

Nothing *much* for kinds

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Abstract Whether the kind/object distinction is grammatically encoded or extra-grammatical in nature has been up for debate. This paper reviews a recent grammatical approach by Borik & Espinal (2012) that proposes that grammatical number also encodes a *realization* operator, a kind-to-object type-shift, with reference to kinds ultimately deriving from numberless definites and subkind interpretations emerging from a predicate-driven object-to-subkind type-shift. I argue that this approach to subkinds suffers from conceptual and empirical challenges, focusing particularly on the unavailability of subkind interpretations for English mass quantifiers and Dutch mass diminutives which reveals their deep connection to the count system of the grammar. I propose severing grammatical number and realization, with the latter emerging from its own functional structure, DimP. After adopting this analysis, I demonstrate that several other constructions cross-linguistically appear to behave like English mass quantifiers or Dutch diminutives and propose a typology, suggesting that two possible but unattested grammatical patterns fail to emerge because no language has a dedicated functional structure for kind interpretation. Ultimately, this analysis proposed suggests that we are cognitively constituted to think about kinds as types that are independent of their token objects and grammatically structured to encode a kind type inside nominals, even those that are object-referring.

Keywords: diminutives; kind/object distinction; mass quantifiers; number; realization

1 Introduction

Determining the division of labor between what is memorized and what is computed has long been a driving force in linguistic theory. Within Borer's (2005a) Exoskeletal model, computation plays a central role, with the structures that are constructed having defined properties that are restricted to specific syntactic contexts. Unlike extra-grammatical sources of information which often flex and bend into their grammatical contexts, "the grammar only cares about its own" (Borer 2005a: 11), and grammatical information, once structured, is unable to be coerced or overridden by additional grammatical context. Having these features, grammatical distinctions such as count/mass, proper/common, quantity, indefiniteness, telicity, etc. are argued to emerge from well-defined structural contexts. Such structures are furthermore proposed to be universally available as aspects of the computational system founded within UG. Languages vary, then, as to how they are able to license these structures given the inventory and morphophonology of their grammatical formatives.

From this general perspective, this paper explores the distinction between kinds, the types of things there are, and objects, the tokens of those types (see, e.g. Mueller-Reichau 2011), and asks whether the kind/object distinction is grammatically realized, and if so what the mapping between syntax and kind/object interpretations is. In her own explorations on the topic, Borer (2009; 2011; 2018) has expressed some skepticism towards the grammatical nature of this distinction, and such skepticism is not unfounded. Within

English alone, kind interpretations are known to be available in a diversity of structures, including bare noun, bare plural, and definite nominals, all which can otherwise also receive standard object interpretations.

- (1)
 - a. Milk was introduced into the East Asian diet after WW II.
 - b. Potatoes were introduced into the European diet after the invasion of the Americas.
 - c. The Woolly Mammoth disappeared around 5,000 years ago.

Evidence of this type of systematic ambiguity has led to proposals that the choice between object and kind interpretation as the basic denotation for common nouns is contextually determined, as per Dayal's (1999, 2004) noun ambiguity hypothesis, placing the kind/object distinction outside of the grammar.

- (2) *Noun Ambiguity Hypothesis*: Common nouns denote either a property of objects or a property of kinds.

While the status of (2) has appeared settled (Mari et al. 2012), an important but overlooked grammatical condition on kind interpretations is that they appear to be restricted to count contexts.¹ While this condition was noted in Krifka et al.'s (1995) discussion of kind and taxonomic reference, its consequences were not thoroughly explored, and since that time there have been theoretical advances in our understanding of the structure of nominals along with the discovery of a number of empirical phenomena that suggest that grammatical number, and therefore the count/mass distinction, appears to interact with the availability of kind interpretations.

The proposal in this paper is that number and the count/mass distinction offer us a way in to the grammar for kinds. I take as a starting point the work by Borik & Espinal (2012) linking kind interpretations to the lack of grammatical number in Section 2. This work challenges the Noun Ambiguity Hypothesis and offers an alternative, which I call the Number Realization Hypothesis. I then turn to some conceptual and empirical challenges to the Number Realization Hypothesis in Section 3, coming from both Borik & Espinal's own work and empirically new areas involving English mass quantifiers and Dutch diminutives. Section 4 sets out an account of the kind/object distinction in terms of a functional projection, DimP, proposing that the absence of DimP leads to kind interpretations, whereas elements that force the projection of DimP also require a shift from kinds to objects. Section 5 then extends these results to several other languages, showing that the two paradigms exemplified by English count/mass quantifiers and Dutch mass diminutives occur in other constructions cross-linguistically. Section 6 offers some brief conclusions.

2 Number as realization

While the Noun Ambiguity Hypothesis is considered relatively mainstream, easily capturing the diversity of kind referring constructions, it is not without its critics or challenges. A recent case comes from Borik & Espinal (2012) and subsequent work, which proposes

¹ For Borik & Espinal (2012), definite kinds are, in fact, numberless, an analysis that I will adopt. Numberless constructions are, however, not count, standing as an exception to this restriction, and distinguishing kind interpretations from subkind interpretations, which only occur in count constructions. I take this distinction to be related to the atomic nature of kinds, whereas subkinds emerge from the application of KIND-OF relations on the domain of kinds, thus forming a domain that can be quantified over.

that grammatical number plays an important role in determining kind and object interpretation in several different languages. We will start with their approach to kind reference, where they propose that common nouns denote properties of kinds and thus require a determiner to establish reference to a kind entity, and then turn to their analysis of the realization of objects via grammatical number.

