REFERENCE TO SINGULAR KINDS IN GERMANIC AND ROMANCE*

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The need for the definite article to express a singular kind (*the cat*) in the Germanic languages is predicted by Borer's (2005) structural approach to the mass-count distinction. Chierchia's (1998) "down" operator can apply to *n*Ps to derive mass kinds (*rice*) and to DivPs to derive plural kinds (*cats*), but there is no determinerless structure that exclusively denotes properties of atomic individuals to which this same operator can apply to derive singular kinds. The only alternative is the process that Chierchia proposes for plural kinds in Romance, where the definite article returns a maximal individual that can be intensionalized into a kind. In articleless languages like Mandarin, this account allows for a universal property-denoting denotation of *n*P and simultaneously captures the fact that singular kinds have the same distribution as mass kinds.

1. Introduction

Recent work in Distributed Morphology posits that roots are not individuated by phonological or semantic features but instead by an abstract system of indices (Acquaviva 2009, Pfau 2009, Harley 2014). This approach to syntax raises new questions regarding the analysis of mass versus count denotation: if there are no "mass" or "count" roots, there must be a different source of the syntactic and semantic properties that are often attributed to this distinction. In English, for example, the quantifier *much* can only combine with mass (uses of) nouns, as shown by the contrast between *much rock* and **much rocks*, while the quantifier *many* can only combine with plural (uses of) nouns, as shown by the contrast between *many rocks* versus **many rock*. The fact that the same root can occur in both environments suggests that its interpretation is due to the structure in which it appears rather than to an inherent property of the root.

Within lexical decomposition frameworks, one method of deriving the mass-count distinction is through different configurations of functional heads in the extended projection of a nominalized root. For instance, Borer (2005) asserts that count properties result from the presence of a "divider" in the syntax, which is realized by number morphology in Germanic and Romance. Accordingly, *much rock* and *many rocks* have the structures in (1), where the projection of DivP in (1b) is responsible for the count behaviour of *rocks*.

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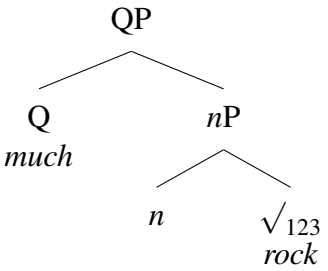
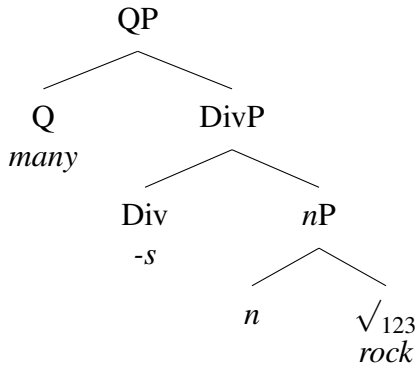
(1) a.



b.



In such a system, one can argue that *many* as a vocabulary item is more specified than *much* in that it is sensitive to the presence of DivP in the structure. The essential point for the discussion that follows is that (1a) represents a "mass" configuration and that (1b) represents a "count" configuration.

Another syntactic difference that has been attributed to the mass-count distinction is the need for the definite article when referring to kinds in the Germanic languages. In English, *rice* corresponds to a root that is conventionally used in mass configurations, and *cat* corresponds to a root that is conventionally used in count configurations. Although *rice* and *cat* in (2) both lack plural inflection and occur as arguments of the kind-selecting predicate *be domesticated*, *rice* rejects the definite article, whereas *cat* requires it.

(2) a. (*The) rice is domesticated. b. *(The) cat is domesticated.

Semantic accounts of this contrast generally assume that there is a lexical difference between mass and count nouns, a view that is irreconcilable with the notion that roots do not have semantic features. Granted, one could resort to a privative feature like [COUNT] or a binary feature like [±MASS] on the nominalizing head to derive mass versus count behaviour, but such an approach would eliminate Borer's (2005) insight that count properties are due to a divider in the structure. Moreover, not all languages with article systems exhibit the syntactic contrast in (2). In the majority of Romance languages, including French, the equivalent of *rice* and *cat* both need the definite article to refer to the kind (Laca 1990, Chierchia 1998, Dobrovie-Sorin and Laca 2003).

(3) a. *(Le) riz est domestiqué.
the rice is domesticated
'Rice is domesticated.'

b. *(Le) chat est domestiqué.
the cat is domesticated
'The cat is domesticated.'

