

The illusion of kind predication¹

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Abstract. Predicates such as *are extinct* or *are widespread* have long been assumed to apply only to kinds. I present evidence that the predicates typically described as kind-level are *numerous*-type collective predicates, based on their interaction with *all* and their failure to exhibit homogeneity effects. This undermines the principal semantic motivation for analysing their bare plural arguments as kind-denoting. Instead, I argue that their arguments are type *e* expressions and that plural kind predication is just plural predication. I give a compositional semantics for bare plurals and explain differences between bare and definite plurals in terms of the situation argument that can restrict their domain.

Keywords: kind predication, plural reference, collective predication, homogeneity, genericity.

1. Introduction

In this paper, I argue against the received wisdom that bare plural arguments of kind-level predicates² refer to kinds in English sentences like (1) (Carlson, 1977; Krifka et al., 1995; Chierchia, 1998; Teichman, 2023; Cohen, 2020; Guerrini, 2026). They refer, instead, to pluralities.

- (1) a. Dodos are extinct.
b. Gender stereotypes are widespread.
c. Pick-up trucks come in three sizes.
d. Black rats reached Australia by ship.
e. Thomas Edison invented filament lightbulbs.

I argue, based on their interaction with *all* and their failure to exhibit homogeneity effects, that all kind-level predicates are *numerous*-type collective predicates (Winter, 2001). I support this with a conceptual argument about the meaning of kind-level predicates. I also argue that some kind-level predicates have lexical selection requirements, usually for biological taxa. Together, these points are sufficient to explain the apparently distinctive behaviour of kind-level predicates, so no ontological commitment to kinds is warranted. Kind predication – at least in the case of bare plural arguments – is merely an illusion, brought on by the fact that a small number of kind-level predicates select for biological taxa.

I begin with a survey of the empirical facts about kind-level predicates and introduce three approaches to the semantics of bare plurals. In §3, I consider and reject two explicit arguments in favour of the view that bare plurals refer to kinds. In §4, I show that kind-level predicates pattern with *numerous*-type collective predicates and use this observation to explain why it is

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²Throughout, I use the familiar terms ‘kind-level predicate’ and ‘kind predication’ as labels, rather than descriptions.

odd to ask whether an individual can be an exception to a kind predication sentence. In §5 I give a compositional semantics for bare plurals in which they refer to pluralities by means of the type-shifting operation *iota*. In the final two sections, I address the nature of taxonomic or sub-kind readings and then respond to an argument by Krifka (2003) that kind-level predicates must take individual concepts as their arguments.

2. Kind predication

2.1. Kind-level predicates

The predicates that have been described as kind-level in the literature are heterogeneous (see Table 1).³ They are typically described as ‘kind-level’ because of an intuition that, unlike individual-level predicates – which combine with bare plurals felicitously in characterising sentences – they cannot be true of individuals.

Dodos are extinct	Domestic dogs evolved from wolves
Boot-cut trousers are popular	Thomas Edison invented filament lightbulbs
Pick-up trucks come in three sizes	Right-wing subreddits are numerous
Gender stereotypes are widespread	Chillis were introduced into India by the Portuguese
Black rats reached Australia by ship	Woolly mammoths disappeared 5000 years ago

Table 1: Examples of kind-level predicates

The most distinctive semantic feature that these sentences share is that the question of non-maximality – whether some object could be an exception to the predication – is at best awkward and at worst ill-formed. For example, a person asking whether some individual domestic dog could be an exception to *Domestic dogs evolved from wolves* seems not to have understood the meaning of the sentence. In contrast, with a habitual predicate, as in *Domestic dogs bark*, it is clear what an exception would be: a domestic dog that never barks.

Bare plural generics with habitual or individual-level predicates have long been known to exhibit homogeneity effects (e.g. Löbner, 2000; Križ, 2015; Guerrini, 2026):

- (2) a. Dogs are intelligent.
 ≈ (Almost) all dogs are intelligent.⁴
- b. Dogs are not intelligent.
 ≈ (Almost) no dogs are intelligent.
- (3) a. LLMs utilise deep learning.
 ≈ (Almost) all LLMs utilise deep learning.
- b. LLMs don’t utilise deep learning.
 ≈ (Almost) no LLMs utilise deep learning.

³The examples in Table 1 are based on a survey of the literature, including Carlson (1977), Krifka et al. (1995), Chierchia (1998), Heim (2011).

⁴*Almost* reflects the availability of non-maximal readings of these sentences.

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A novel empirical observation is that bare plurals with kind-level predicates do not exhibit homogeneity. This is related to the point concerning non-maximality, since homogeneity and non-maximality are closely related (Križ, 2015).