2.1 Reference to kinds

We begin with the following well known paradigm, reported in [Borik & Espinal \(2012\)](#), in which nominals in Spanish cannot occur in argument position unless they have a determiner, regardless of whether they are count, mass, or abstract.

- | | | |
|-----|--|------------|
| (3) | a. *Dodó fue exterminado.
dodo was exterminated | (count) |
| | b. *Agua se encuentra por todas partes.
water CL finds by every part | (mass) |
| | c. *Lingüística es el estudio del lenguaje.
linguistics is the study of.the language | (abstract) |
| (4) | a. El dodó fue exterminado.
the dodo was exterminated
'The dodo was exterminated.' | (count) |
| | b. El agua se encuentra por todas partes.
the water CL finds by every part
'Water is widespread.' | (mass) |
| | c. La Lingüística es el estudio del lenguaje.
the linguistics is the study of.the language
'Linguistics is the study of language.' | (abstract) |

In addressing evidence like this, [Borik & Espinal \(2012\)](#) make two proposals concerning the structure of nominals and their interpretations. First, adopting the standard assumption that NPs denote properties that must be type shifted into entities ([Partee 1987](#)), and that these kinds of type shifting operations are attributed to determiners ([Chierchia 1998](#); [Longobardi 1994; 2005](#)), [Borik & Espinal \(2015\)](#) propose that the definite articles, denoting the iota operator, ι , are required in (4) to shift properties, $\langle e,t \rangle$, to entities, e .² The examples in (3) are ruled out because they lack a type-shifting determiner, which must be overt in Spanish.

Because they require overt determiners, it is easy to make the case in Spanish that determiners are the source that type-shifts property denotations within nominals. Languages that lack determiners however provide more of a challenge. [Borik & Espinal \(2012; 2019\)](#) argue that kind-denoting nominals in Russian also have a DP structure.³ Following [Pereltsvaig \(2006; 2007\)](#), they observe that Russian kind-referring subjects in (5) can be antecedents for pronominal and reflexive anaphora, whereas Russian property-type nominals in (6) do not allow for anaphoric reference.

² Alternatively, properties can be shifted to quantifiers, $\langle \langle e,t \rangle, t \rangle$. Quantifiers are noted below as they are associated with subkind interpretations.

³ [Borik & Espinal \(2020\)](#) makes a similar argument, but does not commit to this covert structure being a DP.

- (5) a. Panda nahodit'sja na grani ischeznovenija. Ona javljaetsja oficial'nym panda is.found on verge extinction.GEN she appears official simbolom vsemirnogo fonda dikoj prirody. symbol world fund wild nature
'The panda is on the verge of extinction. It is the official symbol of WWF.'
- b. Dront ischez s lica zemli potomu chto ne mog. zaschitit' dodo disappeared from surface of.earth because that not could protect sebja ot napadenija. self from attacks
'The dodo was extinct because it could not protect itself from being attacked.'
- (6) Ja budu ballotirovat'sja v presidency. *Ih / *Ego vybirajut raz v I will run for presidents. *They / *Him elect once in shest' let. six years
Intended: 'I will run for president. The president is elected once in six years.'

Second, building on work by Dobrovie-Sorin (2009), Dobrovie-Sorin & De Oliveira (2008), Espinal (2010), Espinal & McNally (2011), and McNally (2004), Borik & Espinal (2012) also propose that nouns denote not just properties, but more specifically properties of kinds, with properties of objects (alongside objects and kinds themselves) being further derived.⁴ Evidence for this comes from several sources.

First, bare nouns in the object position of *have*-predicates are restricted to classifying modification only, blocking qualitative or descriptive modifiers. As seen in (7), *estable* 'stable' and *formal* 'former' in (7a) are allowed to modify bare *parella* 'partner', referring to a subtype of partner, but not *alta* 'tall' or *malalata* 'ill' in (7b), as tall or ill partners is not a subtype of partner.⁵

- (7) a. Té parella estable / formal.
has partner stable / formal
'She has a long-term partner.'
- b. Té *(una) parella alta / malalata.
has a partner tall / ill
Intended: 'She has a tall/ill partner.'

The object of *have*-predicates therefore appears to select for kind-denoting bare NPs. Outside of *have*-predicates, nominals with classifying modifiers can appear in kind-level predicates more generally as definite kinds, shown in (8).

- (8) La pareja estable casi se ha extinguido en el mundo occidental.
the partner stable almost CL has extinct in the world occidental
'The long-term partner has become almost extinct in the occidental society.'

⁴ I will adopt Borik & Espinal's (2012) proposal for common nouns in this paper, noting however, that there is likely more to be said in terms of nouns and their structure. For example, following much work in cognitive psychology (Bloom 1997; Gelman 2004) and linguistics (Krifka 1995; Zamparelli 2000), Acquaviva (2014; 2019) argues that (most) common nouns denote an *e*-type kind and are structurally complex, being at least a root in combination a nominalizer, *n*. Nominalized roots are then shifted to properties, $\langle e, t \rangle$, by further functional structure.

⁵ McNally (2004) propose that relational adjectives are also properties of kinds and, on an intersective analysis, require the noun to also be a property of kinds.