A question that continues to be debated in the literature on Romance is whether *le* 'the' lexicalizes the same semantic operator in (3a) and (3b).

In this paper, I claim that Chierchia's (1998) "down" operator (∩) generates a kind without divisions when it applies to *n*Ps and that it generates a kind with divisions when it applies to DivPs. There is, however, no structure that denotes properties of atoms to

the exclusion of their sums to which $^{\cap}$ can apply to generate a singular kind, and so an alternative process is necessary. I propose that the iota operator (ι), which is lexicalized by the definite article in Germanic, is used to derive a maximal entity that can then be intensionalized by the cap operator ($\hat{}$), resulting in a singular kind. There are, in principle, other possibilities given that structure above DivP is required for singularity in Germanic, all of which is realized by overt morphology. Nevertheless, only $\hat{}\iota$ strikes the balance between structural complexity and meaning preservation.

The remainder of this paper is organized as follows. In section 2, I motivate a uniform denotation of *n*Ps as property-denoting expressions, and in section 3, I present the distinction between properties of unindividuated entities and properties of their divisions. In section 4, I argue that exclusively singular denotation is contingent upon a subset of indefinite determiners, and in section 5, I show that definite determiners give rise to a systematic ambiguity between mass and count interpretation due to the semantics of maximality that they encode. In section 6, I maintain that $\hat{}\iota$ is needed to establish singular kinds in Germanic because there is no structure that can be converted by $^{\cap}$ to this same end. I then consider the implications of the proposal for articleless languages like Mandarin before concluding in section 7.

2. Properties versus kinds

An ongoing debate in the semantics of nouns is whether *n*P has a uniform denotation across languages. I start by reviewing some of the key arguments that *n*Ps denote properties, at least in Germanic and Romance, setting the stage for the discussion of properties of entities versus properties of their divisions in section 3.

According to Chierchia's (1998) Nominal Mapping Parameter, which assumes that the mass-count distinction is lexical, Germanic and Romance languages differ in the following way: in Germanic, *n*Ps can be arguments or predicates, but in Romance, *n*Ps can only be predicates. The flexible semantics of *n*Ps in Germanic is intended to capture the distinct behaviour of uninflected, or nonpluralized, "mass" and "count" nouns when they occur as arguments, such as the objects in (4).

(4) a. I saw rice. b. #I saw cat.

In the Germanic languages, Chierchia deems mass nouns to be kind-denoting, or type e, expressions and count nouns to be property-denoting, or type $\langle e,\ t\rangle$, expressions. The issue is that *rice* in (4a) does not refer to the kind but instead to some quantity of rice in the discourse context. To address this problem, Chierchia (1998: 364) posits that the covert operation in (5), which is known as Derived Kind Predication, introduces existential force.[1]

(5) If P applies to objects and k denotes a kind, then
$P(k) = \exists x\,[^{\cup}k(x) \wedge P(x)]$

[1]See Chierchia 1998: 350–351 and Dayal 2011: 1095 for the definitions of the "up" ($^{\cup}$) and "down" ($^{\cap}$) operators and further discussion.

Derived Kind Predication freely applies to give rise to existential readings of determiner-less mass and plural nouns in Germanic. However, this type-shifter is not the only covert operation that is needed to account for the distribution and possible interpretations of nominal arguments in this family. Mass nouns readily appear with the definite article, as in *I saw the rice*, which is unexpected if they denote kinds in Germanic. Assuming that the definite article solely combines with property-denoting expressions, the semantic type of *rice* as a kind-denoting expression must be covertly raised by $\cup$ before functional application can take place (Dayal 2011). Considering that at least two covert operations are required to capture the behaviour of mass nouns in Germanic, it is worth exploring a different approach to their semantics.

It turns out that one can maintain a uniform property-denoting semantics of *n*Ps in Germanic, as Chierchia (1998) proposes for Romance, without increasing the number of covert operations. Concretely, *n*Ps can be covertly shifted by $\cap$ to derive kinds and by a rule of existential closure to derive existential readings, and they can be overtly shifted by ι to derive individuals. With respect to the operators $\cap$ and ι, the English examples in (6) indicate that only ι is lexicalized in this language.

(6) a. Rice is domesticated. (Kind) b. The rice was cold. (Individual)

The picture is less clear in German since *Reis* 'rice' can be introduced by the definite article even as the argument of a kind-selecting predicate (Krifka et al. 1995, Krifka 2003).