- (4) a. Dodos are extinct.
 ≠ (Almost) all dodos are extinct.
- b. Dodos are not extinct.
 ≠ (Almost) no dodos are extinct.
- (5) a. Pick-up trucks come in three sizes.
 ≠ (Almost) all pick-up trucks come in three sizes.
- b. Pick-up trucks do not come in three sizes.
 ≠ (Almost) no pick-up trucks come in three sizes.
- (6) a. Black rats reached Australia by ship.
 ≠ (Almost) all black rats reached Australia by ship.
- b. Black rats did not reach Australia by ship.
 ≠ (Almost) no black rats reached Australia by ship.
- (7) a. Thomas Edison invented filament lightbulbs.
 ≠ Thomas Edison invented (almost) all filament lightbulbs.
- b. Thomas Edison did not invent filament lightbulbs.
 ≠ Thomas Edison invented (almost) no filament lightbulbs

Some kind-level predicates are quite restrictive in their arguments; *extinct* and *evolved* are awkward with highly modified bare plurals (and are best with biological taxa, as above).

- (8) a. ??Grumpy school teachers are extinct.
- b. ??Cute cats evolved from lions.

Others, such as *numerous*, *popular* and *come in three sizes* don't obviously have anything to do with kinds and are acceptable with almost any bare plural argument. Predicates which describe a particular event, such as *disappeared...* or *reached...*, can also be acceptable in non-generic sentences:

- (9) a. The monkeys at London Zoo disappeared last week.
- b. Willem Janszoon reached Australia by ship.

The predicates in Table 1 all have it in common that they cannot get a kind-level reading with an indefinite singular NP:⁵

⁵I have not included two predicates that are sometimes described as kind-level, *rare* and *common*, because they are, unlike the examples discussed here, acceptable with indefinite singular NPs (see Krifka et al., 1995: 95-96):

- (i) A black diamond is rare.
- (ii) An unexpected error is common.

Krifka et al. argue that those predicates are second-order, taking properties as arguments, which explains why they are acceptable with (property-denoting) indefinite singulars.

- (10) a. #A dodo is extinct.
 b. #A gender stereotype is widespread.
 c. #A pick-up truck comes in three sizes. *acceptable only on a taxonomic reading*
 d. #A black rat reached Australia by ship. *acceptable only on an existential reading*
 e. #Thomas Edison invented a filament lightbulb.
acceptable only on a taxonomic reading

2.2. Arguments of kind-level predicates

According to the standard view, it follows from the assumption that kind-level predicates accept only kinds as arguments that all of the bare plurals above denote kinds, whereas indefinite singulars do not. How do bare plurals come to denote kinds? According to an influential theory by Chierchia (1998), bare plurals begin by denoting properties and come to denote intensional pluralities (sometimes called ‘individual concepts’, of semantic type $\langle s, e \rangle$) by means of an intensional type-shifting operation, $^{\cap}$ (*nom*) (see also Dayal, 2004). *nom* is an operation on properties, of type $\langle s, \langle e, t \rangle \rangle$:

$$\llbracket ^{\cap} P \rrbracket = \begin{cases} [\lambda s. \iota P_s], & \text{if } [\lambda s. \iota P_s] \text{ is in } K, \\ \text{undefined} & \text{otherwise} \end{cases}$$

where K is the domain of all kinds
and P_s is the extension of P in s .

Alternatively, following Carlson (1977), we could view bare plural count nouns as *names* of kinds, such as the kind DODO.

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| <p>(11) Chierchia</p> <p>a. $\llbracket [^{\cap} \text{dodos}] \rrbracket$ are extinct]</p> <p>b. $\llbracket \text{dodos} \rrbracket = \lambda s_s. \lambda x_e. \text{dodos}_s(x)$</p> <p>c. $\text{extinct}(\lambda s. \iota \text{dodos}_s)$</p> | <p>(12) Carlson</p> <p>a. $\llbracket [\text{dodos}] \rrbracket$ are extinct]</p> <p>b. $\llbracket \text{dodos} \rrbracket = \text{DODO}$</p> <p>c. $\text{extinct}(\text{DODO})$</p> |
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On Chierchia’s view, kinds have internal structure accessible to the semantics, whereas, according to Carlson (1977) and Teichman (2023), the referents of bare plurals are atomic. This is reflected in the semantics by positing a special semantic type for kinds, e^k , distinct from the semantic type of ordinary objects, e^o .

A third view is that bare plural arguments of kind-level predicates refer plurally, not to individual concepts, but directly to pluralities of type e (Moltmann, 2013); Moltmann claims that the bare plural in a sentence like (1a) refers to the plurality of all dodos in all possible worlds.⁶

Moltmann presents a range of arguments against a kind-reference theory of bare plurals, but here I will consider things from the other direction and address the *motivations* for a kind-reference theory. The standard view is that pluralities and ordinary individuals are not the right sort of thing to satisfy kind-level predicates: only kinds can do that. I will argue here that this

⁶Moltmann employs a plural metalanguage, using plural variables (such as xx) which take more than one value.