Second, Borik & Espinal (2015) also observe that definite kinds are sensitive to the pragmatic/encyclopedic restriction on well-established kinds (Carlson 1977). While this restriction remains poorly understood, the underlying idea is that our common sense understanding of the natural world does not typically attribute some fundamental status to wounded tigers, leading (9b) to be judged as odd.⁶

- (9) a. El tigre de Bengala es peligroso.
 the tiger of Bengal is dangerous
 ‘The Bengal tiger is dangerous.’
 b. #El tigre herido es peligroso.
 the tiger wounded is dangerous

Finally, Borik & Espinal (2015) propose that number neutral interpretations derive from kind interpretations. They note that bare nouns in argument positions are compatible with both atomicity and non-atomicity entailments. As shown in (10), bare nouns in object position do not have a dependent plural or a dependent singular reading and are not specified for number. For example, (10b) is true when the subject is client of Deutsche Bank without specifying the number of accounts they have.

- (10) a. L’ ametller té flor.
 the almond-tree has flower
 ‘The almond tree has bloomed.’ (It could have one flower, or more than one)
 b. Tinc compte corrent al Deutsche Bank.
 have account checking at.the Deutsche Bank
 ‘I am a client of the DB.’ (I may have one account, or more than one)

Borik & Espinal’s (2012) two proposals are encapsulated in (11).⁷ Nouns in general denote properties of kinds and the definite, denoting the iota operator, ι , shifts these property denotations to entities. The structure in (12) demonstrates how these two elements are put together for a definite kind DP.

- (11) a. $[[N]] = \lambda x^k [N(x^k)]$
 b. $[[the]] = \lambda P_{\langle e,t \rangle} \iota x [P(x)]$

- (12)
- $$\begin{array}{c}
 \text{DP } \iota x^k [dodo(x^k)] \\
 \swarrow \quad \searrow \\
 \text{D} \qquad \text{N} \\
 \text{the} \qquad \text{dodo } \lambda x^k [dodo(x^k)] \\
 \lambda P_{\langle e,t \rangle} \iota x [P(x)]
 \end{array}$$

2.2 Reference to objects

Reference to kinds therefore emerges as the default for definite nominals given the general kind-denotation of nouns. However, definite nominals are also quite capable of

⁶ Such status can, however, be contextually supported, which also improves judgements.

⁷ Superscripts k and o indicate kind and object subtypes of type e entity variables, respectively. I adopt the standard formulation that variable x is type e from the domain of entities, D_e , and functions $\langle e,t \rangle$ can apply to both x^k and x^o unless otherwise specified to a particular subtype, i.e. $\langle e^k,t \rangle$ for kinds and $\langle e^o,t \rangle$ for objects.

receiving an object interpretation, requiring further analysis. If nouns unambiguously denote properties of kinds, [Borik & Espinal \(2012\)](#) must say more about how object-denoting nominals can emerge. They begin by observing that, just as the mapping of properties, $\langle e, t \rangle$, to entities, e , via determiners required a type-shift, a type-shift is also required in their framework to take properties of kinds, $\langle e^k, t \rangle$, to properties of objects, $\langle e^o, t \rangle$. The question then is what is responsible for such a type-shift. Clearly, determiners cannot be this type-shift's locus since the same determiner forms occur with both kind and object readings. Instead, to identify a potential source, [Borik & Espinal \(2012\)](#) consider the following two paradigms.

First, they observe that *have*-predicates permit a bare nominal or a definite, but they are unacceptable with number marked nominals. To the extent that *have*-predicates are restricted to kind-level interpretations as suggested above, number marking appears to be incompatible with kind-level interpretations.

- (13) a. Tener gripe (porcina).
 have flu swine
 'To have (swine) flu.'
 b. Tener la gripe (porcina).
 have the flu swine
 'To have the (swine) flu.'
 c. *Tener las gripes (porcinas).
 have the.PL flu.PL (swine.PL).

Second, [Borik & Espinal \(2012\)](#) observe that, while definite kinds are permitted in Spanish kind-level predicates, cases of plural definites like (14b) are ruled out.⁸

- (14) a. La nevera se inventó en el siglo XVIII.
 the fridge CL invented.3SG in the century XVIII
 'The fridge was invented in the 18th century.'
 b. *Las (dos) neveras se inventaron en el siglo XVIII.
 the.PL two fridge.PL CL invented.3PL in the century XVIII

Based on evidence like this, [Borik & Espinal \(2012\)](#) propose the nominal structure in (15a) for object referring nominals and argue that Num encodes a type shift from properties of kinds to properties of objects. They thus distinguish (15a) from (15b) and propose that nominals lacking NumP remain in the domain of kinds and are thus kind-denoting.

- (15) a. [_{DP} D [_{NumP} Num [_{NP} N]]] (object)
 b. [_{DP} D [_{NP} N]] (kind)

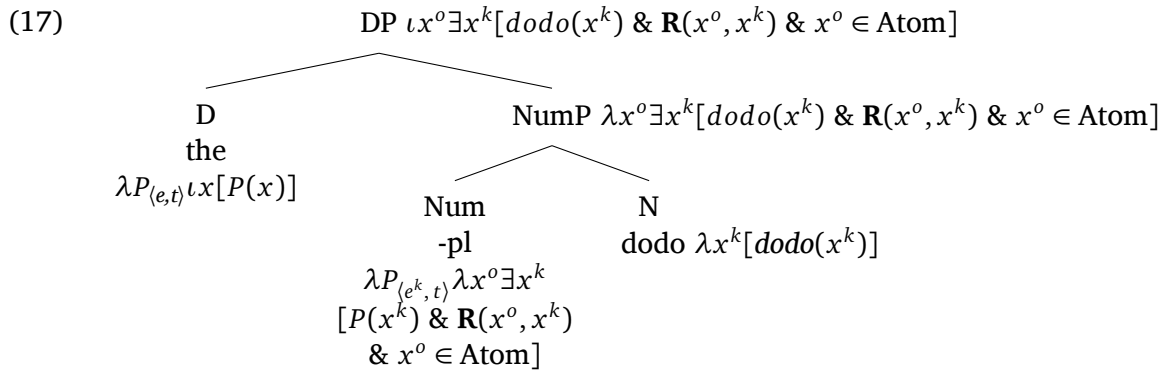
As for the type-shift itself, they propose the following denotations for plural and non-plural number which include **R**, a version of [Carlson's \(1977\)](#) realization operator, and otherwise also encode a normal semantics for number, here taking the resulting denotations to range over sums or atoms as shown in (16). The structure in (17) provides a compositional analysis for a definite object-denoting DP.

