Genericity and Logical Form

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Abstract: In this paper I propose a novel treatment of generic sentences, which proceeds by means of different levels of analysis. According to this account, all generic sentences (I-generics and D-generics alike) are initially treated in a uniform manner, as involving higher-order predication (following the work of George Boolos, James Higginbotham and Barry Schein on plurals). Their non-uniform character, however, re-emerges at subsequent levels of analysis, when the higher-order predications of the first level are cashed out in terms of quantification over individuals: this last step, I suggest, involves knowledge concerning the lexical meaning of the predicates in question.

1. Introduction

Generic sentences, such as those in (1) and (2),

(1) A dog is a faithful pet.
(2) The dinosaur is extinct.

exhibit some interesting and puzzling semantic features, which have seemed to resist treatment by means of the standard apparatus of first-order predication and quantification over individuals.[1] It is now commonplace to distinguish between two different kinds of generic sentences: 'I-generics', as illustrated in (1), which exhibit what is known as 'sentence-oriented genericity', and 'D-generics', as illustrated in (2), which exhibit what is known as 'NP-oriented genericity' (cf. Krifka, 1987, 1988; Carlson and Pelletier, 1995,

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[1] For some literature on genericity, cf. e.g. Gregory Carlson, 1977a, 1977b, 1979, 1982, 1989; Carlson and Pelletier, 1995; Chierchia, 1982; Farkas and Sugioka, 1983; Gerstner, 1979; Gerstner-Link, 1988; Gerstner and Krifka, 1993; Krifka, 1987, 1988; Lewis, 1975; Schubert and Pelletier, 1987, 1989; Wilkinson, 1991.

especially ch. 1). (The 'I' in 'I-generics' is meant to suggest 'indefinite', because indefinite NPs can occur very happily in these sentences; similarly, 'D' in 'D-generics' stands for 'definite'.)

I-generics intuitively assert some sort of (law-like) generalization, general tendency, disposition, characteristic, or regularity, of a thing or collection of things *in general*. We can insert adverbs like 'generally', 'characteristically', 'typically' and 'normally' into these sentences without distorting their meaning. (1), for example, attributes a characteristic property to dogs in general, namely that they are typically faithful pets.

I-generics have two commonly noted features. First, they tolerate (but do not require) exceptions. Thus, (1) is considered true, even in the face of the occasional unfaithful dog: for dogs to be typically, normally or characteristically faithful pets, it need not be the case that every single dog in fact satisfy this property. Secondly, there is no absolute number or specific proportion of instances of the kind of thing in question that makes all I-generic sentences true. (1) is true just in case *most* dogs are faithful pets. However, there are other I-generic sentences, such as those in (3)–(6), for which a paraphrase involving 'most' would not be appropriate:

(3) Whales are mammals.
(4) Guppies give live birth to their young.
(5) Dutchmen are good sailors.
(6) Mary smokes.

The truth of (3) requires *all* whales to be mammals; (4), on the other hand, is true if only *less than half* of all guppies give live birth to their young (viz. the healthy female ones); in (5), only perhaps a *handful* of Dutchmen need to be good sailors; in (6), it might be enough if Mary smokes, say, *a few* cigarettes a day, as long as she does so habitually. ((6) belongs to a group of sentences known as *habituals*.)

The second group of generic sentences, of which (2) was a representative example, is quite different from the first. D-generics do not assert a characteristic property of a thing or collection of things in general; rather, they seem to assert some (possibly quite non-characteristic) property of a *kind* of thing directly, as compared to individual instances of the kind. (2), for example, says of the kind of animal, the dinosaur, that *it* is extinct. This property does not sensibly distribute over individual dinosaurs: it is the whole species or kind of animals that becomes extinct, not the individual animals.[2]

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[2]   The two kinds of genericity need not always occur separately. For example, according to Carlson and Pelletier, (1995, ch. 1, section 1.3.6, pp. 88–93), (a) is actually ambiguous between the two readings brought out in (b) and (c):

   (a) Potatoes contain vitamin C.
   (b) *The potato* contains vitamin C.
   (c) *A potato* contains vitamin C.

On their view, (b) contains both NP-oriented genericity (as indicated by the definite NP 'the potato') and sentence-oriented genericity (since the property of containing vitamin C is a characteristic property of potatoes in general), while (c) is more naturally

Generic sentences therefore pose a threefold challenge to the semanticist: How is the special nature of I-generics best captured formally? What is the correct analysis of D-generics? Is it possible (or even desirable) to represent both groups of generic sentences in a uniform manner?

The structure of this paper will be as follows. In section 2, I briefly discuss three possible approaches to the semantics of generic sentences: the *Subject/Predicate Analysis* (section 2.1); the *Relational Analysis* (section 2.2); and the *Non-Uniform Analysis* (section 2.3); as it turns out, all three approaches, at least as they have been traditionally formulated, give rise to serious difficulties (section 2.4). In the light of these difficulties, I propose an alternative treatment in section 3, which proceeds by means of *different levels of analysis*. According to this novel account, all generic sentences (I-generics and D-generics alike) are initially treated in a *uniform* manner, as involving *higher-order predication* (following the work of George Boolos, James Higginbotham and Barry Schein on plurals; cf. especially Boolos, 1984; Higginbotham and Schein, 1989; Schein, 1993). Their *non-uniform* character, however, re-emerges at subsequent levels of analysis, when the higher-order predications of the first level are cashed out in terms of quantification over individuals: this last step, I suggest, involves knowledge concerning the *lexical* meaning of the predicates in question.

2. Three Approaches

2.1 The Subject/Predicate Analysis

There is some intuitive plausibility to the view that generic sentences have a simple *subject/predicate* structure. Contrast, for example, the non-generic sentences in (7) and (8) with the generic (1) and (5), repeated here:

(7) There is *a dog* in the garden.
(8) *Dutchmen* are waiting outside.

(1) *A dog* is a faithful pet.
(5) *Dutchmen* are good sailors.

In (7) and (8), the NPs 'a dog' and 'Dutchmen' are used to single out a specific, contextually salient dog or group of Dutchmen; in (1) and (5), on the other hand, they contribute to an observation about dogs and Dutchmen

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understood as a pure I-generic. If this is right, then (a) would be an example of a sentence which exhibits both kinds of genericity, at least on one of its readings. I am not sure, however, I agree with their assessment that (a) is in fact ambiguous, and hence that (b) and (c) express different readings. This diagnosis seems to depend on a prior resolution, which strikes me as dubious, that definite NPs in English always indicate the presence of a D-generic. In any case, we will have occasion to consider examples of so-called 'mixed' sentences below, which undoubtedly contain both kinds of genericity.

in general, without bringing anyone in particular into the foreground. It is tempting to represent this difference by viewing (7) and (8) as quantificational, with 'a dog' and 'Dutchmen' playing the role of a *general term*, and (1) and (5) as having a simple subject/predicate structure, where the same two NPs now function as *singular terms*.