Argument	Type	Author	Example
Abstract Object	e^k	Carlson; Teichman	$\lambda x_{e^k}. \text{extinct}(x)$
Intension of Plurality	$\langle s, e \rangle$	Chierchia; Dayal; Guerrini	$\lambda d_{\langle s, e \rangle}. \text{extinct}(d)$
Plurality	e	Moltmann	$\lambda x x_e. \text{extinct}(xx)$

Table 2: Semantic types of bare plural arguments of kind-level predicates

standard view is mistaken. Kind-level predicates are collective predicates which can be satisfied by pluralities, so the motivation to view their arguments as referring to kinds is diminished. I will then propose an alternative plural reference account, which differs from Moltmann's in that it allows for the reference of bare plurals to be restricted.

3. Two arguments in favour of kind predication

This section examines two arguments that have been taken to support the view that bare plurals denote kinds. I show that neither argument succeeds.

3.1. The truth-conditional argument

The first argument concerns the truth-conditions of sentences with kind-level predicates.⁷

- (i) An ordinary individual such as a dodo cannot be extinct.
- (ii) The sentence *Dodos are extinct* is true.
- (iii) The argument of the predicate *are extinct* cannot refer to an ordinary individual.
- (C) It must, instead, refer to the sort of thing which can be extinct: a kind.

This argument relies on the intuition that ordinary individuals can't satisfy kind-level predicates. But it does not address the question of whether a plurality can satisfy a kind-level predicate. It is possible to make an analogous argument about collective predicates, to reach an ontological conclusion about the referents of plural terms:

- (i) An ordinary individual such as a child cannot gather.
- (ii) The sentence *The children gathered* is true (in some situations).
- (iii) The argument of the predicate *gathered* cannot refer to an ordinary individual.
- (C) It must, instead, refer to the sort of thing which can gather: a composite object or group.

But this argument does not warrant its ontological conclusion; it just tells us that some predicates can be satisfied by many things but cannot be satisfied by individuals. Which is, of course, just to say that *some predicates are collective*. It is an open question whether groups or composite objects are needed for the analysis of collective predicates (e.g. Landman, 1989), but this argument clearly does not settle the matter.

⁷For versions of this argument, see Carlson (1977), Wilkinson (1991), Teichman (2023), Liebesman and Sterken (2021). More often, it is assumed without being explicitly stated. For example, compatibility with *are extinct* is widely used as a diagnostic for kind-reference (e.g. Zamparelli, 2002).

3.2. The selection argument

The second argument focuses on the constraints that some kind-level predicates place on the bare plurals they can take as arguments (Chierchia, 1998; Collins, 2018). The selection argument relies on the observation that bare plurals are infelicitous with kind-level predicates when they fail to denote kinds.

(i) Some bare plurals are not felicitous with kind-level predicates. For example:

- (13) a. ??Bees with one wing evolved from wasps.
 b. ??Grumpy school teachers are extinct.
 c. ??Computers in the next room come in three sizes.

(ii) In these examples, the bare plurals intuitively do not refer to kinds.

(C) The infelicity of the examples in (13) can be explained by a restriction on the arguments of kind-level predicates: they must denote kinds.

3.2.1. Lexical selection restrictions

I will focus first on (13a) and (13b), both of which involve predicates which are usually reserved for biological taxa. It is not unusual for predicates to be quite selective in the arguments that they can combine with (Cohen, 1999). When they combine with arguments that are not of the right sort, judgments of infelicity are elicited as the sentences have the air of a category error:

- (14) a. ??The number two is blue.
 b. ??This rock is sad.
 c. ??Pat is eating classical extensional mereology.

Selection restrictions are, I argue, sufficient to explain the acceptability of the bare plurals in sentences like (13a) and (13b), so the selection argument cannot motivate an additional restriction to kinds. The problem with the selection argument is that it relies on the selection restrictions of a limited number of kind-level predicates, particularly those which intuitively apply only to biological taxa.⁸ If the kind-restriction were responsible for the unacceptability of (13a) and (13b), two predictions would follow. Both are false.

The first prediction is that the same bare plurals are not acceptable with other kind-level predicates. But that is false:

- (15) a. Bees with one wing are popular/widespread/come in three sizes.
 b. Grumpy school teachers are (un)popular/widespread/come in three sizes/first arrived in the British education system in the 1930s.

⁸This is probably too restrictive: languages can be extinct (Manfred Krifka p.c.), as can volcanoes and baronetcies or dukedoms. Similarly, we can say that languages evolved from others. (Intransitive *evolve* also seems to be less restrictive, as in *The situation is has evolved (since our last meeting).*)

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The second prediction is that all bare plurals which denote kinds are acceptable with *extinct* or *evolved*. Again, this is false, since the following bare plurals should denote bona fide kinds according to this theory:

- (16) a. ??Diamonds evolved from rocks.
- b. ??Black cabs are extinct.

Of course, the proponent of the selection argument will claim that predicates like *evolve* and *extinct*, in addition to requiring that their arguments denote kinds, have a selection restriction for biological taxa. That would explain, then, why (13a) and (13b) are acceptable, while (16a) and (16b) are not. The problem with this suggestion is that the kind-restriction is explanatorily redundant: the selection restrictions on certain kind-level predicates are sufficient to explain the distribution of acceptable arguments without any appeal to a further more general restriction on the arguments of kind-level predicates. The selection argument therefore fails to motivate the view that bare plural arguments of kind-level predicates must denote kinds.