⁸ While they do not provide any examples in Spanish, [Borik & Espinal \(2012\)](#) note that stage-level predicates cannot be interpreted as kinds. Subjects of stage-level predicates like (i) can, however, receive a generic interpretation, requiring a generic operator for their interpretation.

(i) A blue whale eats an average of three tones of food a day.

For more on the distinction between kind and generic interpretations couched in the same framework, see [Husband \(2019\)](#).

- (16) a. $\llbracket \text{Num}_{+PL} \rrbracket = \lambda P_{\langle e^k, t \rangle} \lambda x^o \exists x^k [P(x^k) \ \& \ \mathbf{R}(x^o, x^k) \ \& \ x^o \in \text{Sum}]$
 b. $\llbracket \text{Num}_{-PL} \rrbracket = \lambda P_{\langle e^k, t \rangle} \lambda x^o \exists x^k [P(x^k) \ \& \ \mathbf{R}(x^o, x^k) \ \& \ x^o \in \text{Atom}]$



The coupling of realization with number offers an alternative to the Noun Ambiguity Hypothesis in (2), which I will refer to as the Number Realization Hypothesis, articulated in (18).

- (18) *Number Realization Hypothesis*: Grammatical number hosts a realization operator that shifts properties of kinds to properties of objects.

The Number Realization Hypothesis captures an important grammatical distinction between definite kinds and objects. Nominals bearing number are predicted to denote objects, while those that lack number denote kinds.

3 Against number as realization

While Borik & Espinal's (2012) approach challenges the idea that nouns are ambiguous between kind and object interpretations and offers a positive account in which realization forms part of the grammar, the idea that number is the locus of realization faces potential challenges in terms of the wider distribution of number marking and the availability of kind interpretations, in addition to other conceptual and empirical challenges outlined below.

3.1 The obstacle with subkinds

Within their own work, while Borik & Espinal (2012) note resistant to grammatical number in (14b),⁹ Borik & Espinal (2015) observe that the definite plural is generally permitted in Spanish kind-level predicates, shown in (19b), even though it is overtly marked for number.

⁹ Within kind-level predicates, *invent*-predicates like those in (14) have been noted for resisting plural nominals, especially in object position (Krifka et al. 1995), suggesting that these different judgements may be related to distinctions between different types of kind-level predicates (Mueller-Reichau 2011) and not to plurality itself. Alternatively, these different judgements may be related to the lack of well-established subkinds for *neveras* 'fridges' compared with *búhos* 'owls'.

- (19) a. El búho es común / está por todas partes / desaparece rápidamente /
 the owl is common / is at all parts / disappears rapidly /
 a menudo es inteligente.
 often is smart
 ‘The owl is common / widespread / fast disappearing / often intelligent.’
- b. Los búhos son comunes / están por todas partes / desaparecen
 the.PL owl.PL are common / are at all parts / disappear
 rápidamente / a menudo son inteligentes.
 rapidly / often are smart
 ‘Owls are common / widespread / fast disappearing / often intelligent.’

Furthermore, while it is difficult to diagnose the precise interpretation of the definite plural in kind-level predicates, in general number marked nominals are interpreted as subkinds in kind-level predicates. Both the singular, as marked by the indefinite and singular demonstrative in (20a), and the plural, marked by a range of cases in (20b), emerge with subkind interpretations.

- (20) a. Una / Esta ballena está en peligro de extinción.
 a / this whale is on verge of extinction
 ‘A/This whale is on the verge of extinction.’
- b. Dos / Muchas / algunas / todas las ballenas están en peligro de extinción.
 two / many / some / all the whale.PL is.PL on verge of extinction
 ‘Two/Many/Some/All the whales are on the verge of extinction.’

Borik & Espinal (2012; 2015) were well aware of this wider distribution of kind-related interpretations. To maintain their theory about number and realization, they propose that subkind interpretation arises from a subkind type-shift that operates as a last resort in response to a type clash between object-denoting arguments and kind-level predicates.¹⁰

- (21) *Type-shifting to subkinds*
 $e^o \rightarrow e^{sk}$ when an individual object is the semantic argument corresponding to a selected k-argument of a k-level or an i-level predicate.

Borik & Espinal (2015) propose that type-shifting to subkinds is ‘V-driven’, i.e. is driven by k/i-level predicates, which explains why the availability of (sub)kind interpretations appears to be so widespread across a diversity of grammatical constructions. Most all of these constructions should, in fact, be object-denoting and would be if they were not being type-shifted by their predicates. Indeed, from this perspective, only numberless definites purely denote kinds. However, while this analysis provides a way to maintain the Number Realization Hypothesis, it faces additional conceptual, empirical, and formal hurdles which I consider below.