(7) a. (Der) Reis ist domestiziert.
the rice is domesticated
'Rice is domesticated.' (Kind)

b. Der Reis war kalt.
the rice was cold
'The rice was cold.' (Individual)

In light of such data, Dayal (2004) suggests that both $\cap$ and ι are lexicalized by the definite article in German, yet its optionality in (7a) does not follow from Chierchia's (1998) Blocking Principle, which states that a language cannot use a covert type-shifter in place of a corresponding overt determiner. To explain this optionality, Dayal posits that the Blocking Principle only applies to canonical uses of determiners and that it is ι rather than $\cap$ that represents the canonical use of the definite article. Consequently, the article is necessary in the case of individual reference, as in (7b), but not in that of kind reference, as in (7a). Interestingly, and of particular relevance to the topic of this paper, the definite article cannot be omitted with uninflected nouns when the intended reading is count (Dayal 2004).

(8) *(Die) Katze ist domestiziert.
the cat is domesticated
'The cat is domesticated.'

The contrast between *(der) Reis* 'rice' in (7a) and **(die) Katze* 'the cat' in (8) raises the possibility that there is more than one path to kind reference in Germanic. In the remaining sections, I argue that this analysis is correct because there is no structure that exclusively denotes properties of atomic individuals to which $\cap$ can apply.

3. Properties of entities and properties of their divisions

Building on the approach in Jambrović (to appear) regarding Spanish, I claim that *n*Ps denote properties of unindividuated entities in both Germanic and Romance, as shown with the English noun *rice* and the French noun *riz* 'rice' in (9).

(9) a. 

b. $[\![\text{rice/riz}]\!] = \lambda x_e \,.\, \texttt{Rice}(x)$

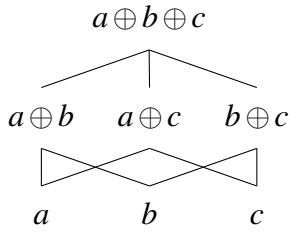
In English, *n*Ps can be covertly lowered to type e by $\cap$ to derive mass kinds, or kinds without divisions. In French, on the other hand, a covert type-shift is not possible, and the question is whether the definite article that is needed for kind reference lexicalizes $\cap$ or only ι, the latter of which can be intensionalized to the same effect as $\cap$. I return to this issue in section 6, though my analysis of singular kinds does not hinge on resolving it.

In Germanic and Romance, number morphology performs the role of Borer's (2005) divider. Inspired by authors who employ Carlson's (1977, 1980) realization formula $\mathrm{R}(x,\, y)$ in their accounts of number, I argue that DivP converts properties of unindividuated entities into properties of their divisions by means of $\textsc{div}(x,\, y)$, which states that x is a division of y.[2] This operation is a component of the proposed semantic value of Div in (10).[3]

(10) $[\![\text{Div}]\!] = \lambda P_{\langle e,\, t\rangle} \,.\, \lambda x_e \,.\, \exists y_e \,.\, [P(y) \wedge \textsc{div}(x,\, y)]$

In prose, Div takes a property-denoting expression and returns a function that maps every entity x to the truth value 1 if and only if there exists an entity y that has the property in question and x is a division of y.

The outcome of division can be illustrated by a complete join semilattice, as in (11), which is commonly used to represent pluralities (Link 1983, Krifka 1989, Landman 1989).

(11) 

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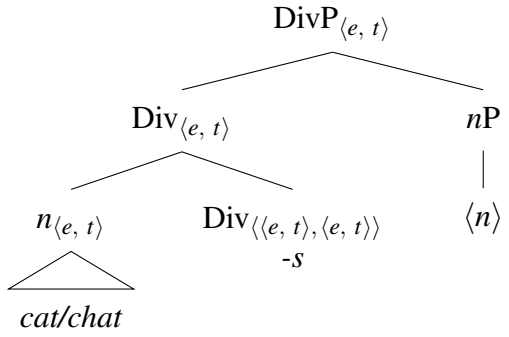
[2]For Déprez (2005), number converts kinds into properties of their realizations, and for Borik and Espinal (2012, 2015), number converts properties of kinds into properties of their realizations.

[3]In the literature on pronouns, ϕ-features like number are often modeled as presupposition triggers. I remain agnostic about the viability of a unified approach to number in all nominal expressions but note that the lexical entry in (10) could be amended as follows: $\lambda P_{\langle e,\, t\rangle} \,.\, \lambda x_e \,:\, \exists y_e \,.\, [P(y) \wedge \textsc{div}(x,\, y)] \,.\, P(x)$.