3.2.2. Lack of temporal specificity

Returning to (13c), the same bare plurals that were infelicitous with *extinct* and *evolve* were acceptable with *come in three sizes* (see (15)). If those bare plurals don't refer to kinds, then the infelicity of (13c) can't be put down to the same factor, since the examples in (15) are perfectly acceptable with kind-level predicates. To explain the oddness of (13c), I rely on an observation from Carlson (1977: 318): the bare plural *computers in the next room* intuitively refers to a finite and specific plurality of objects. When a speaker has a specific plurality of objects in mind, a definite description is typically used to pick those objects out (i.e. *the computers in the next room*). What is odd about the bare plural in (13c) is that it suggests that the speaker does not intend to refer to a particular plurality of computers. The bare plural instead suggests that the speaker intends to refer not only to the computers currently located in that room, but to any computer that might come to be located in that room at another time. Without supporting context, that interpretation is deviant. But with an appropriate discourse context establishing a stable organising principle for the room, the sentence improves markedly:

- (17) Welcome to the Apple store. In this room you will find only our largest model of laptop, but computers in the next room come in three sizes.

This suggests that it is not the failure of the bare plural to denote a kind which explains the infelicity of (13c), but the fact that, without supporting context, it is difficult to interpret the sentence as describing an ongoing pattern or regularity. I return to the differences between bare plurals and plural definites in §5.

4. Semantic properties of kind-level predicates

So far, I have argued against two attempts to motivate the idea that kind-level predicates can only be satisfied by kinds. I now make a descriptive generalisation: the predicates that are described as kind-level pattern with *numerous-type* collective predicates. I then explain the strangeness

of the question of exceptions to kind-level predicates in terms of the meaning of *numerous*-type collective predicates.

4.1. The *gather-numerous* distinction

There is a puzzle as to why certain collective predicates are compatible with *all*, whereas others are not (Kroch, 1974; Dowty, 1987; Winter, 2001). For example:

- (18) a. (All) the students gathered in the hallway.
b. (#All) the students are numerous.

Collective predicates which are compatible with *all* are therefore known as *gather*-type (G-type) predicates; those which are not are known as *numerous*-type (N-type) predicates. One immediate caveat here is that N-type predicates may be compatible with *all* when it is possible to distribute the predicate over its argument. This happens when the argument of the predicate refers to a plurality of pluralities or groups, such as *armies* or *sets*, each of which satisfies the collective predicate as an individual (Kroch, 1974).

- (19) a. All the enemy armies are numerous.
b. $\approx$ Every enemy army is numerous.
(20) a. All the sets of axioms are inconsistent.
b. $\approx$ Every set of axioms is inconsistent.⁹

For N-type predicates: if a distributive reading is possible, as in (19), *all* forces a distributive reading, paraphrased with *every*; otherwise the sentence is unacceptable, as in (18b). For G-type predicates: adding *all* is not equivalent to the distributive reading, even when its argument is a plurality of groups. (21a) has a reading which is not equivalent to (21b) (Winter, 2001: 203):

- (21) a. All the committees met in Room C.
b. $\neq$ Every committee met in Room C.

(21b) can only report the actions of each individual committee (i.e. a series separate meetings), whereas (21a) has a reading which says that there was one large meeting of all the committees. So for G-type predicates, adding *all* is not equivalent to the distributive reading, since every committee could meet on its own, without it being true that all the committees met (together).

The *gather-numerous* opposition also corresponds to a difference in *homogeneity*. G-type predicates are (typically) homogenous, N-type predicates are non-homogenous (cf. Križ, 2015: 23; Amiraz, 2020). For example:

- (22) a. The girls gathered in the hall.
 $\approx$ (Almost) all the girls gathered in the hall.

⁹The observation that *are inconsistent* (on its external *with each other* reading) is N-type is due to Kuhn (2020).

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- b. The girls didn't gather in the hall.
≈ (Almost) none of the girls gathered in the hall.
- (23) a. The girls are numerous.
≈ (Almost) all the girls are numerous.
- b. The girls are not numerous.
≈ (Almost) none of the girls are numerous.

4.2. Kind-level predicates are N-type collective predicates

I now show that kind-level predicates pattern with N-type predicates in these tests. The most obvious example of a kind-level predicate which is also an N-type collective predicate is, of course, *are numerous*; I will demonstrate the facts using other examples to show that they hold more generally. First, kind-level predicates are incompatible with *all*, except on a taxonomic/sub-kind reading, equivalent to *all types of F are G*, analogous to the sub-group distributivity in (41b):¹⁰

- (24) a. All dinosaurs are extinct.
- b. *Can only mean*: Every species of dinosaur is extinct.
- (25) a. All pick-up trucks come in three sizes.
- b. *Can only mean*: Every model of pick-up truck comes in three sizes.
- (26) a. All black rats reached Australia by ship.
- b. *Can mean*: All kinds of black rat reached Australia by ship.
- c. *Can mean*: All individual black rats reached Australia by ship.¹¹
- (27) a. Thomas Edison invented all filament lightbulbs.
- b. *Can only mean*: Thomas Edison invented all kinds of filament lightbulb.

