English bare plurals and distributivity

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1. Introduction

When bare plurals occur in sentences featuring predicates of kinds, as in (1), they are usually analyzed as denoting a kind, i.e. a function from worlds to plural individuals (Carlson 1997, Krifka *et al.*, 1995). At a given world, the plural individual denotes the maximal sum of individuals belonging to the kind (as in, e.g., Chierchia, 1998).[1]

(1) a. Dodos are extinct.
b. $[\![\text{dodos}]\!] = \lambda w.\iota X.\forall y.y \leq X \rightarrow [\textsc{atom}(y) \wedge dodo'(y)(w)] = {}^{\cap}dodo'$
c. $[\![\text{Dodos are extinct}]\!] = extinct'({}^{\cap}dodo')$

In the case of predicates of individuals, instead, it is usually assumed that bare plurals provide a restriction for the generic quantifier, as in the analyses in (2-a) and (2-b). The generic quantifier is usually viewed as a silent, modalized quantificational adverb with a meaning akin to 'generally' (cf. Lewis 1975, Krifka *et al.*, 1995).

(2) Lions have a mane.
a. $\textsc{gen}_{x,w}[x \leq_w {}^{\cap}lions][have\text{-}a\text{-}mane(x)(w)]$ Chierchia (1998), Dayal (2004), a.o.
b. $\textsc{gen}_{x,w}[lion'(x)(w)][have\text{-}a\text{-}mane(x)(w)]$ Diesing (1992), Krifka (2003), a.o.

In this respect, the standard treatment of bare plurals differs strikingly from the standard treatment of definite plurals. Indeed, on the one hand, predicates of pluralities are captured in a way entirely akin to (1-c), as shown in (3).

(3) $[\![\text{The students are numerous}]\!] = numerous'(\iota\ student')$

However, predicates of individuals are usually taken to directly distribute over members of the plurality, via a distributivity operator as in (4).

(4) a. $DIST(P_{\langle e,t\rangle}) = \lambda X.\forall x(\textsc{atom}(x) \wedge x \leq X) \rightarrow P(x)$ Roberts, 1987

In this note, I propose that since kinds are plural entities, it is possible to distribute predicates over them via $DIST$. I briefly illustrate how this offers a new perspective over three puzzles in the interpretation of English bare plurals.

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[1] Here and throughout, I assume that the world argument can be saturated contextually, so that the bare plural can alternatively denote objects of type $\langle s, e\rangle$ or, when the world argument is saturated, of type $\langle e\rangle$

2. Puzzle 1: flavors of genericity

It has long been noticed that English singular indefinites have a more restricted distribution than bare plurals – and the same holds for Italian singular indefinites and plural definites.

(5) a. # A madrigal is popular. (ACCIDENTAL)
b. A madrigal is polyphonic. (LAW-LIKE)

(6) a. Madrigals are popular. (ACCIDENTAL)
b. Madrigals are polyphonic. (LAW-LIKE)

There is no consensus analysis of this contrast, which is puzzling on classical views, as (5-a) and (6-a) were thought to have the same LF involving GEN. Krifka *et al.* (1995) raised the possibility that (6-a) is felicitous because it involves kind predication ((7)), and not generic quantification ((8)).[2]

(7) $popular(^{\cap}madrigals)$ (cf. Carlson, 1977)

(8) $\text{GEN}_x[madrigal(x)][popular(x)]$

Cohen (2001) argues against this: clear direct kind predication with bare plurals resists modification by Q-adverbs (cf. (9)), unlike characterizing sentences (cf. (10)). Since GEN is a silent Q-adverb, this appears to suggest that it is absent in kind predication, but present in (6-a).

(9) *Lions are usually extinct.

(10) Madrigals are usually popular.

Others have argued against Krifka *et al.*'s idea by invoking the behavior of bare plurals with respect to binding: (11-a) does not mean that the cat kind likes the cat kind, as in (11-b) (Chierchia, 1998 a.o.).

(11) a. Cats like themselves.
b. $like(^{\cap}cats, ^{\cap}cats)$

Subsequently, two families of views developed. A good representative of 'ambiguity' theories is Cohen (2001), who proposes that bare plural generics are ambiguous between a 'rule' reading and a probabilistic reading, while singular indefinite generics can only refer to rules. Greenberg (2004) is a good representative of 'one meaning' theories: accordingly, bare plural generics unambiguously involve GEN, just like singular indefinites. However, bare plurals induce a more 'tolerant' accessibility relation for GEN than singular indefinites.

I combine insights from these theories. In the spirit of Cohen, I propose that definite plural generics are ambiguous between an LF yielding law-like readings and one that results in accidental readings. With Cohen and Greenberg, I take the LF giving rise to the law-like reading to involve GEN. Crucially however, in the spirit of Krifka *et al.* and *contra* Greenberg and Cohen, I take the accidental reading of definite plurals to be the result of kind predication, which is mediated via a distributive operator. I here leave aside the details of the compositional implementation, which is compatible with various approaches to generic quantification (cf. Guerrini, forthcoming for a worked out account).The central point is that the essential flavor is contributed by a parse in which the bare plural is interpreted inside the restriction of the generic quantifier. The accidental flavor, instead, is contributed by a parse in which the predicate is distributed over *actual* members of the kind.