According to the Subject/Predicate Analysis, this is the structure assigned to all generic sentences across the board. As it was traditionally formulated (cf. especially Carlson, 1977a, 1977b), the subject term of a generic sentence is viewed as a proper name which refers to a special, irreducible entity: a *kind*. The locus of genericity, on this view, is the kind-referring NP itself: its special nature is what accounts for the peculiar character of generic sentences. Of course, the predicate must also be of the appropriate variety in order to combine sensibly with the kind-referring subject term. Not every predicate fits this description, as illustrated by the difference between (9) and (10):

(9) Dogs are barking.
(10) Dogs bark.

(9) is most easily read as non-generic, while (10) only has a generic reading. This difference surely has to do with the difference in aspect between the progressive 'are barking' and the non-progressive 'bark'. Thus, given an appropriate predicate '$\Phi(x)$' and a kind-referring subject term 'k', the Subject/Predicate Analysis assigns the following *bipartite* structure to generic sentences:

(11) $\Phi(k)$.

2.2 The Relational Analysis

The *Relational Analysis* (cf. especially Carlson, 1989; Krifka, 1987, 1988) views generic sentences as implicitly *quantificational*, with the following *tripartite* structure consisting of a dyadic sentential operator 'GEN' and its two arguments, '$F(x)$' and '$G(x)$':

(12) GEN (x) [F(x), G(x)].

A generic sentence, according to this view, is partitioned into two parts: the *background* or *restrictive clause* and the *focus* or *nuclear scope*. The schema in (12) reads: 'In general, cases which satisfy the background also satisfy the focus'. As applied to (1), this would yield the following structure:

(13) GEN (x) [Is-a-dog (x), Is-a-faithful-pet (x)].

(13) is true just in case in general something that is a dog is also a faithful pet.

The locus of genericity, on this analysis, is no longer the subject term

but the generic operator 'GEN'. This operator is commonly thought of as a generalized quantifier, which unselectively binds all the free variables in the sentence.[3] As a quantifier, one of the functions of 'GEN' is to indicate a relation of cardinality (or, more generally, size or proportion) between the Fs and the Gs. But, as we observed in section 1, part of what it means for the Fs to be *generally* Gs is not only that a certain number or proportion of Fs are Gs, but also that they are so *typically*, *normally* or *characteristically*. Thus (at least one group of) generic sentences also have a certain lawlikeness associated with them, although the force and character of the 'law' in question may vary from case to case (e.g. the lawlikeness with which whales are mammals is quite different from that with which Dutchmen are good sailors or Mary smokes). To account for the lawlike character of generic sentences, 'GEN' is often taken to be a modal operator of some sort involving various strengths of necessity (e.g. physical, metaphysical, logical or various weaker kinds of necessity).[4]

2.3 The Non-Uniform Analysis

Given the two analyses sketched in sections 2.1 and 2.2, there is now a third possibility for the analysis of generic sentences, namely to combine the two. This may seem called for particularly in view of the asymmetries between the two groups of generic sentences introduced in section 1, I-generics and D-generics. To review, I-generics assert characteristic properties of instances of a kind of thing in general, whereas D-generics appear to attribute (possibly quite non-characteristic) properties to a kind directly. The *Non-Uniform Analysis* (cf. Krifka, 1987, 1988, and Carlson and Pelletier, 1995, ch. 1) suggests that both the Subject/Predicate Analysis and the Relational Analysis have their place in the semantics of genericity: the former is appropriate for the NP-oriented genericity found in D-generics, while the latter serves to capture the sentence-oriented genericity of I-generic sentences. Correspondingly, sentences (1) and (2) would be assigned two very different structures, as illustrated in (13), repeated here, and (14):

(13) GEN (x) [Is-a-dog (x), Is-a-faithful-pet (x)].
(14) Is-extinct (the dinosaur).

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[3]   For more details on generalized quantifiers, see, for example, Barwise and Cooper, 1981; on unselective binding, see, for example, Lewis, 1975; Heim, 1982.
[4]   The precise nature of the generic operator is no doubt one of the most interesting and pressing issues concerning genericity. For a helpful survey of the different directions one may go in (e.g. pragmatic accounts; prototypes; stereotypes; modal interpretations; and, in particular, non-monotonic reasoning), see Carlson and Pelletier, 1995, section 1.2.6, pp. 43–63. For interesting critical remarks concerning the generic operator 'GEN' and an alternative proposal (viz. an operator called 'CHAR' for 'characteristically'), see Higginbotham and Ramchand, 1997, especially pp. 65ff. For reasons of space, I cannot comment further on the nature of the generic operator, in the present context.

2.4 Some Problems with these Accounts

Both the Subject/Predicate Analysis, as formulated above, and the Relational Analysis are inadequate by themselves. Very briefly, the familiar objection against the Subject/Predicate Analysis (cf. Carlson, 1989) is that it has trouble with sentences of the following sort:

(15) Hurricanes arise in this part of the Pacific.
(16) It rains 30 inches a year around here.

(15) has the following two readings:

(17) It is generally true of hurricanes that they arise in this part of the Pacific.
(18) It is generally true of this part of the Pacific that hurricanes arise in it.

(17) says of the kind of wind, hurricanes, that instances of it typically have a common origin, namely this part of the Pacific. On this reading, we would expect at least *most*, if not possibly (almost) *all*, hurricanes to originate in this part of the world. (18), which is actually the preferred reading of (15), says roughly that from time to time *some* hurricane *or other* arises in this part of the Pacific: this reading asserts a characteristic property of the geographical area; the subject term 'hurricanes' here seems to have existential force. These and similar examples suggest that generic sentences can have a more complex logical form than the one admitted by the simple Subject/Predicate Analysis, possibly involving quantification. (16) poses a difficulty for the Subject/Predicate Analysis because of its apparent lack of a kind-denoting subject term to which the meteorological property of 30 inches of rain per year could be attributed.[5]

The Relational Analysis by itself is inadequate, because it is ill-tailored to the semantic properties of D-generics, such as (2), repeated here:

(2) The dinosaur is extinct.

The appropriate paraphrase of (2) is not (19),

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[5]   While the difficulties raised by (15) and (16) are no doubt serious, they do not seem to me to present knock-down arguments against the Subject/Predicate Analysis of genericity. One possibility would be, for example, to account for the difference between (17) and (18) along the lines of (a) and (b):
(a) Arise-in-this-part-of-the-Pacific (hurricanes).
(b) Hurricanes-arise-in-it (this part of the Pacific).
These paraphrases suggest that the difference between (17) and (18) depends on which part of the sentence is to be analysed as the subject and which as the predicate. (16) presents less of a threat, since the semantic analysis of the dummy 'it' is difficult across the board, not just in the context of generic sentences.

(19) GEN (x) [Is-a-dinosaur(x), Is-extinct(x)]

as it is not individual instances of the kind, dinosaur, that are extinct; moreover, being extinct is not a characteristic, normal or typical property either of the kind or of its instances.