Second, kind-level predicates exhibit homogeneity failure. I showed this above in (4)-(7). So kind-level predicates pattern with N-type predicates with respect to *all*, distribution over sub-groups and homogeneity failure.

4.3. Exceptions (or lack thereof)

As discussed above, one of the distinctive features of kind-level predicates is that the question of whether an object could count as an exception seems either odd or ill-formed. This is, in part, what contributes to the intuition that their arguments refer to kinds. However, as Križ (2015) and Amiraz (2020) have observed, this same phenomenon arises for N-type collective predicates even when their arguments don't denote kinds. I will briefly consider here why the question of exceptions makes little sense for kind-level predicates.

¹⁰I return to the nature of taxonomic readings below.

¹¹The true distributive reading here is acceptable because this predicate has both a collective and a distributive achievement reading. What matters here is that *all* forces at a distributive reading.

There is an intuitive difference between stative predicates, like *extinct*, *numerous*, *widespread*, *abundant* or *scarce* and achievement predicates like *be invented*, *be introduced into...*, *reach...*¹² For the former, the question of whether some object is an exception seems ill-formed, whereas, for the latter, it merely seems strange.

4.3.1. States

Many kind-level adjectives denote states. Intuitively, these predicates measure their argument: *extinct* is sensitive to the existence of members of the plurality across time, *numerous* is sensitive to the total number of members and *widespread* is sensitive to the distribution of members across space.

I will assume, following Križ (2015), Amiraz (2020), and Kuhn (2020) that the failure of homogeneity in these cases is explained by the lexical semantics of these predicates (see also Dowty, 1987). They express “emergent” properties of a plurality or group taken as a whole (Kuhn, 2020: 227). By virtue of their meaning, these properties need not distribute down to any sub-pluralities among their arguments (in the terms of Champollion (2015), they do not have “stratified reference”). As a result, a plurality either has the property or it does not; it does not make sense to consider cases in which an individual fails to satisfy the property on its own. This explains both the ill-formedness of the question of exceptions and their failure to exhibit homogeneity effects, since the predicate applies to its argument as a whole, not to its members.

4.3.2. Collective achievements

Whether the same applies to collective achievement kind-level predicates is less clear. On the one hand, there is a sense in which an individual black rat could be an exception to (1d): by failing to arrive in Australia by ship. On the other, there is a sense in which the sentence is not intended to communicate that *all* black rats arrived in Australia by ship.

I will treat these examples as cases of ‘team credit’. Importantly, the same phenomenon arises for collective achievement predicates unrelated to kinds, where most of the members of the argument of the predicate did not participate in the achievement. For example:

- (28) a. The Republicans voted the proposal through.
- b. The soldiers surrendered.
- c. The Americans reached the moon first.
- d. The Rothschild family established a banking house in Paris in 1912 (Krifka, 2003).

In each case, the plurality or group holds the achievement on behalf of its members. It would be a mistake to aim for a general analysis of the relationship between the parts and the whole which would explain under what conditions a collective achievement predicate may be true of a plurality or group; instead the relationship seems to be driven by pragmatic considerations. For example, in (28a), for the Republicans to have voted for the proposal is for some sufficiently

¹²The categories of state and achievement relate to the lexical aspect of the predicate and are properties of the eventualities that the predicate describes (Vendler, 1957). The observation that collective achievement predicates are incompatible with *all* is due to Taub (1989), following the discussion in Dowty (1987).

large proportion of Republicans to have voted for the proposal, where what counts as sufficient might depend on the voting system. But it seems like a confusion to ask whether any particular Republican is an exception to the achievement. So, in (1d), the property of reaching Australia by ship can be held by black rats in general, on behalf of the particular black rats that made a sea voyage.

According to the lexical semantics of these predicates, a plurality satisfies the predicate iff some (sufficiently large) plurality of its members does. This does not allow for a ‘middle case’ or a gap, which explains why homogeneity fails here. And since the plurality satisfies the predicate in virtue of only some of its members doing so, it is strange to ask of some individual whether they are an exception. Because this phenomenon arises for the sentences in (28), which do not involve kind predication, we can conclude that there is an explanation for the team credit interpretation of (1d) which does not involve reference to kinds.

5. Type-shifting bare plurals

The previous section showed that kind-level predicates pattern with N-type collective predicates and explained this fact in terms of the meaning of the predicates. I now give a compositional semantics for bare plurals in English, based on the type-shifting operation *iota*, which shifts a property of type $\langle s, \langle e, t \rangle \rangle$ into a plurality of type e .