3.2 Conceptual issues

We begin with some of the conceptual issues of this analysis. When spelled out, Borik & Espinal’s (2012) analysis of subkinds as a predicate-driven type-shift means that subkinds are, in a strict sense, built out of object-denoting nominals. Classically, type-shifts are

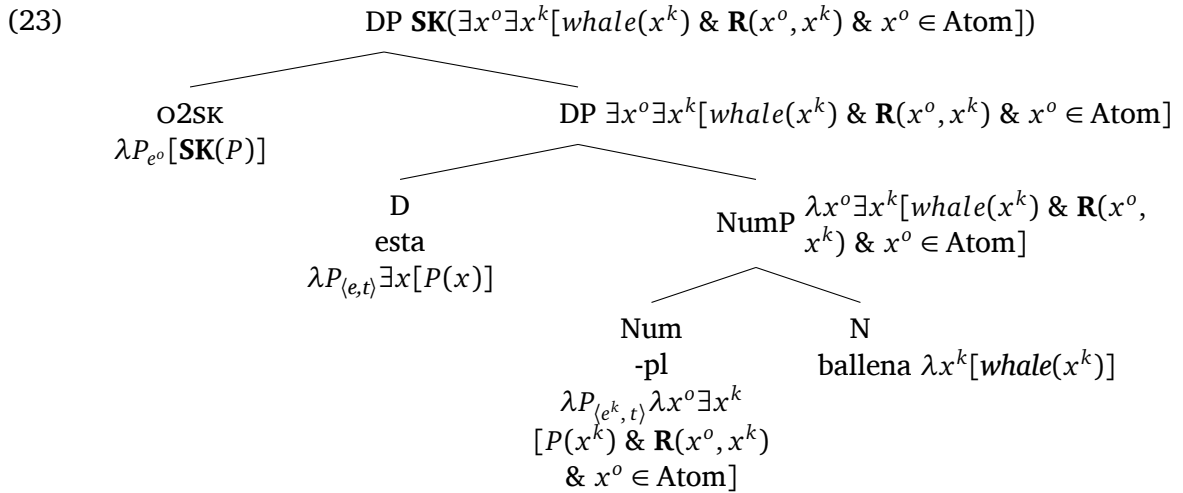
¹⁰ The last resort nature of (21) is needed to avoid a potential ambiguity between numberless and singular numbered definites, e.g. *el dodó* ‘the dodo’.

compositional. They do not tamper with the denotation they apply to but rather add to their interpretation, and in doing so, change their type.

While Borik & Espinal (2012) do not provide a denotation for the subkind type-shift, something like (22) which applies a subkind operator **SK** to an object, e^o , to yield a subkind, e^{sk} might fit the bill.¹¹

$$(22) \quad \llbracket \text{O2SK} \rrbracket = \lambda P_{e^o}[\mathbf{SK}(P)]$$

With this denotation, the subkind-referring subject *esta ballena* ‘this whale’ in (20a) is given the compositional analysis in (23).¹²



The final interpretation of *esta ballena* reads as a subkind of an existing object of an existing kind called *whale*, such that the existing object realizes the kind *whale* and the existing object is in the set of atoms. This is quite distinct from the denotation of a definite kind *the dodo* in (12) which denotes a unique kind *dodo* simpliciter, with no reference to any object type, existing or otherwise. This suggests that Borik & Espinal’s (2012) analysis of subkind and kind interpretations are, in fact, quite distinct, with subkinds embedding object-level denotation that are absent from kind interpretations.

Counter to this analysis, kind and subkind interpretations do not appear to be all that distinct from one another. Both appear to rest comfortably in kind-level predicates. Both can be said to have been invented or have gone extinct. And, as with kind interpretations, subkinds are separately countable from the number of instances that (happen to) realize them. Conceptually, therefore, an analysis which derives subkinds from object-level denotations appears to be undesirable if an alternative analysis that captures the close similarity between kind and subkind interpretations is available.

¹¹ Exactly how the subkind operator in (22) achieves reference to subkinds is not clarified in this proposal. In particular, this operator needs to return subkinds that are sensitive to the quantity and determination of the denoted objects, e.g. that they are atoms/sums, given Borik & Espinal’s (2012) analysis of Num_{+PL} and Num_{-PL} , are of a certain quantity like *two*, etc. As I do not adopt this part of their proposal, I set further specification of the subkind operator aside here.

¹² I adopt here a simple existential analysis for singular demonstratives, a clearly suboptimal analysis that fails to capture critical elements of demonstrative reference. Nothing, however, hinges on this choice, and a better analysis could be incorporated without changing the underlying argumentation.

3.3 Empirical issues

3.3.1 Mass quantifiers

In addition to conceptual issues, consider the following class of exceptions to (21) which involves the mass quantifiers *much/little* in comparison to their count equivalents *many/few*.¹³

- (24) a. *The Germans invented (too) much beer.
 b. *Little mold evolved before the Ediacaran period.
- (25) a. The Germans invented (too) many beers. (subkind)
 b. Few molds evolved before the Ediacaran period.

This inability of kind-level predicates to shift mass quantifiers also extends to other mass environments. Thus while count quantifiers, like those in (26), are ambiguous between subkind and object interpretations, mass contexts involving certain quantifiers without plural markers, shown in (27), are unambiguously object-denoting.

- (26) a. many/few beers (subkind/object)
 b. all/no/most/more beers
 c. a lot of/plenty of beers
 d. several/three beers
 e. every/each/a/one beer
- (27) a. much/little beer (object mass only)
 b. all/no/most/more beer
 c. a lot of/plenty of beer

This can perhaps be most clearly seen by the inability of mass nominals to support *kind of* insertion (Zamparelli 1995). While all count contexts in (28) are compatible with *kind of*, the mass contexts in (29) are all ungrammatical.