Given the weaknesses of the previous two views, the Non-Uniform Analysis appears to be the strongest contender for an analysis that can capture the respective features of both groups of generic sentences. However, the Non-Uniform Analysis runs into at least the following three difficulties. First, it in effect posits a systematic semantic ambiguity governing all NPs. Depending on the context in which a particular NP occurs, it can play two different semantic roles: that of a kind-referring name and that of a predicate, true of the instances of the kind.

This strategy is not uncommon in current semantic theory. For example, the literature on the stage-level/individual-level distinction (cf. Diesing, 1988; Kratzer, 1995) standardly represents the contrast between (20) and (21) as being due to a systematic ambiguity in the subject term 'John':

(20) John smokes.
(21) John is smoking.

According to this view, the NP 'John' can denote, depending on the context, either the 'entire' individual, John (as in (20)), or a mere space-time slice thereof (as in (21)).

But the difference between (20) and (21) can also be located elsewhere in the sentence. For example, (20) could be viewed as making a general claim about smoking-events involving John, while (21) asserts that one particular such event is occurring right now. Other things being equal, this second strategy has some advantages over the first. First, by keeping the semantic role played by the NP 'John' constant, it preserves our intuition that (20) and (21) talk about the very same object, namely the 'whole' individual, John. Secondly, it avoids ontological commitment to temporal parts, which are by many considered to be problematic, if not incoherent, when intended as more than a mere *façon de parler*.[6]

The Non-Uniform Analysis follows the first strategy of locating the difference between, for example, the D-generic (22) and the I-generic (23), in a systematic semantic ambiguity in the subject term 'potatoes':

(22) Potatoes were introduced into Ireland in the seventeenth century.
(23) Potatoes contain vitamin C.

On this account, one and the same NP, 'potatoes', functions as a kind-refer-

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[6] For an attack on the metaphysic of temporal parts, cf. Chisholm, 1976, Appendix A; Thomson, 1983; Oderberg, 1993, et al.; for a defence, cf. Heller, 1984, 1990, et al.

ring name in (22) and as a predicate true of instances of the kind in (23).[7] In this way, the Non-Uniform Analysis gives rise to a pervasive ambiguity governing all NPs. Just as in the case of the stage-level/individual-level distinction, however, alternative treatments are available here as well; one such proposal will be explored below.

The Non-Uniform Analysis is, furthermore, metaphysically suspect due to its commitment to kinds as irreducible entities. For familiar reasons, kinds cannot be understood as straightforward set-theoretic entities or mereological sums: it must be possible for two kinds to be instantiated by the same instances (possibly none) without counting as the same kinds. This consequence is avoided if kinds are viewed as intensional entities, but then a sentence like (22), repeated here,

(22) Potatoes were introduced into Ireland in the seventeenth century.

turns out to be, counterintuitively, about, for example, the property of being a potato. Finally, it does not help to resolve, in the light of these considerations, that kinds are best taken to be, not set-theoretic, mereological or intensional entities, but 'basic individuals';[8] for assigning something the status of a 'basic individual' makes it no less suspect.

It should be noted that commitment to kinds, in this context, includes far more than *natural* kinds. For the claim is that *any* NP that can felicitously occur as the subject term of a D-generic sentence functions as a proper name of a kind. But since the subject position of a D-generic sentence is just as accessible to NPs like 'Coke-bottle' and 'Dutch sailor' as it is to those denoting biological species and chemical substances, the Non-Uniform Analysis will commit us to a wide range of kinds, including ones that are utterly meaningless from the point of view of science.

There is no doubt that D-generic sentences do intuitively seem to point more in the direction of a subject/predicate analysis than a quantificational account. But such appearances can be misleading, as is illustrated by (24)–(26):

(24) The average man pays his taxes.
(25) I drank a quick cup of coffee.
(26) An occasional sailor strolled by.

The NPs, 'the average man', 'a quick cup of coffee' and 'an occasional sailor', in (24)–(26), behave syntactically much like 'the tall man', 'a hot cup of cof-

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[7] This is somewhat of a simplification. As mentioned in footnote 2, some find (23) to be ambiguous between a pure I-generic and a 'mixed' reading. However, this does not affect my overall point that the Non-Uniform Analysis is committed to a systematic ambiguity governing all NPs.

[8] This is the view taken in Carlson, 1977a, e.g. p. 442, and later work; Krifka and others follow him in this.

fee' and 'a hungry sailor'. And yet, these grammatical facts alone surely do not show that there is such a *thing* as the average man (who has all kinds of strange properties, such as having 2.2 children), a quick cup of coffee and an occasional sailor, in the same sense in which there are tall men, hot cups of coffee and hungry sailors. Rather, 'average', 'quick', and 'occasional' are perhaps best analysed as adverbs, not as adjectives.[9]

The third objection to the Non-Uniform Analysis concerns again (like the first one) its non-uniform character. Because the Non-Uniform Analysis assigns two completely different semantic roles to the same NP, depending on the context, it fails to deal convincingly with sentences that are 'mixed', in the sense that they contain both an I-generic and a D-generic component, as illustrated in (27) and (28):

> (27) Gold, which is valuable, was discovered by the Sumerians.
> (28) Potatoes, which were introduced into Ireland in the seventeenth century, contain vitamin C.

The non-restrictive relative clause in (27) is an I-generic, while its main clause is a D-generic; (28) exhibits the converse structure. According to the Non-Uniform Analysis, the relative clause in (27) is to be analysed as involving generic quantification, with the NP, 'gold', playing the role of a predicate true of instances of the substance, gold. The main clause, on the other hand, is rendered as a simple subject/predicate structure, where the same NP is now functioning as a kind-referring name. The only way to account for the mixed structure in (27), on this view, is simply to conjoin these two components. But, in addition to its inelegance, this solution also fails to preserve the intuition that 'gold' only makes a single semantic contribution to the whole sentence.[10]

In the light of these difficulties, an alternative treatment of generic sentences is called for. In particular, the objections raised in this section suggest that the following features are desirable in an analysis of genericity. First, the analysis should, if possible, avoid positing a systematic semantic ambiguity governing all NPs, as between a kind-referring and a non-kind-referring role. Second, other things being equal, an analysis which gets by without onto-

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[9] The relation between grammatical form and logical form has been explored, among others, by James Higginbotham in a series of papers, in particular Higginbotham, 1985, 1989a, 1989b, 1993; the examples in (24)–(26) are discussed by Higginbotham in various places. (24) is originally due to Hornstein, 1984, p. 58; (25) comes from an unpublished paper by Isabelle Haik (cf. Haik, 1985); and (26) can be found in Bolinger, 1967, p. 5.

[10] The fact that 'potatoes' may be ambiguous between a kind-referring role and a non-kind-referring role, as observed in fn. 2, does not help us in this context. For if I-generics do in fact exhibit such an ambiguity, then the I-generic component of (27) and (28) admits of at least one reading in which the NP in question does *not* refer to the kind. It is this reading that creates the 'mixed' character of sentences like (27) and (28). Hence, the phenomenon of a truly 'mixed' sentence does not go away, even in the face of the alleged ambiguity.

logical commitment to kinds is preferable to one which carries such commitment. Thirdly, the phenomenon of 'mixed' sentences points in the direction of a uniform analysis, in favour of the heterogeneous conjunctions that come with a non-uniform treatment.[11] In what follows, I develop an analysis which satisfies all three of these desiderata.