5.1. *iota* vs *nom*

The standard picture, from Chierchia (1998), is that bare plurals can be type-shifted by *nom*, to refer to kinds, of type $\langle s, e \rangle$. But *nom* is not the only possible type-shifting operation. *nom* is an intensional version of ι (*iota*), which is thought to be (roughly) the meaning of the English definite article, ‘the’ (Partee, 1986):

$$\llbracket \iota P \rrbracket = \begin{cases} \iota P_{s^*} & \text{if there are } Ps \text{ in } s^* \\ \text{undefined} & \text{otherwise} \end{cases} \quad \text{where } s^* \text{ is a contextually salient situation}$$

Here, s^* is a (free) situation variable; the difference between *nom* and *iota* is that in the former the situation variable is bound, whereas in the latter it is free. Of course, since type-shifting by *iota* would make bare plurals identical in meaning to definite plurals, if we are to maintain this line of argument, we need to explain why kind-level predicates are not acceptable (on the intended reading) with plural definites:

- (29)
- a. #The dodos are extinct.
 - b. #The gender stereotypes are widespread.
 - c. #The pick-up trucks come in three sizes.
 - d. #The black rats reached Australia by ship.
 - e. #Thomas Edison invented the filament lightbulbs.

To explain this difference, I will assume that when an NP is type-shifted by *iota*, the situation variable will always take the broadest possible value in the context of utterance. This follows from the observation by Heim (2011) that English bare plurals differ from definite plurals in that bare plurals are felicitous in cases where the speaker intends to refer to the plurality of all instances of the NP in existence, even when the predicate is not kind-level. For example:

- (30) a. Cats number over 500 million.
b. #The cats number over 500 million.

In this example, a bare plural is acceptable with the interpretation ‘the cats that exist in the universe’, whereas the definite plural is not (unless that plurality has been introduced in prior discourse). My proposal is that we should take this observation seriously for all bare plural arguments of kind-level predicates: a bare plural *NPs* type-shifted by *iota* refers to the maximal plurality of *NPs* in the global domain of discourse (see also Guerrini and Spector, 2025). On the view I endorse, then, there is no ontological distinction between maximal pluralities and kinds (Heim, 2011: 1008): there are only maximal pluralities. We can then revise the definition of *iota* so that it can only be restricted in a global way:

$$\llbracket {}^tP \rrbracket = \begin{cases} [\iota P_{s^*}], & \text{if there are } Ps \text{ in } s^* \\ \text{undefined} & \text{otherwise} \end{cases}$$

where s^* is the global domain of discourse

This gives us the following analysis of a simple example:

- (31) a. $\llbracket {}^t\text{dodos} \rrbracket$ are extinct]
b. $\text{extinct}(\iota\text{dodos}_{s^*})$

5.2. Possibilities for implicit domain restriction

I noted above that the use of a bare plural rather than a plural definite suggests that a speaker does not intend to refer to a plurality of objects which are located at a particular location in space and time. We now have an explanation for this: a definite description can easily pick up an implicit restriction to a specific point in time, but a bare plural will resist this restriction. So when a bare plural is used it will suggest that the speaker intends to refer to objects within a longer stretch of time, which is why it is not typically acceptable to refer to a specific plurality of objects using a bare plural, when a plural definite can be used to do so.

When the topic of discourse concerns biological species, it is likely that the domain of discourse will involve a very long stretch of time. The use of predicates like *extinct* or *evolved* will trigger a very broad domain, such as an entire world (worlds being very large situations), so that every dodo at any time is referred to by the type-shifted bare plural in (31a).

By default, it seems plausible that the situation argument of an *iota*-shifted property will take a world as its value. But if the situation argument takes the global domain of discourse as its value,

it follows that by explicitly setting the domain of discourse, it should be possible to restrict the domain of the bare plural, contra Moltmann (2013). Here is some evidence that this is indeed the case:

- (32) A: Let's talk about the UK. What do you like and dislike about it?
 B: I like that boot-cut trousers are popular and I dislike that red squirrels are at risk of extinction.

B's response intuitively only refers to boot-cut trousers and red squirrels in the UK. I take it that the response is true, even though red squirrels – taken as a whole species – are not at risk of extinction, because red squirrels *in the UK* are at risk of extinction.

5.3. The Blocking Principle

The standard assumption, following Chierchia (1998), is that *iota* is not available as a type-shifting operation in languages with a definite article, such as English. This is justified by a general principle: *Don't do covertly what you can do overtly!* More precisely:

Blocking Principle (Chierchia, 1998)

For any type-shifting operation τ and any X:

$\# \tau(X)$ if there is a determiner D such that for any X in its domain: $D(X) = \tau(X)$.

The idea is that the type-shifter *nom* is allowed in English because the definite determiner 'the' lacks this intensional meaning, whereas it is blocked in Romance languages which have a definite determiner that encodes *nom* and this explains why those languages allow for generic readings of definite plurals, but not bare plurals.