In this case, the divisions of an entity consist of the atoms *a*, *b*, and *c* and the possible sums of these atoms. It should be mentioned that Borer (2005: 120) distinguishes between divisions and atoms based on examples like *Pat built houses all summer*, which allows for a reading where Pat did not complete any one house. However, it seems that the atelic nature of the predicate plays a role in making this interpretation available, as it is far more difficult to access in a sentence like *Pat saw houses in the distance*. In this paper, I adopt the view that DivP establishes atoms and leave the analysis of bare plurals in atelic environments to future investigation.

According to the proposed treatment of plural morphology, the English noun *cats* and the French noun *chats* 'cats' have the interpretable structure and semantic value in (12), where I assume that head movement takes place in the syntax and that DivP inherits the semantic type of the complex head.

(12) a.



b. $[\![\text{cats/chats}]\!] = \lambda x_e \,.\, \exists y_e \,.\, [\texttt{Cat}(y) \wedge \textsc{div}(x, y)]$

The extension of DivP can be represented as $\{a,\ b,\ c,\ a \oplus b,\ a \oplus c,\ b \oplus c,\ a \oplus b \oplus c, ...\}$, or the algebraic closure of $\{a,\ b,\ c, ...\}$. As with *n*Ps, DivPs can be covertly shifted by $^{\cap}$ in English, resulting in plural kinds, or kinds with divisions. In French, the definite article is required for kind reference, raising the same possibility as with mass kinds that French lacks $^{\cap}$. Where I depart from previous work that invokes Carlson's realization operator in the semantics of number morphology is that I do not differentiate between singularity and plurality at the level of DivP, hence the absence of features on Div. To do so would overlook the generalization that exclusively singular denotation is contingent upon an indefinite determiner, which is the focus of the next section.

4. Indefinite determiners and singularity

Only a select few indefinite determiners in Germanic and Romance give rise to exclusively singular readings of nouns. It is telling that when these determiners combine with nouns that are typically used in mass configurations, the interpretation is either that of the universal packager ("amount of") or the universal sorter ("type of"), as these effects are often described (Bunt 1985, Jackendoff 1991, Landman 1991). Such facts are shown with the Swedish noun *ris* 'rice' in (13) and the Spanish noun *arroz* 'rice' in (14).

(13) a. varje ris
every rice
'every amount/type of rice'

b. ett ris
one/a rice
'one/a(n) amount/type of rice'

(14) a. cada arroz
every rice
'every amount/type of rice'

b. un arroz
one/a rice
'one/a(n) amount/type of rice'

In work on Spanish, I have argued that such determiners impose a cardinality of one on the DivP that they select (Jambrović to appear). Placing the burden of singularity entirely on the determiner system is possible in an approach to number where the extension of DivP includes atoms as well as their sums.

Slightly adapting Scontras's (2022: 1173) treatment of "one-ness", this presupposition can be formalized as $\forall x_e \in P(|x| = 1)$, or only the individuals x in the extension of predicate P that have a cardinality of one. In (15), I add this presupposition to the standard lexical entries for *every* and *a*.

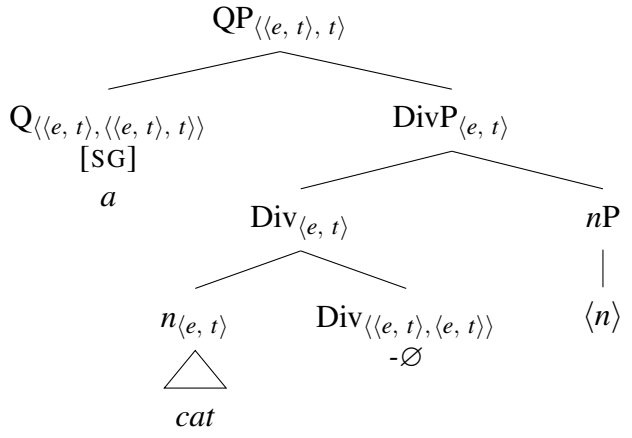
(15) a. $[\![\text{every}]\!] = \lambda P_{\langle e,\, t\rangle} : \forall x_e \in P(|x| = 1) \,.\, \lambda Q_{\langle e,\, t\rangle} \,.\, \forall x_e \,.\, [P(x) \rightarrow Q(x)]$

b. $[\![\text{a}]\!] = \lambda P_{\langle e,\, t\rangle} : \forall x_e \in P(|x| = 1) \,.\, \lambda Q_{\langle e,\, t\rangle} \,.\, \exists x_e \,.\, [P(x) \wedge Q(x)]$

The "amount of" and "type of" readings in (13) and (14) result from the need to accommodate the lack of canonical atoms in the extension of the plural noun *rices*. The next step is to address the absence of plural morphology in expressions like *every rice* (**every rices*) and *every cat* (**every cats*).