3. A New Analysis

We saw above, in connection with the phenomenon of 'mixed' sentences, that there is something to be said for a *uniform* analysis of genericity. In section 2, we considered two kinds of uniform analyses, the simple Subject/Predicate Analysis and the Relational Analysis, but neither one had

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[11] There may be a further objection against reference to kinds, which, if successful, would by itself be fatal. This objection is raised in Higginbotham and Schein, 1989, and further elaborated in chapter 2 of Schein, 1993, against what they call the 'objectual view' of plurals, according to which plurals refer to objects. Since kinds are just another variety of plural objects, the line of reasoning advanced in Higginbotham and Schein, 1989, and Schein, 1993, would seem to carry over to the present context. If this is correct, the subject/predicate analysis of D-generics runs headlong into Russell's paradox. Very briefly, the reasoning is as follows. Suppose we denote the kind-forming operator by '{x: . . . x . . .}', where '. . . x . . .' is to be filled by a predicate that applies to individual instances of the kind, e.g. '{x: Is-a-potato(x)}' denotes the kind of vegetable, the potato, while 'Is-a-potato(x)' is a predicate true of individual potatoes. To account for what ordinary speakers of English know about sentences like (22) (e.g. the basic inferences they are capable of drawing), the subject/predicate analysis must introduce comprehension principles relating kinds to their individual instances. Although the property of being introduced into Ireland in the seventeenth century may not directly distribute over individual potatoes, competent speakers of English are nevertheless able to infer from (22) that *something* significant involving individual potatoes being brought to Ireland happened in the seventeenth century. The characteristics of the kind therefore *supervene* on those of its individual instances, in that everything that is attributed to a kind surely has *some* basis in what happens to its instances, even if we may not be able to transfer the characteristic of the kind directly over to its instances. The axioms needed to relate kinds to their individual instances are instances of the following schema (comprehension):

(i) y is among {x: . . . x . . .} ↔ . . . y . . .

The role of the relation 'x is among y' is often taken over by what is known as the 'realization relation', or 'R'. An instance of (i) would be (ii)

(ii) y is among {x: Is-a-potato(x)} ↔ Is-a-potato(y)

which says that y is an instance of the kind, potato, just in case y is an individual potato. But (i) leads directly to Russell's paradox. For suppose y is the set of all sets that are not members of themselves (i.e. that do not contain themselves as elements). Then, y is a member of itself only if it is not a member of itself; and vice versa. I state the Higginbotham and Schein objection with a certain degree of hesitation, as I am at this point not fully convinced that the advocate of reference to plural objects or kinds may not help himself to one of the standard solutions to the paradoxes, without significant threat to empirical adequacy. To do justice to this interesting and complex issue would require more space than I can devote to it here. For this reason, I assert only that *if* this objection proves to be successful, it would indeed present powerful evidence against reference to plural objects or kinds.

the conceptual resources needed to do justice to both groups of generic sentences. Given the semantic parallels between plurals and generics, an attractive possibility for a uniform account, which has not yet been explored in the literature, is to extend the analysis of plurals proposed by George Boolos, James Higginbotham and Barry Schein to the present case of genericity.

3.1 Kinds and Pluralities: Genericity and Plural Quantification

We observed in section 2.1 that there was some temptation to view generic sentences as having a simple subject/predicate structure, with the subject NP functioning as a kind-referring singular term. For example, consider again the contrast between the non-generic (7) and (8) and the generic (1) and (5), repeated here:

(7) There is *a dog* in the garden.
(8) *Dutchmen* are waiting outside.

(1) *A dog* is a faithful pet.
(5) *Dutchmen* are good sailors.

The same two NPs, the indefinite 'a dog' and the plural 'Dutchmen', seem to play very different roles in these two pairs: in the non-generic (7) and (8), they serve to single out a specific, contextually salient dog or group of Dutchmen; the generic (1) and (5), on the other hand, concern dogs and Dutchmen in general, no one in particular. It is this 'all-inclusive' way of referring to a kind of thing in general, characteristic of generic sentences, which makes it tempting to interpret the two NPs in (1) and (5) *referentially*, as kind-denoting singular terms. If anything, this intuition is only strengthened when we move from I-generic to D-generic sentences, where the predicate in question often does not even distribute sensibly over the instances of the kind in question, as in (2), repeated here:

(2) The dinosaur is extinct.

An analogous contrast arises in connection with the semantics of plurals. Consider, for example, the contrast between (29) and (30), which is due to Boolos (1984):

(29) *The guests* left the party.
(30) *The rocks* rained down.

At least on the face of it, there is nothing about (29) that appears to be *essentially* plural: for if it is true that the guests left the party, then it is also true of *each* of the guests that he or she left the party. Judging from sentences like (29), then, one might conclude that plural NPs do not require any kind of extension of our ordinary ontology or semantic apparatus beyond what

is already required for sentences containing *singular* NPs, such as (31) or (32) below:

(31) *The guest* left the party.
(32) *Every guest* left the party.

(30), on the other hand, is less inviting towards a reduction to singular predication and quantification: for the rocks to rain down does not mean for *each* of the rocks to rain down. As in the case of the generic sentences above, the plural NP 'the rocks' here appears to refer in a similar 'all-inclusive' way, which may again suggest a *referential* treatment, along the lines of the Subject/Predicate Analysis discussed earlier. In the case of generics, the Subject/Predicate Analysis requires an extension of our ordinary ontology through the introduction of *kinds*; an analogous move is available, in the case of plurals. This route has been taken by what Higginbotham and Schein (1989) and Schein (1993) call the *Objectual View* of plurals (cf. Russell, 1903; Higginbotham, 1980; Scha, 1981; Gillon, 1984; Link, 1983, 1987; and Lønning, 1987): plural NPs, on this approach, are analysed as singular terms referring to objects of a special kind, namely 'pluralities' of some variety (e.g. sets, mereological sums, groups, etc.). Other than the admission of plural objects into our ontology (which, for reasons discussed in fn. 11, is not at all insignificant), an attractive consequence of this view is that no extension of our familiar notions of reference, predication, truth, satisfaction, quantification, etc. is required: plural reference becomes simply singular reference in disguise; and similarly for the other semantic concepts.

As against the objectual treatment of plurals, Higginbotham and Schein propose a *Conceptual Analysis*, according to which plurals do not refer to plural objects, but function semantically as *predicates*: their semantic values are *concepts*, in Frege's sense of the term.[12] For example, the plural NP 'the rocks' denotes a concept satisfied by the rocks and nothing else. This is represented by means of the following *second-order* expression:

(33) $(\iota X) (\forall y) [X(y) \leftrightarrow \text{Is-a-rock}(y)]$.

