causation of the event described by the predicate.

That participation in an event is the crucial parameter is also supported by the way evaluative predicates apply to pluralities and groups:

(49) a. The children are impressive. (given what they do)
        b. The group of children is impressive. (given its configuration,

composition)

Evaluative predicates can have a collective interpretation with plurals, but they can then evaluate only the collective participation of the group members in an event, not the composition or configuration of the group, as is possible with collective NPs.

Somewhat different are the predicates in (46). Here the predicate describes a cumulative relation of the group members to a measure (10 kilo) or space ('a lot of space'). By contrast, the predicates in (47-48) do not describe a cumulative group property at all, but only the overall configuration of the group.

Thus, the characteristic of predicates allowing for a collective interpretation with plurals appears to be that the predicate relates the group to another entity to which the individual group members are related in a cumulative way. On such a collective interpretation, the predicate can then be considered as having a derived property as its content, a property reducible to basic relations relating the individual group members to another entity.

The extended distributive meaning of a predicate N will be as in (50):

(50) $[N_{distr}] = \{x \mid \forall x' \, (x' \, P \, x \dashrightarrow N(x'))\}$

Again we must ask the question: what is the formal status of this extension?

There is reason not to assume that it constitutes an additional disjunct in a disjunctive broadened meaning of the predicate. That is because when a speaker utters a sentence like (51), he can't leave it open whether the predicate is to be understood distributively or collectively. Rather he must have one or the other reading in mind:

(51)   The students lifted the box.

Distributivity thus is better seen as generating a separate lexical meaning. For every predicate N, there will then be a related predicate N_{distr}, which is the distributive extension of N for its application to puralities.

The predicates in (35-40) clearly correspond to the class of instance-distribution predicates with kinds. They have a content that is obviously obtained from basic relations or properties to be fulfilled by the individual group members. Thus, their content is a derived property, a property that can be fulfilled only by nonobjects like pluralities and not by objects such as groups.

Let us turn to the predicate *exist* as in (41), which with pluralities cannot claim the existence of the collection as such, but only the existence of the members of the collection. Here the analogy to kinds does not quite hold: *exist* when applied to kinds, I suggested, gets an extended meaning on which its

application to the kind is equivalent to the original meaning of *exist* applying to the intension corresponding to the kind (the function from indices to sets of instances). In the case of pluralities, *exist* appears to apply distributively to the intension of each individual group member. Thus, (41a) will be analysed as in (52) with the extended distributive meaning of *exist*: (Here < is the relation between group members and pluralities.)

(52) $\text{exist}_{\text{distr}}(\text{sum}(\{\text{indiv-conc}(x) \mid x < [\textit{the students}]\})$

Another issue any account of plurals has to deal with is the use of *and* when applying to two pluralities. As is well-known, *and* either generates a mixed group consisting of the members of the two pluralities or a higher-order group having the two pluralities as members:

(53)   John compared the dogs and the cats.

(53) can either mean that John compared individual dogs and cats or that he compared the dogs to the cats. On the present account, the two readings of *and* are best dealt with by assigning *and* two different meanings. The first meaning, forming mixed groups, will be as in (54):

(54) $[\textit{and}_{\text{s}}](d, d') = \text{sum}(\{d, d'\})$

The second meaning will first map the two pluralities onto corresponding objects before forming a group with two members:

(55) $[\textit{and}_{2}] (d, d') = \text{sum}(\text{reif}(d), \text{reif}(d'))$

4.3. other accounts of plurals

On the present account, the two kinds of groups and the two kinds of universals share fundamental similarities and are distringuished by the same underlying parameter concerning the fulfilment of properties. The focus of this account is the nature of properties: entities are distinguished by what properties they can fulfil and the acceptability and the readings of predicates is explained in terms of the nature of the properties they express. With its focus on properties, the account differs fundamentally from the existing acccounts that assume a uniform semantics of singular and plural definite NPs, accounts which focus on the inherent nature of the entities referred to. In what follows, I will briefly discuss these accounts to see how they would fare in explaining the data in question.

4.3.1. positing different formal objects

A very influential account in the semantic literature has been the lattice-theoretic account of Link (1983). For Link, pluralities come form a domain that is ordered by a transitive part of-relation and whose atoms are individuals. Formally, this is a joint semilattice with atoms $<E, <_i>$, where $<_i$ is the 'i-part relation' and the sum operation is defined as $sum(\{x, y\}) = sup_<(\{x, y\})$. Given that individuals act as atoms of such a lattice, a different part relation would apply to them. Pluralities are mapped onto corresponding individuals in order to account for higher-order group formation with *and*. Distributivity for Link, moreover, consists in quantification over the i-parts of sums.