I claim that the presupposition of singularity corresponds to a [SG] feature on the relevant functional heads, such as Numeral for *one* and Q for *every* and *a*, and that the presence of this feature conditions the null realization of Div in Germanic and Romance.[4]

(16) a.



[4]See Ortmann (2000) and Borer (2005) for facts from a typologically diverse set of languages where indefinite determiners and plural marking are in complementary distribution.

b. $[\![\text{a cat-}\varnothing]\!] = \lambda P_{\langle e,\, t\rangle} \,.\, \exists x_e \,.\, [\exists y_e \,.\, [\texttt{Cat}(y) \wedge \textsc{div}(x,\, y)] \wedge P(x)]$,
defined only if x has a cardinality of one

That is, *a cat* is a function that maps every property-denoting expression P to the truth value 1 if and only if there exists an entity x for which there is an entity y that has the property Cat, x is a division of y, and x has property P. Furthermore, this function is defined only if x has a cardinality of one. To summarize the proposal, the uninflected form of the noun in expressions like *a cat* is merely a reflex, and not the source, of the singularity that is presupposed by certain determiners. After all, *cat* has the same form in a sentence like *I saw cat on the street* where there is no presupposition of singularity.

As it turns out, indefinite determiners are the sole path to exclusive singularity in Germanic and Romance. In the next section, I show that definite uninflected nouns like *the cat* are ambiguous between mass and count denotation, which I attribute to the maximality operator that is a component of definite determiners.

5. Definite determiners and maximality

A fundamental difference between indefinite and definite determiners is that no definite determiner imposes a count reading on an uninflected noun (Jambrović to appear). The Dutch and Italian examples in (17) and (18) indicate that the definite article, demonstratives, and possessive determiners are equally compatible with *rijst/riso* 'rice' and *kat/gatto* 'cat'.

(17) a. de rijst/kat
the rice/cat
'the rice/cat'

b. deze rijst/kat
this rice/cat
'this rice/cat'

c. mijn rijst/kat
my rice/cat
'my rice/cat'

(18) a. il riso/gatto
the rice/cat
'the rice/cat'

b. questo riso/gatto
this rice/cat
'this rice/cat'

c. il mio riso/gatto
the my rice/cat
'my rice/cat'

In the previous section, I claimed that indefinite determiners such as *every* and *a* presuppose a cardinality of one on the DivP that they combine with. Definite determiners introduce a presupposition a well, but one of a distinct nature.

Since Sharvy (1980), the definite article has been argued to encode maximality, and this analysis can be extended to demonstratives, possessive determiners, and even pronouns.[5] Although a definite description like *the cat* is most often used to refer to an atomic individual, it can also refer to a totality of unindividuated "stuff", as illustrated in (19).

[5]See Postal (1966) and Elbourne (2005, 2013) for the view that pronouns are definite determiners whose covert *n*P complement is overt in constructions like *we/you linguists*.

(19) What should we do about the cat on the street? No one else is going to clean it up.

It is a gruesome but essential fact about the definite article that it does not impose a reading where the cat substance in (19) comes from the same cat, only that the speaker is referring to the totality of this substance in the discourse context. On the other hand, the indefinite expression *a cat* does convey that a single cat is involved, even in an environment that favours a mass interpretation such as that in (20).[6]

(20) If you see a cat on the street, you should clean it up.

This observation supports my claim in section 4 that the indefinite article that is responsible for singularity, not the uninflected form of the noun.