'The rocks' denotes the concept X, such that something y is in its extension if and only if it is a rock. According to the nominalist interpretation of second-order logic developed by George Boolos (cf. Boolos, 1975, 1984, 1985a, 1985b), expressions like (33) do not commit us ontologically to anything over and above the individual rocks that satisfy it: to say that 'the rocks' denotes the concept stated in (33) is to say nothing more than that 'the rocks' denotes the rocks. In this way, the Conceptual Analysis of plurals

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[12] Cf. Higginbotham and Schein, 1989; Schein, 1993. Higginbotham and Schein are inspired by a series of influential papers on plurals and second-order logic by George Boolos, in particular Boolos, 1984, and also by Bennett, 1972.

is not merely a terminological variant of the Objectual Analysis; for the crucial insight behind Boolos's work on this subject is precisely that second-order quantification does *not* reduce to first-order quantification over sets or similar entities:

> Abandon, if one ever had it, the idea that use of plural forms must always be understood to commit one to the existence of sets (or 'classes', 'collections', or 'totalities') of those things to which the corresponding singular forms apply. The idea is untenable in general in any event: There are *some sets* of which every set that is not a member of itself is one, but there is no *set* of which every set that is not a member of itself is a member, as the reader, understanding English and knowing some set theory is doubtless prepared to agree. (Boolos, 1984, p. 442; my emphasis)[13]

The parallels between plurals and generics suggest that the Higginbotham/Schein analysis of plurals can be extended straightforwardly to the analysis of genericity. Kinds, after all, are just another variety of plural objects. Even though they are introduced in the context of generic sentences as the semantic values of more than just plural NPs (e.g. definite and indefinite singular NPs), the basic idea behind reference to kinds is still to form a single (not-so-ordinary) object out of a plurality of (ordinary) objects. The Higginbotham/Schein analysis therefore promises to offer an attractive alternative account, which is both uniform and foregoes commitment to kinds.

3.2 A Uniform Treatment of Genericity

Applying the Higginbotham/Schein analysis to our original I-generic sentence in (1), repeated here,

(1) A dog is a faithful pet.

yields the following structure,

(34) Are-faithful-pets ((ιX) ($\forall$y) [X(y) $\leftrightarrow$ Is-a-dog(y)]).

which involves *higher-order plural predication* (as indicated by the upper-case variables). The paraphrase in (34) reads 'The y's, such that they are in the extension of the concept *dog*, are also satisfiers of the predicate 'are-faithful-pets(X)''. I will turn to the interpretation of higher-order plural predicates, such as 'are-faithful-pets(X)', shortly.

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[13] Because the Conceptual Analysis does without plural objects, no comprehension principles are needed to mediate between the plural object and its individual instances; hence, there is no threat of paradox (cf. fn. 11).

Since we are, at least initially, aiming for a *uniform* analysis, the D-generic in (2), repeated here,

(2) The dinosaur is extinct.

is assigned the *same* structure as the I-generic in (1):

(35) Are-extinct ((ιX) ($\forall$y) [X(y) ↔ Is-a-dinosaur(y)]).

The paraphrase in (35) reads in parallel fashion: 'The y's, such that they are in the extension of the concept *dinosaur*, are also satisfiers of the predicate 'are-extinct(X)''.[14]

Through its uniformity and ontological leanness, this analysis satisfies all three desiderata mentioned above at the end of section 2.4. First, it foregoes any commitment to kinds. Second, it posits no systematic semantic ambiguity governing all NPs. Third, it makes for a more satisfying treatment of 'mixed' sentences.

First, following Boolos's nominalist interpretation of second-order logic, the paraphrases in (34) and (35) do not commit us to anything over and above the things to which we are already committed by the use of our first-order variables. The crucial idea here is Boolos's distinction between (i) speaking of the *same* things in *different* ways and (ii) speaking of *different* things in the *same* way (cf. Boolos, 1984, p. 449). This distinction translates, in our current scenario, into a choice between either (i) expanding our semantic apparatus or (ii) admitting new objects into our ontology. The Objectual or Subject/Predicate Analysis goes the second route: it views plurals and generics as speaking in the *same* way about *different* objects; our ontology is expanded by the addition of plural objects or kinds, but no extension of our standard semantic apparatus of reference, predication, quantification, truth, satisfaction, etc. is needed. The Conceptual Analysis, on the other hand, chooses the first option: it views plurals and generics as providing a *different*, characteristically 'all-inclusive', way of speaking about the same old objects to which we were already committed by the use of our first-order variables. This different way of speaking requires an expansion of our standard semantic apparatus to include higher-order plural predication and quantification, but leaves the first-order ontology intact. The uniform treatment of genericity proposed above is therefore not to be confused with a mere terminological

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[14]   I should note that the analysis proposed above leaves out an important feature of the Higginbotham/Schein account of plurals: according to them, every predicate has an extra argument place for a Davidsonian event-position (cf. Davidson, 1967a). The difference between an essential plural, as in (30), and a non-essential plural, as in (29), is then expressed by means of different scope relations between the event-quantifier and other components of the sentence (e.g. the θ-roles). However, for present purposes, we can simply concentrate on the idea that certain kinds of NPs function semantically as higher-order predicates that denote Fregean concepts.

variant of the Subject/Predicate Analysis, whose only distinction is that it makes reference to a different variety of plural object; the two approaches are genuinely and importantly different.

Secondly, since the subject NPs of both I-generic and D-generic sentences are assigned the *same* semantic role (namely they both denote a Fregean concept of the kind '$((\iota X) (\forall y) [X(y) \leftrightarrow F(y)])$'), we avoid a systematic semantic ambiguity governing all NPs. This also helps us, thirdly, with the phenomenon of 'mixed' sentences, as illustrated by (27) and (28), repeated here:

> (27) Gold, which is valuable, was discovered by the Sumerians.
> (28) Potatoes, which were introduced into Ireland in the seventeenth century, contain vitamin C.

'Mixed' sentences, such as (27), can now be given a more elegant analysis, as illustrated in (36):

> (36) (λY) [Are-valuable(Y) & Were-discovered- ... (Y)] $((\iota X) (\forall y) [X(y) \leftrightarrow$ Is-gold(y)]).

(36) nicely reflects the intuition that 'gold' is playing a single semantic role in (27). (Note that the higher-order plural predicate is appropriate even in sentences containing nouns that have mass-occurrences, e.g. 'gold' in (27), since the plural predicate applies to the things in the extension of the concept *gold*, i.e. all the individual instances of gold. For a defence of the view that nouns in their mass-occurrences play the semantic role of a predicate, see Koslicki, 1999.)

Finally, the uniform conceptual treatment proposed above allows for a relatively straightforward derivation of the logical form of a sentence from its surface grammar. Consider the simple generic sentence in (10), repeated here:

> (10) Dogs bark.

Abstracting away from all complications, suppose (10) has the following simple structure:

> (37) $[_S [_{NP} [_N N]] [_{VP} [_v V]]]$.