- (28) a. many/few kinds of beers (subkind)
 b. all/no/most/more kinds of beers
 c. a lot of/plenty of kinds of beers
 d. several/three kinds of beers
 e. every/each/a/one kind of beer
- (29) a. *much/little kind of beer
 b. *all/no/most/more kind of beer
 c. *a lot of/plenty of kind of beer

Of particular interest are cases like (30) where *kind* itself is overtly marked plural. In these instances, quantifiers that can occur with both plural and unmarked nouns are unambiguous in their reference to subkinds, as seen in (30b) and (30c). Unambiguous mass quantifiers in (30a), meanwhile, remain ungrammatical.¹⁴

- (30) a. *much/little kinds of beer
 b. all/no/most/more kinds of beer (subkind)
 c. a lot of/plenty of kinds of beer

¹³ These exceptions also challenge Dayal's (2004) proposal that all determiners can combine with object and kind denotations, suggesting further difficulty with the Noun Ambiguity Hypothesis in (2).

¹⁴ Like container/measure phrases and other elements that act in some contexts as functional elements and in others as regular open-class items, *kind* itself may be a semi-functional item, with (pseudo)partitive structures depending on a variety of factors which I set aside here.

Interesting, *kind of* insertion more generally tracks the presence of grammatical number. As noted in Borik & Espinal (2012), *kind of*, while optional in number marked nominals, is not permitted with definite kinds, taking this to be further evidence that definite kinds are numberless.

- (31) a. La (*clase de) ballena está en peligro de extinción. (kind)
 the kind of whale is on verge of extinction
 ‘The (*kind of) whale is on the verge of extinction.’
 b. Esta (clase de) ballena está en peligro de extinción. (subkind)
 this kind of whale is on verge of extinction
 ‘This (kind of) whale is on the verge of extinction.’
 c. Dos (tipos de) ballenas están en peligro de extinción. (subkind)
 two kind.PL of whale.PL is.PL on verge of extinction
 ‘Two (kinds of) whales are on the verge of extinction.’

The idea that mass quantifiers resist kind interpretation is interesting from the formal perspective of mass interpretation proposed in Borer (2005a).¹⁵ Within the Exoskeletal framework, nouns are not, for example, inherently count or mass, but rather come to have count or mass interpretations depending on the structures they find themselves in. Borer proposes that all NPs need to be portioned out before they can interact with the count system of the grammar. This portioning out is accomplished by dividing functions that are part of DivP,¹⁶ licensed in English by, e.g., the plural, indefinite article, singular definite, or distributive quantifier, e.g. *each/every*. Mass interpretations arise when nominals fail to license DivP and thus fail to divide their denotation, with mass quantifiers being incompatible with the presence of DivP. This suggests that whatever structure is responsible for encoding realization interacts in important ways with dividing structures, such that mass quantifiers both block the projection of DivP while also licensing realization.

To the extent that the plural and other number marking elements identify the same functional structure in Borik & Espinal’s (2012) framework (NumP) as they do in Borer’s (2005a) (DivP), we note that the structure of numberless nominals in Borik & Espinal, (33a), is the same as the structure underlying mass interpretation in Borer, (33b), the defining feature being that both lack number. Setting aside other differences of function structure between these two theories (e.g. whether strong determiners license a single

¹⁵ Borer (2005a; b) proposes that the head of a functional projection is a (typed) open variable, $\langle e \rangle$, which can be assigned a value either (i) directly by an abstract head feature or functional morpheme (which form a head-pair with the variable), or (ii) indirectly by an adverb of quantification, discourse operator, or specifier-head agreement (range assignment indicated by superscript). Assigning range to an open variable requires that head to project, and each functional element must assign range to its specified open variables (a version of the general ban on vacuous quantification). Importantly for direct range assignment, head movement is required to support an abstract head feature, while functional morphemes specifically block head movement, tracking the morphophonological properties of functional elements which account for intra- and inter-language variation.

(i)	<i>Direct range assignment</i>			
a.	Abstract head feature		$[_{\#P} \langle f^i \rangle . N . \langle e^i \rangle_{\#}]$	$[_{NP} \mathbb{N}]]$ (obligatory head mvt)
b.	Functional morpheme		$[_{\#P} f\text{-morph}^i . \langle e^i \rangle_{\#}]$	$[_{NP} N]]$ (head mvt blocked)
(ii)	<i>Indirect range assignment</i>			
a.	Quantificational adverb	adv_Q^i	$[_{\#P} \langle e^i \rangle_{\#}]$	$[_{NP} N]]$ (head mvt not forced)
b.	Discourse operator	D-Op^i	$[_{TP} \langle e^i \rangle_T]$	$[_{VP} V]]$
c.	Specifier-head agreement		$[_{DP} [_{DP} \text{the } N\text{'s}]^i \langle e^i \rangle_D]$	$[_{NP} N]]$

¹⁶ Borer (2005a) originally labels this projection CIP for classifier phrase.

D projection or a D and a # projection responsible for quantity), the structures given in (32) that include Num/Div are interpreted as count objects, but those in (33), lacking Num/Div, are interpreted as kinds in Borik & Espinal (2012) but as mass in Borer (2005a).

- (32) a. [_{DP} D [_{NumP} Num [_{NP} N]]] (objects & count)
 b. [_{DP} D [_{#P} # [_{DivP} Div [_{NP} N]]]]
 (33) a. [_{DP} D [_{NP} N]] (Borik & Espinal kind,
 b. [_{DP} D [_{#P} # [_{NP} N]]] Borer mass)

For example, the nominals in (34) rooted by *hair* and *water* are interpreted as mass and thus presumably receive an analysis like (35) or (36) which lacks NumP/DivP, respectively.