Maximalities are like superlatives in that there can be at most one, but this "one" is not necessarily atomic, as evidenced by the ability of *the cat* to denote a whole cat as well as a totality of cat substance in a given context. As defined by Heim (2011: 998) in (21), maximality (MAX) is part of both the presupposed and asserted content of the definite article, where a maximalized property-denoting expression is a function that maps every entity x to the truth value 1 if and only if x has the property in question and there exists no entity y such that y has the same property and x is a proper part of y ($x < y$).[7]

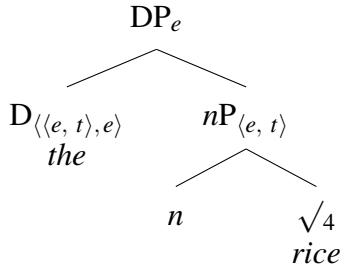
(21) a. $[\![\text{the}]\!] = \lambda P_{\langle e,\, t\rangle} : \exists x_e \,.\, \forall y_e \,.\, [\textsc{max}(P)(y) \leftrightarrow x = y] \,.\, \iota x_e \,.\, \textsc{max}(P)(x)$

b. $\textsc{max}(P) := \lambda x_e \,.\, [P(x) \wedge \neg\exists y_e \,.\, [P(y) \wedge x < y]]$

In other words, the definite article first checks that there exists a unique maximal entity that has property P and then returns that entity. As $\cap$ is semantically equivalent to $\hat{}\iota$, it follows that maximality is a factor in establishing reference to kinds as well.

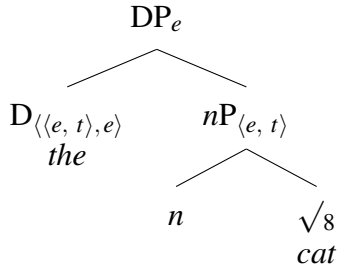
To account for the flexibility of definite uninflected nouns with respect to the mass-count distinction, I propose that they uniformly lack DivP. As such, the sole difference between *the rice* in (22) and *the cat* in (23) is the root that is nominalized.

(22) a.



b. $[\![\text{the rice}]\!] = \iota x_e \,.\, \textsc{max}(\texttt{Rice})(x)$

(23) a.



b. $[\![\text{the cat}]\!] = \iota x_e \,.\, \textsc{max}(\texttt{Cat})(x)$

[6] I thank Guillaume Thomas for this point about the indefinite article.

[7] For reasons of space, I abstract away from the issue of domain restriction.

As for the inability of *the cat* to denote a maximal sum of cats in a given context, I argue that this restriction is due to the lack of DivP in (23a), which is needed to establish sums.

My approach to definite uninflected nouns differs radically from that of Borik and Espinal (2012, 2015), who consider *n*Ps to denote properties of kinds, an intensional notion, rather than properties of entities, an extensional notion. For these authors, definite nouns like *el gato* 'the cat' have the structure in (24a) when they denote kinds and the structure in (24b) when they denote individuals, where NumP (DivP) is responsible for converting properties of kinds into properties of their realizations (Borik and Espinal 2015: 189).

(24) a. $[_{DP}\ D\ [_{NP}\ N]]$ Kind
b. $[_{DP}\ D\ [_{NumP}\ Num_{[-PL]}\ [_{NP}\ N]]]$ Individual object

The issue with the proposal in (24) is that Borik and Espinal ascribe the kind versus individual reading of a definite noun like *el arroz* 'the rice' to the same structural difference. However, there is no evidence to suggest that *el arroz* expresses individuation when it refers to a maximal amount of rice, unlike *un arroz* 'a rice'. By including NumP in the structure of all individual-denoting definite uninflected nouns, their account does not capture the systematic ambiguity of such expressions in terms of mass versus count denotation. Like Borik and Espinal, I assert that all individual-denoting definite uninflected nouns have the same structure, but I maintain that they lack rather than contain DivP.

6. Deriving singular kinds

To summarize the discussion so far, I have made four primary claims. First, *n*Ps denote properties of unindividuated entities and have mass interpretations as bare arguments. Second, DivPs denote properties of the divisions of entities and have count interpretations as bare arguments. Third, exclusive singularity is contingent upon a limited number of indefinite determiners. Fourth, definite uninflected nouns are ambiguous with respect to the mass-count distinction, which I attribute to the semantics of maximality. I now demonstrate how the various components of the analysis explain the contrast between *rice* and *the cat* as kind-denoting expressions in the Germanic languages.

Both Chierchia (1998) and Dayal (2004) concur that $\cap$ ranks above $\exists$ as a type-shifter because it allows a property-denoting expression to occur in argument position without introducing existential force. That is, $\cap$ better preserves the "meaning" of a predicate. For this reason, *a cat* is infelicitous as the argument of a kind-selecting predicate.