The conceptual resources available from Link's account are those of atom vs. proper sum and different part relations for different domains of entities. This is obviously too little to explain the facts discussed in this paper. The account would explain why distributivity is possible only with pluralities, not with groups (since it uses the i-part relation only). But the account does not provide a nonstipulative way of explaining why some predicates or readings of predicates apply only to sums and not atoms. Moreover, it does not provide a way of explaining why predicates of form have only a distributive reading, whereas predicates describing events display distributive and collective readings.

Landman (1989) gives an account of plurals which traces the availability of collective or distributive interpretations to the nature of the argument involved. For Landman, definite plural NPs denote sets of individuals if the predicate gets a distributive interpretation. But their denotation is lifted to the singleton of that set if the predicate receives a distributive interpretation. Thus, distributivity is not traced to the presence of a distributive operator (in the sentence meaning or the content of the predicate), but rather to the nature of the group argument.

This account clearly misses several generalizations this paper has established. First, it misses the generalization that not only distributivity, but also certain characterizable classes of collective predicates (or predicates on a collective reading) are possible only with plural arguments.

Both Link's and Landman's account, moreover, have a severe limitation, namely in that their account could not be carried over to the analogous behavior of kinds and properties.

4.3.2. integrated wholes

An approach that puts emphasis on properties is the approach I develop in Moltmann (1997). This approach makes crucial use of the notion of integrated whole. An integrated whole, roughly, is an entity that has a boundary or shape, or

displays integrity in some other way. Singular count nouns generally express properties of integrated wholes. By contrast, plurals and mass nouns don't. A plurality of ojects, with more than one object, generally, is not an integrated whole and a quantity of water is not either. Only if the nonlinguistic context specifies relevant integrity conditions can a plurality of objects count, in the context, as an integrated whole. Predicates or readings of predicates that make reference to the parts but not the whole of an argument require the argument not to be an integrated whole in the context. For this reason, distributivity as well as the predicates in (35-40) are not applicable to integrated wholes.

The deficiencies of this account are twofold. First, the account does not explain why certain collective predicates are applicable to pluralities. Second, the account is incapable of generalizing to properties and kinds. The notion of integrated whole hardly applies to properties and thus properties and kinds cannot be distinguished on the basis of the notion of integrity. There are also problems with the notion of integrated whole when limited to particulars. There are a number of count nouns that do not express any specific integrity conditions, for example *thing*, *entity*, *quantity*, or *object*. But these nouns have the same effect of blocking distributivity and the application of certain predicates as singular count nouns expressing specific integrity conditions:

(56)   John distinguished that entity. (no internal reading)

In Moltmann (1997), I argued that these nouns impose implicit integrity conditions or merely conceived integrity. But of course the notion of a merely conceived integrated whole is quite problematic. On the present account, it is not integrity that plays the crucial role for objecthood and the application of the relevant predicates, but rather the ability to fulfil basic properties. Thus, the lexical content of *object*, *quantity,* or *entity* need not involve any sort of integrity, but rather only the general condition of being an object, i.e. a possible argument of basic properties.

There is another difficulty for the account, and that is the treatment of higher-order group formation, as in (61):

(57)   John compared the cats and the dogs.

The two readings of (61) are possible against exactly the same background circumstances. On my 1997 account, the higher-order group reading requires that the group of dogs and the group cats are 'strong' integrated wholes, whereas on the other reading they are not. Again, it is entirely unclear where the integrity should come from that is to distinguish the two readings. On the present account, *and* is ambiguous: it either directly maps its arguments onto sums, or first maps its arguments onto objects. The second meaning could not be based on the notion of

integrated whole, which requires information from somewhere that defines integrity, but only with the notion of object as a primitive notion.

Conclusion: Criteria for Objecthood

In this paper, I have argued for an ontological criterion of objecthood — being a potential bearer of a basic property. This criterion coincides to a great extent with the linguistic criterion of being described by a singular count noun. One can even say the notion of object as a potential bearer of basic properties gives content to singular count nouns generally. Positing an ontological criterion criterion for objecthood, however, goes against a dominant tradition in philosophy, represented by Frege, Quine, Dummett, and others, which posits a linguistic criterion for objecthood instead. For Frege, to be an object is to be the referent of a referential noun phrase, and as such to be a possible argument of a predicate. For Quine, 'to be is to be the value of a variable'.[4] Given the present account, such linguistic criteria are misguided: they may identify entities or semantic objects, but there is yet another distinction to be made them that will yield the class of true objects.