Then, to interpret (10) in the uniform manner proposed above, the theory of meaning would need to include an axiom to map the subject NP of a generic sentence onto a second-order expression (in this case, '$((\iota X) (\forall y) [X(y) \leftrightarrow$ Is-a-dog(y)])$'); an axiom to map the VP onto a higher-order plural predicate (in this case, 'bark(X)'); and a general (non-terminal) axiom governing predication, to the effect that a generic sentence of the structure in (37)

is true just in case the higher-order plural predicate determined by the VP truly applies to the concept determined by the subject NP.

But there is a sense in which the paraphrases given so far are only appropriate as a *first* level of analysis. For when we ask what it means for a plural predicate like 'bark(X)' to apply truly to a second-order expression like '((ιX) ($\forall$y) [X(y) $\leftrightarrow$ Is-a-dog(y)])', the answer will surely lead us back to the individual things in the extension of the concept and their characteristics. And this is precisely where the difference between I-generics and D-generics resurfaces.

Let's consider I-generics first. As we know from our discussion of I-generics in sections 1 and 2, a sentence like 'Dogs bark' is true just in case it is true of *individual* dogs that they *generally* bark. Thus, the higher-order plural predication in (38),

(38) Bark((ιX) ($\forall$y) [X(y) $\leftrightarrow$ Is-a-dog(y)]).

needs to be tied back in some way to the generic quantification over individual instances in (39) originally proposed by the Relational Analysis,

(39) GEN (x) [Is-a-dog(x), Barks(x)].

where 'Is-a-dog(x)' and 'Barks(x)' are now our familiar *first-order singular* predicates, which are true, respectively, of individual dogs and individual barking things.

Thus, a *second* level of analysis is needed in order to reflect the connection between the higher-order plural predication and the generic quantification over individuals, as in (40) and (41):

(40) Bark (X) — GEN (x) [X(x), Barks(x)].
(41) Are-faithful-pets(X) — GEN (x) [X(x), Is-a-faithful-pet(x)].

In the case of an I-generic sentence, there is for each higher-order plural predicate (e.g. 'Are-faithful-pets(X)') a first-order singular predicate closely related to it (e.g. 'Is-a-faithful-pet(x)'). What it ultimately means for the higher-order plural predicate to apply to a concept, then, is *generally* for the individuals in the extension of the concept to have the characteristic denoted by the first-order singular predicate, as illustrated in (40) and (41). However, *both* levels of analysis have an important role to play: the one to fill the need for a uniform treatment of genericity; the other to spell out how the 'all-inclusive' way of speaking characteristic of generic sentences ultimately translates into quantification over individual things (i.e. the values of our first-order variables) and their characteristics.

3.3 'Unpacking' D-generics

The case of D-generics is unfortunately less straightforward. As noted above, D-generics appear to attribute a possibly non-characteristic property of a

kind of thing directly (e.g. the property of being extinct); the properties in question usually do not distribute sensibly over individual instances of the kind. And while the characteristics of the kind nevertheless supervene ultimately on those of its instances, the connection between the higher-order plural predicate and the first-order quantification over individuals will not be quite as direct as in the case of I-generics. Consider again the D-generic sentences in (2), (22) and (42):

(2)   The dinosaur is extinct.
(22) Potatoes were introduced into Ireland in the seventeenth century.
(42) Gold was discovered by the Sumerians.

which are analysed initially in the manner of (35), (43) and (44):

(35) Are-extinct((ιX) $(\forall y)$ [X(y) $\leftrightarrow$ Is-a-dinosaur(y)]).
(43) Were-introduced- ... ((ιX) $(\forall y)$ [X(y) $\leftrightarrow$ Is-a-potato(y)]).
(44) Were-discovered- ... ((ιX) $(\forall y)$ [X(y) $\leftrightarrow$ Is-gold(y)]).

Since it is not the individual dinosaurs that have become extinct, but the species as a whole (and similarly with (22) and (42)), there will be no first-order singular predicate of the form 'Is-extinct(x)' which can be attributed directly to individual dinosaurs. Of course, any characteristic of the species involves ultimately *something* happening to its individual members; but to express exactly what this something is will involve 'unpacking' the higher-order plural predicate in question in some way.

Translated into quantification over individuals, (2) says roughly that there used to be individual dinosaurs around, but there no longer are. There are several ways to represent this, depending on one's views concerning the semantics of tense and its interaction with the existential quantifier. One possibility is given in (45):

(45) PAST [$(\exists x)$ (Is-a-dinosaur(x))] & PRESENT [$(\neg \exists x)$ (Is-a-dinosaur(x))].

'PAST' and 'PRESENT', in (45), are to be understood as sentential operators, in the sense of Prior (1967). (45) reads 'In the past, it was the case that there were some dinosaurs and in the present, it is not the case that there are any more dinosaurs'. Alternatively, one might analyse (2) in terms of quantification over instants of time, but this option would involve a tensed existential quantifier, as in (46):

(46) $(\exists t)$ [t < now & $(\exists x)_t$ (Is-a-dinosaur(x))] & $(\neg \exists x_{now})$(Is-a-dinosaur(x)).

(46) reads 'There is a time t, before now, such that dinosaurs existed at t, and there are no more dinosaurs now'.

(42) says roughly that the first time anyone ever came across any gold, it

was the Sumerians. One way to represent this is in terms of quantification over events, as in (47):[15]

(47) (∃e)(∃x)(∃y)(∃t) [[Finding(e) & AGENT(x,e) & Is-a-Sumerian(x) & THEME(y,e) & Is-gold(y) & TIME(t,e)] & (¬∃e')(∃w)(∃z)(∃t') [Finding(e') & AGENT(w,e') & THEME(z,e') & Is-gold(z) & TIME(t',e') & t' < t]].

(47) reads 'There is an event e, such that e is a finding of gold by the Sumerians that took place at a certain time, and there was no prior such finding-event involving gold'. I am assuming that to discover the stuff, gold, is, at least roughly, to find individual instances of gold for the first time.[16]

(22) is somewhat more complicated. As a first gesture, we might paraphrase it in the following manner:

(48) (∃e)(∃x) [Bringing(e) & THEME(x,e) & Is-a-potato(x) & GOAL(Ireland,e) & TIME(seventeenth century,e)] & (¬∃e')(∃y)(∃t) [Bringing(e') & THEME(y,e') & Is-a-potato(y) & GOAL(Ireland,e') & TIME(t,e') & t < seventeenth century].

(48) says 'There was an event of bringing potatoes to Ireland which took place in the seventeenth century, and there was no such event of bringing potatoes to Ireland prior to this'. But it is questionable whether this paraphrase is adequate: if someone brought individual potatoes to Ireland and ate them the minute he crossed the border, he would not count as having introduced potatoes into Ireland. (22) is, in this respect, similar to (49) and (50):

(49) The potato is now well-established in Greenland.
(50) Long skirts became fashionable during the sixties.