(25) #A cat is domesticated.

As shown in (26), it is possible for *a cat* to denote a subkind of cat, but such taxonomic readings arguably belong to a distinct set of phenomena (Krifka et al. 1995, Dayal 2004).

(26) A cat, *Felis catus*, is domesticated.

As argued in section 3, $\cap$ applies to *n*Ps to derive kinds without divisions and to DivPs to derive kinds with divisions. It is evident that $\cap$ is not lexicalized in English, which only allows determinerless mass and plural nouns to appear with kind-selecting predicates.

(27) a. (*The) rice is domesticated. b. (*The) cats are domesticated.

In German, mass and plural nouns can either occur bare or with the definite article as arguments of kind-selecting predicates, hence Dayal's claim that $\cap$ is optionally lexicalized by the definite article in this language.

(28) a. (Der) Reis ist domestiziert.
the rice is domesticated
'Rice is domesticated.'

b. (Die) Katzen sind domestiziert.
the cats are domesticated
'Cats are domesticated.'

As for French and many other Romance languages, it seems that $\cap$ is lexicalized by the definite article since kind-selecting predicates require a definite noun.

(29) a. *(Le) riz est domestiqué.
the rice is domesticated
'Rice is domesticated.'

b. *(Les) chats sont domestiqués.
the cats are domesticated
'Cats are domesticated.'

However, Borik and Espinal (2015) reject the notion that the definite article is ambiguous between ι and $\cap$ in Spanish based on the following reasoning, which could be generalized to Romance and even to German. If the definite article also lexicalizes $\cap$, existential readings of definite nouns should be possible via the Derived Kind Predication rule in (5), yet *los gatos* 'the cats' in (30) does not permit an existential interpretation.

(30) Los gatos jugaban en la calle.
the cats played.IPFV in the street
'The cats were playing in the street.'

It is beyond the scope of this paper to resolve the question of whether the definite article lexicalizes both ι and $\cap$ or only ι in Romance, nor does the analysis of singular kinds hinge on this issue. What matters is that, within any given Germanic or Romance language, mass and plural nouns display uniform syntactic behaviour when they appear as arguments of kind-selecting predicates: they reject, allow, or require the definite article. Therefore, I conclude that mass and plural kinds are established by the same means in these languages.

Singular kinds pattern differently than mass and plural kinds in Germanic in that the definite article is obligatory, suggesting that they are derived by a separate process.

(31) *(The) cat is domesticated.

(32) *(Die) Katze ist domestiziert.
the cat is domesticated
'The cat is domesticated.'

The need for the definite article to establish a singular kind follows from the claim that there is no level of the noun phrase that denotes properties of atoms to the exclusion of their sums to which $\cap$ can apply. In this way, I identify a structural reason for Chierchia's (1998) observation that $\cap$ is not defined for singular properties.

In Germanic, structural complexity and meaning preservation are both relevant factors in the derivation of singular kinds. Since exclusive singularity requires an indefinite determiner and maximality requires a definite determiner, *a cat* and *the cat* are equally complex. However, *the cat* more closely preserves the meaning of *cat* according to Chierchia (1998) and Dayal's (2004) ranking of type-shifters, and this definite expression can be intensionalized by a covert cap operator ($\hat{}$) to denote the kind rather than an individual.

This idea builds on Chierchia (1998) and Borik and Espinal's (2015) view that plural kinds are due to $\hat{}\iota$ in Romance languages like Italian and Spanish. Although $\hat{}\iota$ takes two steps to accomplish what $\cap$ does in one, this violation of economy is justified by the lack of a simpler structure that $\cap$ can convert into a singular kind. Another reason to consider a two-step process for singular kinds in Germanic is that definite uninflected nouns like *the cat* are often ambiguous in contexts where mass and plural nouns are not.

(33) a. Rice can tolerate many environments. (Generic only)
b. Cats can tolerate many environments. (Generic only)
c. The cat can tolerate many environments. (Individual or generic)

The proposed derivations of *rice*, *cats*, and *the cat* as kind-referring expressions in English are given in (34).

(34) a. $\cap[_{n\text{P}}\ \textit{rice}]$ b. $\cap[_{\text{DivP}}\ \textit{-s}\ [_{n\text{P}}\ \textit{cat}]]$ c. $\hat{}[_{\text{DP}}\ \textit{the}\ [_{n\text{P}}\ \textit{cat}]]$

Moreover, I argue that *die Katze* 'the cat' in German and *le chat* 'the cat' in French also have the logical form in (34c) as kind-denoting definite uninflected nouns.