Appendix: Modeltheoretic semantics for a fragment of English

In this appendix, I will sketch a direct model-theoretic semantics for a fragment of English containing one- and two-place predicates, bare mass nouns and plurals, adjective nominalizations, and explicit property-referring terms (but no quantifiers and variables). The fragment will be disambiguated, though. Occurrences of nouns as predicates and as head nouns of NPs will be distinguished from ocurrences of nouns as bare mass nouns as plurals. In the latter case, I will have the noun be subscripted by 'nom', as in $children_{nom}$ (the nominalization of the noun). 'nom' will also replace the various morphemes that form adjective nominalizations. Thus instead of $wisdom$, we will have $wise_{nom}$.

I will assume that predicates denote properties as intensional primitive objects. Such properties, however, will not act as objects in the object language (since they do not occur as arguments of predicates). The properties that are predicate denotations rather form the basis for the semantics of nominalizations, that is, for the semantics of bare plurals and mass nouns as well as adjective nominalizations. This rather platonic assumption is not crucial, though. Alternatively, to satisfy a nominalist, the modeltheoretic structure could contain the predicates themselves.

A model for the fragment of English thus consists of the folloqing components:

(i)   nonempty sets of properties **P** and (two-place) relations **R** (possible predicate denotations). **P** and **R** contain 'extensional' properties and relations in the sense that the extensions of those properties and relations consist in sets of entities or relations among entities. A model also contains sets $\mathbf{P_{int}}$ and $\mathbf{R_{int}}$ of intensional properties and relations, that is, properties and relations whose extension consists in intensions or relations between entities and intensions.

(ii) a nonempty set of entities **E**, which divides into a subset **O** of objects and a subset **N** of nonobjects. Another subset **I** of **E** consists of individuals and pluralities. I is ordered by a part relation $<_i$ and is closed under sum formation $sup_{<i}$. I will follow Link (1983) by assuming that $<\mathbf{I}, <_i>$ is a complete join semilattice. The set **O** consists of the atoms of **I**, whereas the nonatoms of I form a subset of **N**. M contains two other complete join semilattices $<\mathbf{M}, <_m>$ and $<\mathbf{K}, <_k>$, where **M** (the set of quantities) is a subset of **N** and $<_m$ a part relation ordering it, and **K** (the set of kinds) also is a subset of **N** ordered by the part relation $<_k$.

(iii)   a partial function k mapping elements of **P** onto kinds, i.e., elements of **N**.

(iv)   an intension function int. int maps properties in **P**, **R**, $\mathbf{P_{int}}$**, or** $\mathbf{R_{int}}$ onto intensions, functions mapping a world and time to an extension. Thus, for $P \in \mathbf{P}$, $w \in \mathbf{W}$ and $t \in \mathbf{T}$, we will have $int(P)(w, t) \subseteq \mathbf{E}$, and for $P \in \mathbf{P_{int}}$, $int(P)(w, t)$ will be a set of functions either from WxT to E or from WxT to $\wp(E)$. int moreover maps kinds, elements of **K**, onto intensions. The intension of the content of a (plural or mass) noun is the same as the intension of the kind denoted by the 'nominalization' of the noun (the bare plural or mass noun): if P is the denotation of a noun, then $int(P) = int(k(P))$. This identity does not hold for adjectives, however: the elements in the extension of *wise* are individuals, whereas the instances of (elements in the extension of) wisdom are tropes.

(v)   a reification function reif. reif maps elements of **N** onto elements of **O**.

(vi)   a partial function of intensional correlate corr which maps 'extensional' properties or relations onto corresponding intensional properties or relations, that is, which maps some members of P or R onto members of P_{int} or R_{int}.

(vii)   five functions or sets of functions $D_1, D_2, D_3, D_4, \{D_5', D_5'',...\}$, which map properties onto (derived) properties. They are defined as follows (the way D1 and D2 would apply to relations is obvious and need not be given):

For $P \in \mathbf{P}$, $D1(P) = \lambda wtxy[\exists y'(y' \in int(y)(w, t) <x, y'> \in int(P)(w, t))]$

For $P \in \mathbf{P}$, $D2(P) = \lambda wtx[Gn\ y'(y' \in int(y)(w, t) <x, y'> \in int(P)(w, t))]$

For $R \in \mathbf{R}$, $D3(R) = \lambda wtx[x \in int(corr(P))(w, t)]$

For $P \in \mathbf{P_{int}}$, $D4(P) = \lambda wtx[x \in int(P)(w, t)]$

(The functions D5', D5", ... will not be defined here: they should yield the content of instance distribution predicates whose precise definition goes beyond the

present concerns. This also holds for event describing collective predicates when they describe the cumulative contribution of group members to the event.)