(12) a. **Law-like flavor:**
$\text{GEN}_x[x \leq {}^{\cap}madrigals][polyphonic(x)]$
b. **accidental flavor:**
$[DIST[\lambda x.popular(x)]]({}^{\cap}madrigals) = \forall x.\big(\text{ATOM}(x) \wedge x \leq {}^{\cap}madrigals\big) \rightarrow popular(x)$

Now we can explain the difference between bare plurals and singular indefinites. In the (12-a), the NP is in the restriction of GEN, whose modality results in the law-like reading. In (12-b) reading, we have quantification over *actual* lions; whence the accidental reading. As is standard, *DIST* is weaker than a

[2] For simplicity, I will henceforth leave out world variables.

universal quantification such as the one expressed by *each*. Rather, it is the source of homogeneity and non-maximality when combining with definites (Schwarzschild, 1996; Križ, 2016; Križ and Spector, 2021).

What about the singular indefinite? It cannot denote a kind, since notice that it cannot provide an argument for kind predication:

(13) *A lion is extinct.

The singular indefinite can thus provide a property for the restriction of GEN (cf. (14a)) or scope out and get an existential reading (cf. (14b)). This derives the contrast: the singular indefinite only has a parse with GEN, and not the parse with *DIST* that gives rise to the accidental flavor.

(14) a. $\text{GEN}_x[x \leq {}^{\cap}madrigals][polyphonic(x)]$
b. $\exists x.madrigal(x) \wedge polyphonic(x)$

3. Puzzle 2: cumulative generics

It has been long known that referential plurals support weaker-than-distributive readings. Sentence (15) is true in a situation in which each girl greeted only one of the boys and each of the boys was greeted by at least one girl.

(15) The girls greeted the boys.

These are usually accounted for via the insertion of a cumulativity operator, ** (Beck & Sauerland, 2000).

(16) $** = \lambda P_{e,\langle e,t\rangle}.\lambda y.\lambda x.\forall x'.x' \leq x.\exists y'.y' \leq y P(x,y) \wedge \forall y'.y' \leq y \exists x'.x' \leq x.P(x,y)$

Singular Indefinite generics cannot receive cumulative readings, as shown in (17).

(17) #An elephant lives in Africa and in Asia.

This makes sense under (18): an individual typical elephant doesn't live both in Africa and in Asia.

(18) $\text{GEN}_{s,x}[elephant_s(x) \wedge C(x,s)][lives\text{-}in_s(Africa,x) \wedge lives\text{-}in_s(Asia,x)]$

However, cumulative readings are possible with Bare Plurals in English (cf. Nickel, 2008).

(19) Elephants live in Africa and in Asia.

(20) Gli elefanti vivono in Africa e in Asia.
The elephants live in Africa & in Asia.
'Elephants live in Africa and in Asia'

If bare plural generics receive the same interpretation as singular indefinite generics, we incorrectly predict them to behave similarly. However, we can reason as in the previous section: bare plurals, unlike singular indefinites, can denote a plural entity. So we expect ** to apply to them, and not to singular indefinites.[3]

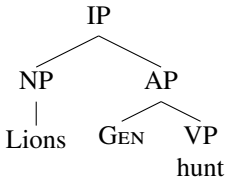
(21) ${}^{\cap}elephant[Asia \oplus Africa[** [\lambda y.\lambda x.live\text{-}in(x,y)]]] =$
$\forall x\big(\text{ATOM}(x) \wedge x \leq {}^{\cap}elephant\big) \rightarrow \big(\exists y.\text{ATOM}(y) \wedge y \leq Asia \oplus Africa \wedge live\text{-}in(x,y)\big) \wedge$
$\forall y\big(\text{ATOM}(y) \wedge y \leq Asia \oplus Africa\big) \rightarrow \big(\exists x.\text{ATOM}(x) \wedge x \leq {}^{\cap}elephant \wedge live\text{-}in(x,y)\big)$

4. Puzzle 3: Episodic universal bare plurals

On a standard picture of bare plurals like Chierchia (1998), the near-universal force of bare plurals is provided by the generic quantifier, and the generic quantifier is provided by the habitual aspect of the verb, as in (22) below.

[3] Though see Kirkpatrick (2022) for a proposal on how to accommodate cumulative readings within GEN.

(22)



When aspect does not provide generic quantification, Chierchia assumes that a type-shifter with existential force applies:

(23) a. $DKP = \lambda P.\lambda X.\exists y.y \leq X \wedge P(y)$
b. $[\![\text{Bears are destroying my garden}]\!] = DKP[\lambda x.destroying(x)](^{\cap}bears) = \exists x.x \leq {}^{\cap}bears \wedge destroying(x)$

On this picture, we would expect bare plurals to be systematically interpreted existentially with non-habitual verbs. However, bare plurals can receive universal readings in episodic contexts, as in Condoravdi's (1994) examples:

(24) a. Bears are hibernating.

This is puzzling. Now, notice that the singular indefinite 'a bear' can only be interpreted existentially in a sentence like (24).

(25) A bear is hibernating.

If we can distribute predicates over kind, we predict the felicity of (24) with a universal reading.

(26) $[\![\text{Bears are hibernating}]\!] = [DIST[\lambda x.hibernating(x)]](^{\cap}bears)$

Moreover, we predict the infelicity of a universal reading in (25), since the singular indefinite cannot denote a kind.[4]

5. Conclusion

In this note, I have made the simple argument that since bare plural denote kinds, and kinds are plural entities, we should be able to extent to them the distributive operator already used in the treatment of definite plurals. I briefly illustrated how this provides a new perspective on three long-standing puzzles in the interpretation of English bare plurals.

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[4] This of course leaves open the issue of explaining why episodic bare plurals display an existential/universal alternation, unlike definite plurals, an issue which I don't have the ambition to resolve here.

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