- (34) a. There is (too much/*many) hair in the drain. (mass)
 b. The water filled the glass before spilling over onto the table.
 (35) a. [_{DP} much [_{NP} hair]]] (Borik & Espinal)
 b. [_{DP} the [_{NP} water]]]
 (36) a. ∃ⁱ [_{DP} Dⁱ [_# much [_{NP} hair]]] (Borer)
 b. [_{DP} the [_# the [_{NP} water]]]

Inclusion of a number marker like the plural licenses the projection of NumP/DivP and blocks this mass interpretation, preventing mass quantifiers from surfacing and forcing a count interpretation.

- (37) a. *much/*little/all/no/most/more beers
 b. There are (too *much/many) hairs in the drain. (count)
 (38) a. [_{DP} many [_{NumP} hair-s [_{NP} hair]]] (Borik & Espinal)
 b. ∃ⁱ [_{DP} Dⁱ [_# many [_{DivP} hair-s [_{NP} hair]]] (Borer)

Taking these two approaches together then suggests that kind and mass interpretations should arise from the same structural configurations, and thus should be systematically ambiguous. Adapting Borik & Espinal's (2012) Number Realization Hypothesis within Borer's (2005a) broader Exoskeletal framework leads to systematic ambiguity between kind and mass interpreted nominals given these assumptions. But this confluence of approaches creates a curious puzzle: why are mass quantifiers, which by hypothesis are constrained to occur with numberless structures, i.e. structures that lack NumP/DivP, unable to receive subkind interpretations? This is especially pressing for the Number Realization Hypothesis as mass structures are arguably those which precisely lack number, and thus are precisely those which should most readily receive such interpretations, contrary to the data shown, e.g., in (24) and (25).

3.3.2 Diminutives

The empirical puzzles for the Number Realization Hypothesis do not end there. It ends up that mass quantifiers are not the only contexts which resist subkind interpretation. Evidence from Dutch diminutives also challenges the account.¹⁷ As discussed in De Belder

¹⁷ In what follows, I focus on Dutch diminutives, though diminutives in other languages also appear to follow similar empirical contours, with other restrictions to diminutive marking potentially also related to a general

(2008), Dutch mass noun phrases can only receive a subkind interpretation; object interpretation requires the presence of a diminutive.

- (39) a. twee chocolade-s (subkind only)
 two chocolate-PL
 ‘two kinds of chocolate’
 b. twee chocolaa-tje-s (object only)
 two chocolate-DIM-PL
 ‘two pieces of chocolate’

This interpretative distinction can be felt in kind-level predicates where, much like English mass quantifiers, diminutive marked mass nouns are incompatible with their selectional restriction to kind-level reference.

- (40) a. Ons bedrijf heeft (verschillende) chocolade-s uitgevonden. (subkind)
 Our company has (various) chocolate-PL invented
 ‘Our company invented (various) kinds of chocolate.’
 b. *Ons bedrijf heeft (verschillende) chocolaa-tje-s
 Our company has (various) chocolate-DIM-PL
 uitgevonden.
 invented

Interestingly from the point of view sketched above, Dutch diminutives have been argued to also require count syntax, achieved either with plural marking or a count quantifier/determiner (Wiltchko 2007). Bare diminutives are unavailable, as are bare mass nouns, shown via the ungrammaticality of (41a) and (41b) without, e.g. *een* ‘a/one’ or *het* ‘the’. This suggests that, while these nominals require count syntax, they are unable to license it on their own. The presence of other elements is therefore required to complete their syntactic requirements.

- (41) a. *(een/het) chocolaa-tje
 (a/the) chocolate-DIM
 b. *(een/het) chocolade
 (a/the) chocolate

Stated in Exoskeletal terms, it appears that diminutive marked nominals and nominals that ultimately require subkind interpretation must be portioned out by a dividing function that projects NumP/DivP to interact with the count system of the grammar, a requirement that is reminiscent of the requirement of number marking for many count nominals. Thus in English many count quantifiers require nouns that are marked plural, suggesting that while their counting functions are able to select a particular quantity of their complement’s denotation, they are not able to divide the nominal on their own, leaving that requirement to the plural.

- (42) a. *three/several/many/both dog
 b. three/several/many/both dogs

ban against kind interpretation. Zamparelli (2008), for example, observes that bare noun predicates in Italian, which many be related to kind interpretations, resist the diminutive.

- (i) a. Carla era (una) cugina / sorella di Salvo.
 Carla was (a) cousin / sister of Salvo
 b. Carla era *(una) cugin-ett-a / sorell-in-a di Salvo.
 Carla was (a) cousin-DIM / sister-DIM of Salvo

3.4 Summary

In summary, a range of kind-denoting phenomena occur with grammatical number cross-linguistically, challenging the idea that number is the grammatical locus for the realization operator, **R**. Instead, we find that subkind interpretations are systematically available with grammatically marked number and, thus, with count structures, such that additional counting functions can give shape to the range and number of subkinds being referred to when present.

However, we have also seen that the count/mass distinction acts as a window into the grammar of kind and object reference, suggesting that any analysis of the kind/object distinction must also take the distribution of count and mass interpretations into consideration. From Sections 3.3.1 and 3.3.2, it appears that there are two distinct ways that the grammar distributes kind and object interpretations as they relate to parts of the count/mass system, summarized in Table 1. This first, found within the English quantifier system, reveals a kind/object ambiguity with count quantifiers, while mass quantifiers only permit object interpretations. The second, found with Dutch mass nouns, reveals kind-only interpretations with unmarked mass nouns, while diminutive marked mass nouns only allow object interpretations. These restrictions on the availability of subkind interpretations found with mass quantifiers and diminutives pose a serious challenge to the proposed type-shifting to subkinds rule offered to explain subkind interpretations where number is present and suggest that an alternative analysis is in order.