We can then define: P is *derived* iff for some D_i ($i < 6$) and $P' \in \mathbf{P}$, $P = D_i(P')$; P is *basic* otherwise

(viii)   an interpretation function F mapping basic expressions of English to elements of **P** or constructs from **W**, **T** and **E** in the following way:

for a proper name X, F(X) is a constant function from **W** x **T** to **O**

for an intransitive verb, noun or adjective X, $F(X) \in \mathbf{P}$

for an intransitive verb X, $F(X) \in \mathbf{P_{int}}$

for a transitive extensional verb X, $F(X) \in \mathbf{R}$

for a transitive intensional verb X, $F(X) \in \mathbf{R_{int}}$

For a model M, the semantics of the English fragment can now be given as follows, where [] is the valuation function and $w \in \mathbf{W}$ and $t \in \mathbf{T}$:

(i)   For a proper name N, $[N]^M(w, t) = F(N)$

For a bare plural or mass noun N, $[N_{nom}]^M(w, t) = k([N])$

For a bare plural or mass noun N, $[the\ N]^M(w, t) = \sup_<(int([P])(w, t))$

For a singular count noun N, $[the\ N]^M(w, t) =$ the object o such that $o \in int(F(N))(w, t)$

For a plural or mass noun or adjective X, $[X_{nom}]^M(w, t) = k([X])$

(ii)   For a noun phrase NP, verb phrase VP, world w and time t,

(1) if $[NP]^M(w, t) \in \mathbf{O}$, then $[NP\ VP]^M(w, t) = 1$ if $[NP]^M(w, t) \in int([V]^M)(w, t)$ and $[VP]^M$ is basic, $[NP\ VP]^M(w, t) = 0$ if $[NP]^M \notin int([V]^M)(w, t)$ and [VP] is basic, $[NP\ VP]^M(w, t) =$ undefined otherwise.

(2) if $[NP]^M \in \mathbf{N}$, then $[NP\ VP]^M = 1$ if $[NP]^M \in int([VP]^M)(w, t)$ and $[VP]^M$ is derived, $[NP\ VP]^M = 0$ if $[NP]^M \notin int([VP]^M)(w, t)$ and $[VP]^M$ is derived, $[NP\ VP]^M(w, t) =$ undefined otherwise

(iii)   For a transitive verb V, $[V\ NP]^M =$ the element P' of P such that

$int(P')(w, t) = \lambda x[int(P)(w, t)(x, [NP]^M)]$

Finally, the modeltheoretic meanings of some particular expressions:

(iv)   For any $d \in \mathbf{K}$, $[property\ of](d) = reif(d)$

For any d such that for some $X \subseteq \mathbf{E}$, $|X| > 1$, $d = \sup_<(X)$,

$[group\ of](d) = \{d'| d' \in int(d)(w, t)\ \&\ d' = reif(d)\}$

For any $d \in \mathbf{M}$, $[quantity\ of](d) = \{ d' | d' \in int(d)(w, t)\ \&\ d' = reif(d)\}$

Endnotes

1 In what follows, mainly for reasons of space, I will adopt the judgment of those speakers, setting intuitions aside on which properties can be said to be rare or widespread.

2 For arguments that intensional verbs take properties as arguments, see Zimmerman (1992); for arguments that they take intensional quantifiers, see Moltmann (1997).

3 See also Moltmann (1997) for a detailed defense of that view.

4 For critical discussion of the syntactic criterion see also Wright (1983) and Hale (1987).

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<There is independent support for this analysis, namely other cases where the *of*-construction is related to the predicative construction:

(32) a. A unicorn is a good example.
  b. the example of a unicorn
(33) a. Improvement is a necessity.
  b. the necessity of improvement

Again, *example* and *necessity* in (32b, 33b) are better not analysed as predicates, but as functors, mapping an intensional entity ([*a unicorn*]) and a kind ([*improvement*]) respectively onto an object (an example, a necessity).>
<note: There are cases where one might rather take collective and plural NPs to refer to exactly the same entities, e.g. *the things on the table* vs. *the collection of things on the table*. There is at least a use of *collection* on which it acts like a nonrestrictive modifier of *the things on the table*, in which case the groups referred to will not have identity or existence conditions distinct from those of the plurality referred to by *the things on the table*. >
As I noted in Moltmann (1997), predicates not only making reference to the group members, but also to the group as a whole, for example the organization or spatial configuration of the group, allow for plural as well as collective NPs:

(44) a. The class dispersed.
  b. The students dispersed.
(45) a. John organized the collection of things on his desk.
  b. John organized the things on his desk.
   But why are the predicates in (44-45) acceptable with collective NPs? The content of these predicates is not reducible in the same way, but rather involves a configurational property of the whole. Thus these predicates express basic, not derived properties.

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