The current proposal therefore needs to explain why, in English, *iota* is available as a type-shifting operation and, relatedly, why plural definites cannot (always) get a generic reading. Let's briefly consider some of the differences in meaning between the two expressions. It is straightforward for overt definite descriptions to be implicitly restricted, unlike bare plurals:

- (33) *Context.* A reporter is reporting a particular incident of some kangaroos arriving in Australia from a foreign zoo.
 a. The kangaroos reached Australia by ship. *restricted to mentioned kangaroos*
 b. #Kangaroos reached Australia by ship. *no restricted reading*
- (34) *Context.* Two friends are standing in front of a cage which contains two tigers.
 a. The tigers have stripes. *restricted to visible tigers*
 b. #Tigers have stripes. *no restricted reading*

So the two expressions are clearly not interchangeable. An explanation for this difference falls out of the suggestion here that *iota* differs from 'the' in the ways that its domain can be implicitly restricted. If definite plurals can be implicitly contextually restricted, whereas bare plurals cannot, the use of a definite plural will signal to a hearer that a speaker intends to refer to objects within some contextually salient restricted domain; otherwise, they would have used a bare

plural, since its range of possible uses is narrower than a definite plural. This also suggests that *iota* and ‘the’ are not identical in meaning in the way that Chierchia (1998) supposes. More precisely, there are X for which $\llbracket \text{the } X \rrbracket \neq \llbracket 'X \rrbracket$, since *iota* is defined only for a subset of the situations for which ‘the’ is defined. The Blocking Principle is therefore not violated.

Evidence in favour of this pragmatic explanation for the lack of a generic reading of definite plurals comes from the fact that when bare plurals are ruled out for syntactic reasons, the two expressions do not compete and a definite plural can be interpreted generically (i.e. with a completely unrestricted domain):

- (35) a. The poor are numerous/unfortunate.
b. # Poor are numerous/unfortunate.

6. Singular kinds

Recall from (24)-(27) that some bare plurals behave like group-denoting nouns when they are embedded under *all*. In those cases, *all* forced a distributive taxonomic reading, so *All dinosaurs are extinct* can only mean *Every species of dinosaur is extinct*, just as *All the armies are numerous* can only mean *Every one of the armies is numerous*. The explanation for this that I will pursue here is that some count nouns have kinds or species in their extension, just as *army* has armies (not soldiers) in its extension.¹³ This is because *all* forces a distributive reading over entities which can bear the property; in the case of kind-level predicates, kinds are such entities.

Some evidence in favour of this ambiguity is that when a noun has a sense that can be clearly divided into sub-kinds, it is straightforward to refer to or quantify over sub-kinds in this way (Dayal, 2004):

- (36) I am studying a species of cat and a species of dog for my thesis. The cat is endangered.
(37) a. Every mammal has mammalian glands. $\approx$
b. Every kind of mammal has mammalian glands.
(38) a. The crustaceans evolved simultaneously. $\approx$
b. The different kinds of crustacean evolved at the same time.

But when no sub-kinds are available, it is, as expected, impossible to quantify over them:

- (39) a. ??All Nintendo 64s built in 1998 are numerous.
b. ??Every grumpy school teacher first arrived in the British education system in the 1930s. *only distributive reading available*
c. ??The eastern miner bees evolved simultaneously.

¹³I follow Barker (1992) and Schwarzschild (1996) in assuming that the extensions of singular count group nouns contain only mereological atoms.

The fact, then, that some plurals with adnominal *all* pattern with group-denoting nouns motivates an ambiguity theory, where nouns either refer to ordinary objects or to (atomic/singular) kinds. Not all NPs have singular kinds in their extension, which explains why the sentences in (39) have no acceptable reading.

Importantly though, following a line similar to Dayal, the referents of bare plurals are not the same as the singular kinds referred to by singular count nouns, since the referents of bare plurals are pluralities while singular kinds are mereological atoms. The latter can be thought of as abstract objects such as species or taxa and can serve as the referents of definite singulars with kind-level predicates, e.g. *the dodo is extinct*. The more restricted distribution of generic readings of definite singulars than bare plurals (Krifka et al., 1995; Dayal, 2004) can then be put down to the fact that bare plurals refer to pluralities of ordinary objects and definite singulars refer to kinds. Since it is not the case that for every plurality there is a corresponding kind, the distribution of definite singulars should be more restricted than bare plurals.

The fact that singular kind predication is possible is, in part, responsible for the intuition that bare plural arguments of kind-level predicates refer to kinds. Liebesman and Magidor (2025: 274), for example, take the truth of (40a) in situation in which there is a Yukon Gold on the table as evidence that the bare plural in (40b) refers to a kind.¹⁴

- (40) a. One kind of potato on the table was first cultivated in Canada: the Yukon Gold.
b. Yukon Gold potatoes were first cultivated in Canada.

But the fact that the singular kind YUKON GOLD bears the property of being first cultivated in Canada does not rule out that the plurality of Yukon Golds also (collectively) bears this property (and that the two are distinct). Consider, for comparison, the way in which the soldiers that make up an army might collectively bear the same properties as the army that they constitute.

- (41) a. The soldiers surrendered. (42) a. The soldiers are prepared for war.
b. The army surrendered. b. The army is prepared for war.