(49) and (50) are best understood as speaking of a whole set of potato- or

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[15] I am here following a Davidsonian picture, according to which certain kinds of verbs have, in addition to their explicit argument positions, an extra position for events (cf. Davidson, 1967a; Higginbotham, 1985, 1989b; Schein, 1986, 1993; Parsons, 1980, 1985, 1990; Larson and Segal, 1995, ch. 12. Davidson himself would object to the thematic-role decomposition of the event-predicate: instead of '(∃e)(∃x)(∃y) [Finding(e) & AGENT(x,e) & THEME(y,e) & . . .]', he would have simply '(∃e)(∃x)(∃y) [Find(x,y,e) & . . .]' (cf., for example, his 'Reply to Castaneda on Agent and Patient' (Davidson, 1980, pp. 125ff.)). However, the details of the event analysis need not concern us at the moment; moreover, nothing in the present context hinges on accepting the Davidsonian framework.

[16] If there is a use of 'discover', according to which we can discover individual instances of gold (and perhaps discover the kind gold *by* discovering individual instances of it), so much the better. We might then make the logical form of (47) less complex by leaving 'discover' untouched, i.e. not replacing it by 'find'.

skirt-related customs or practices.[17] Similarly, introducing potatoes into Ireland also involves more than just a one-time occurrence of bringing some potatoes over the border. However, it is not clear whether information of this sort should properly be placed into the logical form of (22). Compare, for instance, a sentence like (51):

(51) Columbus discovered America in 1492.

One might consider the use of 'discover' in (51) to be inappropriate, because America was already inhabited when Columbus arrived. But how much of this is part of the semantics of the verb 'discover'? Similarly, to state precisely what it takes for the potato to be introduced into Ireland would involve a whole wealth of transient facts, which may more properly fall within the domain of cultural anthropology, history or sociology, rather than that of semantic theory.

Given the paraphrases in (46), (47) and (48), we can now relate the initial uniform analyses of the D-generic sentences in (2), (22) and (42), which involve higher-order plural predication, back to first-order quantifications over individuals, in the following manner (the predicates in (52)–(54) are simplified to include only the information directly relevant to the purpose at hand):

(52) Are-extinct(X)—PAST [($\exists$x) (X(x))] & PRESENT [($\neg\exists$x) (X(x))].
(53) Are-introduced(X)—($\exists$e)($\exists$x) [Bringing(e) & THEME(x,e) & X(x) . . .].
(54) Are-discovered(X)—($\exists$e)($\exists$x) [[Finding(e) & THEME(x,e) & X(x) . . .]].

Just as in the case of I-generics, spelling out what it means for a higher-order plural predicate to obtain leads us again back to individuals and their characteristics. However, the difference between I-generics and D-generics re-emerges at this second level of analysis. In the case of D-generics, the required 'unpacking' relation yields, not generically quantified statements, but existential quantifications over events, times, places, individuals, and the like.

The Davidsonian paraphrases just offered might seem to raise the following difficulty. Once 'unpacked', D-generics become ordinary existentially quantified sentences, with no obvious place for a generic operator or, for that matter, any other special feature indicating genericity. As far as the

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[17] It may well be that pragmatics has a role to play in filling in the contents of the customs and practices that are said to have become well established and fashionable in (49) and (50). Given that the dominant use of skirts is not, for instance, to frame them and hang them on our walls, it would be unlikely that a speaker was using (50) to convey this; rather, the most commonsensical interpretation of what is meant by (50) is that it became fashionable to *wear* skirts and well-established to *eat/plant/cook*/etc. potatoes, since this is what people normally do with them. Possibly, there is a similar pragmatic element at work in (22).

above paraphrases are concerned, a D-generic sentence like (22), repeated here,

(22) Potatoes were introduced into Ireland in the seventeenth century.

looks not very different from an ordinary non-generic action sentence such as (55):

(55) Aunt Louise made her first apple pie the night before her wedding.

Both sentences report a more or less significant 'first' occurrence; the fact that (22) seems to concern a whole species of vegetable, while (55) is about a particular pie, is nowhere reflected in the Davidsonian paraphrase assigned to (22).

However, what distinguishes an ordinary action sentence like (55) from a D-generic sentence like (22) is that (55) never went through a uniform first level of analysis involving higher-order predication: such an analysis would be inappropriate for (55), since it does not exhibit the characteristically 'all-inclusive' manner of speaking which is the mark of a generic sentence. Thus, the first uniform level of analysis has two important roles to play: it serves to bring out what both groups of generic sentences have in common, and what distinguishes generic sentences from all other sentences. The subsequent level of analysis, on the other hand, emphasizes what is distinct about I-generics and D-generics, respectively.

This section has illustrated at least roughly how to analyse some sample sentences involving NP-oriented genericity, while taking seriously the intuition that characteristics of the kind supervene on characteristics of their individual instances. And while the resulting structures are more complex than those produced by the Subject/Predicate Analysis, they avoid both ontological commitment to kinds and the systematic semantic ambiguity posited by the Non-Uniform Analysis (the subject NP plays the role of a predicate throughout). Moreover, as we will see in the next section, when the analyses offered above are assigned their proper place within a theory of meaning, their complexity should no longer be considered worrisome.

3.4 Semantic Theory and Logical Form

I have so far not been very explicit about the *nature* of the relation that holds between the higher-order plural predications of the uniform analysis and the first-order quantifications over individuals proposed by the subsequent level of analysis. Particularly given the complexity of the structures assigned to D-generic sentences and the kind of information they include, one might wonder whether both levels of analysis are properly viewed as part of the *logical form* of a generic sentence. Let me address this concern with a few

brief remarks concerning the general character of logical form (LF) as a level of linguistic representation.[18]

LF is commonly thought to be that level of linguistic representation at which all *grammatical* structure relevant to semantic interpretation is made explicit. That is, LF represents the contributions of *grammar* to meaning. Of course, not all aspects of meaning are contributed by the grammar. For instance, the meaning of indexical expressions, such as 'this', 'I', 'here' and 'now', are to be determined in large part by the context of the utterance, not the syntactic structure of the sentence in which they occur. Which elements of meaning are in fact contributed by the grammar is highly controversial. Among the semantic operations that are widely held to make their way into LF representations, the following are prominent: relative quantifier scope, the scope of negation, modality, opacity, pronoun binding, variable binding, presupposition and adverbial modification. One of the tasks of LF, for instance, is to disambiguate sentences that admit of different readings. But the ambiguities of meaning dealt with at LF are then, in effect, viewed as *syntactic* ambiguities and are disambiguated *grammatically*.

If some aspects of meaning are contributed by the grammar and some are not, we would expect a theory of meaning for natural language to reflect this distinction in some manner. According to one attractive conception, due to James Higginbotham, a theory of meaning has the following two components: a purely *combinatorial* or *structural* component and a *lexical* component.[19] The first yields nothing more than the *logical skeleton* of the language. In a truth-conditional framework, knowing the logical skeleton of a sentence would consist in knowing the disquotational facts about it; that is, knowing what the predicates, singular terms, logical connectives and other expression-types are and how they are combined to form the sentence. This is the situation we are in with respect to *part* of the following example, taken from Lewis Carroll's *Through the Looking Glass* (only *part* of it, because we already know both the lexical meaning of 'all', 'were' and 'the', and how they combine with other expressions to form sentences):

(56) All mimsy were the borogroves.