(35) $\hat{}[_{\text{DP}}\ \textit{die}\ [_{n\text{P}}\ \textit{Katze}]]$

(36) $\hat{}[_{\text{DP}}\ \textit{le}\ [_{n\text{P}}\ \textit{chat}]]$

In all three cases, the definite article as ι returns a maximal entity that can be intensionalized into a singular kind.

This approach to singular kinds allows for a uniform semantics of *n*P even in languages like Mandarin, where Chierchia (1998) asserts that all *n*Ps are kind-denoting expressions.[8] Because Mandarin does not have a definite article, my account predicts that singular kinds are derived covertly in this language. Mass kinds like *shuǐdào* 'rice' are the result of the one-step process in (37a), where $\cap$ generates a kind directly. Singular kinds like *māo* 'cat', on the other hand, are the result of the two-step process in (37b), where ι establishes an individual that is then intensionalized by $\hat{}$.

[8]See Krifka (1995), Krifka et al. (1995), Cheng and Sybesma (1999), and Yang (2001) for discussion of reference to kinds in Mandarin.

(37) a. $^{\cap}[_{n\text{P}}$ *shuǐdào*$]$ b. $\hat{}\iota[_{n\text{P}}$ *māo*$]$

Even though *shuǐdào* and *māo* both appear as bare arguments in (38), I propose that they are derived by distinct processes.

(38) a. Shuǐdào shì xùnhuà de.
rice is domesticated
'Rice is domesticated.'

b. Māo shì xùnhuà de.
cat is domesticated
'The cat is domesticated.'

More broadly, I contend that all languages generate singular kinds by the same means, $\hat{}\iota$, and that any syntactic differences relate to the lexicalization of ι.

I close by briefly addressing bare nouns that necessarily have plural readings in Mandarin, such as those that occur in reciprocal constructions.

(39) Māo hùxiāng zhuīzhú.
cat each.other chase
'Cats chase each other.'
'The cats are chasing each other.'

In English, definite uninflected nouns cannot be the subject of reciprocal predicates (**the cat chases each other*), suggesting that *māo* 'cat' in (39) contains a phonologically null DivP. If, following Borer (2005), DivP is the locus of classifiers, classifier-noun phrases in Mandarin are the ostensible counterpart of plural nouns in English. However, bare classifier-noun phrases can only be interpreted as singular, even in intensional contexts (Cheng and Sybesma 1999, Yang 2001, Rullmann and You 2006).

(40) Wǒ zài zhǎo zhī māo.
I PROG look.for CL cat
'I am looking for a cat.'

Notably, *zhīmāo* 'a cat' in (40) has a marked interpretation even though *zhī* is the "default" classifier for *māo*. For this reason, I hypothesize that the closest approximation in Mandarin to a plural noun like *cats* is a noun with a silent classifier, as in $[_{\text{DivP}} \varnothing [_{n\text{P}}$ *māo*$]]$. In defense of this appeal to null morphology, there is an important difference between languages with classifiers and languages with plural inflection. In languages with classifiers, Div can take a variety of forms with the same root and introduce content beyond division.

(41) yī {zhī / duì / qún / zhǒng / xiē} māo
one CL pair group kind few cat
Approximate: 'a ∅/pair of/group of/kind of/few cat(s)'

Considering such facts, the notion of a silent classifier that has a semantically unmarked interpretation in Mandarin seems plausible.

7. Conclusion

This account of singular kinds is, to my knowledge, the first to reject a lexical mass-count distinction in favour of Borer's (2005) structural approach to this phenomenon. I claim that *n*Ps denote properties of unindividuated entities and that DivPs denote properties of the divisions of entities, both of which can be covertly type-shifted by $\cap$ to derive mass and plural kinds, respectively. There is, however, no level of the noun phrase that denotes properties of atoms to the exclusion of their sums, and so there is no structure that can be type-shifted by $\cap$ to generate a singular kind. The sole alternative is to recruit the ι operator, which is lexicalized by the definite article in Germanic and Romance, to apply to an *n*P and return a maximal entity that can be intensionalized into a singular kind. As for articleless languages like Mandarin, there are two paths to kind reference: *n*Ps can be covertly type-shifted by $\cap$ to derive mass kinds or by $\hat{}\iota$ to derive singular kinds.

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