It may be true that the army has many of the properties that it has in virtue of the properties of its soldiers (and vice versa), but this is no argument that the two are identical. I believe that equivalences of this kind have contributed to the illusion of kind predication, since the idea that there are collective objects which bear many of the properties of their members can trick us into thinking that there is no ontological distinction between the two (see especially Carlson, 1977: 101-104). The reality of singular kind predication is what makes the illusion of kind predication with bare plurals so convincing.

7. Are individual concepts needed?

The question remains: how different is the proposal made here from the Chierchia-Dayal theory, according to which bare plurals denote individual concepts? After all, on neither approach do

¹⁴In fact, Liebesman and Magidor are quite concessive here and acknowledge that their analysis is consistent with a plural reference theory (2025: 275 n. 9). However, they do not acknowledge the differences between singular kinds and pluralities, so the evidence they use to motivate their kind-reference theory is flawed.

we need to posit a new sort of object (a kind) to explain the meaning of bare plurals.

First, Chierchia's implementation of *nom* presupposes a primitive notion of kindhood, used to determine whether the type-shifting operation is defined for a bare plural. Given that this notion is an undefined primitive, a theory that can explain the data without it is better. Second, unlike my *e*-type proposal, the Chierchia-Dayal approach is committed to a widespread and unmotivated type-ambiguity for predicates like *are numerous*, *are popular*, *disappeared...*, *reached...* and any other predicate which can be satisfied either by pluralities (type *e*) or individual concepts (type $\langle s, e \rangle$).

These considerations are not conclusive. It could turn out that we do need individual concepts to explain the meaning of kind-level predicates after all. Here I will consider an explicit argument in favour of this conclusion from Krifka (2003). He suggests that there is an analogy between sentences with kind-level predicates like *are extinct* and examples like (43b), which Montague (1973) argued show that individual concepts ($\langle s, e \rangle$) are needed:

- (43) a. The temperature is ninety.
 b. The temperature is rising.
 c. $\Rightarrow$ Ninety is rising.

The idea is that the verb *rise* measures the value of *the temperature* at multiple indices (in this case, times), so its argument must be a function from indices to values. Applying this idea to *are extinct*, we would say that the predicate checks the extension of *dodos* at various times. The predicate is true of an individual concept *d* at a time *t* iff the extension of *d* is non-empty at some time $t' < t$ and is empty at *t* (and, possibly, empty at all times t'' , where $t < t''$).

There is nothing objectionable about this analysis. The question is whether it is *required*. Consider the alternative analysis in (31b): this is true at a time *t* iff at some time $t' < t$ there is some *x* among the dodos in s^* and there is no *x* among the dodos in s^* at *t* (and, possibly, there is no *x* among the dodos in s^* at all times t'' , where $t < t''$). The case that distinguishes these analyses is one in which there is an object which is a dodo at some time $t' < t$ and exists at *t* but is no longer a dodo at *t*. On the analysis proposed in (31b), the sentence is false in that situation, since an object which is among the plurality of dodos in s^* exists at *t* (even though it is not a dodo at *t*). On Krifka's alternative, the sentence is true in that situation, since there are no dodos at *t*.

It is hard to say what our semantic theory should predict here because it is hard to conceive of an object which was a dodo at one time but subsequently ceased to be one. This is complicated by the fact that *are extinct* is restrictive in its arguments, so it is not generally felicitous with bare plurals which do not denote pluralities that form a biological species – see (8). Intuitions about the truth of the sentence in this situation therefore do not represent a robust test case for the theory.

Another test would be to try and force substitution failures like in (43). Since $\cap \llbracket \text{dodos} \rrbracket \neq [\lambda s. \llbracket \text{the large flightless birds that Dutch colonists first encountered in the 16th Century} \rrbracket_s]$, the following substitution should fail:

- (44) a. Dodos are extinct.

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- b. Dodos are the large flightless birds that Dutch colonists first encountered in the 16th Century.
- c. $\Rightarrow$ The large flightless birds that Dutch colonists first encountered in the 16th Century are extinct.

But this inference is intuitively valid, unlike in (43). Similarly, although $\cap$ [[woolly mammoths]] $\neq$ [λs .[[Jack's favourite animals]]_s], the following argument is valid:

- (45)
- a. Woolly mammoths disappeared 5000 years ago.
 - b. Woolly mammoths are Jack's favourite animals.
 - c. $\Rightarrow$ Jack's favourite animals disappeared 5000 years ago.

This suggests that the arguments of kind-level predicates are not individual concepts but pluralities, which explains why substitution of extensional equivalents is truth-preserving.

8. Conclusion

I have argued that the class of predicates typically described as 'kind-level' is a subset of the collective predicates, on the basis of evidence concerning their interaction with *all* and their failure to exhibit homogeneity effects. As a result, the fact that they are felicitous with bare plural arguments does not show that bare plurals refer to kinds. Instead, bare plural arguments of kind-level predicates should be analysed as plural referring expressions, of type *e*. I showed how to derive this compositionally, using the type-shifting operation *iota* and explained the differences between English bare plurals and plural definites in terms of the situation argument that can restrict their domain. To sum up in a slogan: *Plural kind predication is plural predication*.

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