It is made clear by the context that the structure of (56) is like that of (57):

(57) The plates were all broken.

only inverted, as in (58):

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[18] These remarks concerning the general character of LF are based mostly on May, 1985, especially ch. 1, and Hornstein, 1995.

[19] The following is based mostly on Higginbotham, 1989a; the examples are his. For more discussion on related matters, see also Higginbotham, 1985, 1989b, 1993. The idea of a 'two-level' semantics itself, however, goes back at least to Davidson's distinction between 'analysis' and 'logical form' (cf. Davidson, 1967b).

(58) All broken were the plates.

Given that the structure of (56) is like that of (58), we already know a good deal about (56). Without knowing the lexical meaning of 'mimsy' and 'borogroves', we know, for example, that 'mimsy' is an adjective and that it is applied to the denotation of 'the borogroves'. Because we understand the mechanism of predication, we know that 'The borogroves are mimsy' is true just in case the borogroves are mimsy.

But a competent speaker knows much more about his language than merely its logical skeleton. In addition, the speaker also possesses *lexical* knowledge. This component can be usefully expressed in terms of what Higginbotham calls '*elucidations of meaning*'. For example, the lexical meaning of the verb 'cut', as it used in a sentence like (59):

(59) I cut the fish.

might be elucidated roughly along the following lines:

(60) 'cut' is a verb that applies truly to events e, involving a patient y, and an agent x who, by means of some instrument z, effects in e a linear separation in the material integrity of y.

(60) spells out the thematic structure of 'cut', i.e. which argument places need to be filled and how these arguments participate in the overall event specified by the verb.

Given this background, I suggest that we view the second level of analysis proposed above in a similar light.[20] 'Unpacking' generic sentences to reveal what they say about individual instances and their characteristics is surely appropriate at some level, as a reflection of what a competent speaker of English knows and can infer from such sentences, but not as a first level of analysis. As stated above, a first level of analysis ought to represent only the logical skeleton of a sentence, those aspects of meaning that are contributed by the syntactic structure and are derivable from its surface grammar via rule applications of the same general character as those found in 'overt' syntax. Therefore, the paraphrases presented above should be viewed as similar in nature to the elucidation of the meaning of 'cut', in (60): they reflect part of the *lexical* knowledge a speaker possesses concerning verbs

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[20]   I intend these remarks to apply particularly to the Davidsonian paraphrases of D-generics proposed in section 3.3. In the case of I-generics, 'unpacking' the higher-order plural predicate reveals a common component of meaning, viz. the presence of the generic operator 'GEN'. To view this information as lexical in nature would be to miss an important generalization. However, given that there is as yet no general consensus concerning the nature of lexical knowledge, I will simply leave this question open here. For some interesting discussion, see, for example, Pustejovsky, 1995, 1998; Marconi, 1997; Fodor and Lepore, 1998.

like 'discover', 'introduce', and 'be extinct', and are, for this reason, not represented as part of the logical form of the sentence.[21]

4. *Conclusion*

In concluding, let me briefly summarize what I have attempted to establish in this paper. In response to the difficulties with the Subject/Predicate, the Relational and the Non-Uniform Analyses, I propose a novel treatment of genericity which proceeds via different levels of analysis. The first level represents only those elements of meaning that are contributed by the grammar, while subsequent levels incorporate some of the lexical knowledge a competent speaker possesses. Following the Boolos/Higginbotham/Schein treatment of plurals, I propose that every generic sentence (D-generics and I-generics alike) should be analysed as involving higher-order plural predication. On this account, 'gold' now plays the same semantic role in the D-generic (42) and the I-generic (61):

(42) Gold was discovered by the Sumerians.
(61) Gold is valuable.

namely that of a concept, in Frege's sense of the term, satisfied by all and only instances of gold.

But a uniform treatment utilizing higher-order predication is appropriate only as a first level of analysis. For when we ask what it takes for a higher-order plural predication to obtain, the answer will surely lead us back to individuals and their characteristics. However, this last step is, in my view, best thought of as bringing out part of the lexical meaning of the predicates involved.

This proposal avoids all of the objections raised against the Non-Uniform Analysis: first, given Boolos's nominalist interpretation of second-order logic, it avoids ontological commitment to kinds or other plural objects; second, given its uniform character, it gets by without positing a systematic semantic ambiguity governing all NPs; third, this in turn allows for a more attractive treatment of 'mixed' sentences. Moreover, the analysis offered here is also methodologically satisfying, in that it accounts for what D-generics and I-generics, respectively, have in common and what distinguishes them from

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[21]   Given the powerful arguments brought forth by Fodor and Lepore (cf., for example, Fodor, 1970, 1987; Fodor, 1998, ch. 4; Fodor and Lepore, 1992; Fodor and Lepore, forthcoming), there are good reasons not to view elucidations of meaning as providing a kind of lexical decomposition. However, for present purposes, it is not necessary to commit ourselves to a particular view concerning lexical knowledge (cf. fn. 20, for more references); the important distinction for now is simply that between two levels of analysis, one which concerns information encoded in the logical form and another which introduces *additional* semantic information possessed by competent speakers.

all other sentences. Finally, the logical form assigned to them is derivable from the surface grammar in a straightforward, non-ad-hoc fashion.

I hope that the proposal advanced here is also of wider interest outside the specific issues raised by generic sentences, in that it may be taken to suggest a more general picture of how semantic analysis ought to proceed. In particular, the idea of different levels of analysis, with particular sensitivity towards such issues as ontological commitment and the positing of unnecessary ambiguities, ought to be applicable elsewhere in semantic theory. The current proposal also suggests a potentially fruitful connection with psychological issues concerning knowledge of language; for it claims that different kinds of knowledge (lexical knowledge versus knowledge of those aspects of meaning that are contributed by the grammar alone) come in at different points within the derivation of a sentence. It would be of great interest to verify this claim against research in language processing and other areas of cognitive science.[22]

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[22] One important issue which was not addressed in this paper is the interesting selectional differences among the different kinds of noun-phrases that can occur in generic sentences. For example, consider the contrast between (a) and (b):

    (a) A potato contains vitamin C.
    (b) *A potato was introduced into Ireland in the seventeenth century.

As (b) indicates, indefinite noun-phrases cannot occur in D-generic sentences; they can, on the other hand, occur very naturally in I-generic sentences, as illustrated in (a). What explains this contrast? According to my analysis, all generic sentences (D-generics and I-generics alike) have the same initial structure, and differences between the different kinds of noun-phrases that can occur in a generic sentence do not surface until later. Therefore, selectional differences, such as those illustrated in (a) and (b), cannot be explained at the first level of analysis; they must be accounted for by appeal to the selectional requirements of the particular *first-order* predicates involved. I must leave this issue for a future study.

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