Table 1: Initial summary of the distribution of kind and object interpretations

		kind	object
English	count quantifier	✓	✓
	mass quantifier	*	✓
Dutch	mass	✓	*
	diminutive mass	*	✓

4 Creating objects, grammatically

4.1 Functional structure for realization

Moving away from the Number Realization Hypothesis, consider instead an analysis that maintains the proposal that common nouns denote properties of kinds, but decouples grammatical number from realization, allowing grammatical number to occupy its own functional projection where it marks its normal interpretations. How then is realization to be structured in light of what we have seen from mass quantifiers and diminutives?

4.1.1 Diminutives and realization

Given the requirement of the diminutive for object reference with mass nouns, we start with its analysis. As diminutive marking forces realization, I take realization to be at least part of the meaning of diminutives, as shown in (43a). As the diminutive can co-occur with the plural, let us assume that the diminutive heads a functional projection of its own, and, as it appears closer to the noun than plural number, let us also adopt the

assumption that this projection is structurally lower than DivP, as shown in (43b).¹⁸ I propose to label this projection DimP as a nod to the diminutive on the one hand and to suggest that this projection gives denotations their spatiotemporal dimensions, e.g. that nominals that license DimP to project denote token realizations of types and thus are taken to occur in time and, for those with extent.

- (43) a. $[[\text{Dim}]] = \lambda P_{\langle e^k, t \rangle} \lambda x^o \exists x^k [P(x^k) \ \& \ \mathbf{R}(x^o, x^k)]$
 b. $[_{\text{DP}} \text{D} \ [_{\#P} \# \ [_{\text{DivP}} \text{Div} \ [_{\text{Dim}} \text{Dim} \ [_{\text{NP}} \text{N}]]]]]$

The structures in (44) and (45) address the issues raised with those in (32) and (33), with DimP in (44) bearing the realization operator and therefore forcing object denotations. The structures in (45), lacking DimP, remain in the kind domain, with further specifications of denotation and reference determined by the surrounding structure, here DP, #P, and DivP as sketched.¹⁹

- (44) a. $[_{\text{DP}} \text{D} \ [_{\#P} \# \ [_{\text{DivP}} \text{Div} \ [_{\text{Dim}} \text{Dim} \ [_{\text{NP}} \text{N}]]]]]$ (count object)
 b. $[_{\text{DP}} \text{D} \ [_{\#P} \# \ [_{\text{Dim}} \text{Dim} \ [_{\text{NP}} \text{N}]]]$ (mass object)
 (45) a. $[_{\text{DP}} \text{D} \ [_{\#P} \# \ [_{\text{DivP}} \text{Div} \ [_{\text{NP}} \text{N}]]]$ (count subkind)
 b. $[_{\text{DP}} \text{D} \ [_{\#P} \# \ [_{\text{NP}} \text{N}]]]$ (kind)

From this point of view, Dutch mass nouns like those in (39) are only permitted in the structures shown in (46), with the plural, -s_{Div}, and diminutive marking, -tje_{Dim}, emerging from the spell out of abstract head features in DivP and DimP that force N-movement for phonological support. Both structures project DivP, allowing the nominal to interact with the count system.²⁰ The structure in (46a) requires DivP as the domain of kinds is a count-only domain, with no mass alternative, unlike potential object interpretations which permit a mass reading. Including the diminutive in (46b) also requires DivP because the diminutive, in addition to shifting the nominal to denote objects, can also only emerge in a count context.²¹

¹⁸ Evidence that DimP is structurally lower than DivP in Dutch as well as German is provided in Husband (in prep).

¹⁹ The structure for kind interpretation in (45b) stands counter to Borer's (2005a) proposal that structures which lack DivP are interpreted as mass by default. Mass interpretations are still related to a lack of DivP, but, because they are part of the object domain, they require DimP to project.

²⁰ While (46) licenses the projection of DivP via the plural, other elements within the Dutch count system appear to independently license DivP, e.g. indefinite/numeral *een* and the definite singular *het*, as found in (41). I leave the particulars of these cases aside here, predicting that they pattern with Borer's (2005a) analysis of +count and +dividing determiners/quantifiers.

²¹ While I will not attempt a full analysis of mass interpretation here, some initial comments are in order. Distributionally, Dutch bare nouns can receive a mass interpretation, as seen in (ia) vs. (ib), but only if they occur post-verbally, even in unergative constructions like (iib). Pre-verbal bare nominals in Dutch are restricted to generic interpretations (Borer 2005b; Oosterhof 2008).

- (i) a. Er zat haar in de afvoer. (mass)
 there was hair in the drain
 'There was hair in the drain.'
 b. Er zat een haar in de afvoer. (count)
 there was a hair in the drain
 'There was a hair in the drain.'
 (ii) a. Water trickled from the faucet. (English mass)
 b. Er druppelde water uit de kraan. (Dutch mass)
 there trickled water from the faucet
 'Water trickled from the faucet.'

Given the system emerging from the analysis here, mass interpretation requires DimP to project, shifting the noun into the object domain, without licensing the projection of DivP, leaving the nominal's object deno-

Attempts to encode bare diminutives in (47a) fail to license DivP, leaving the count-requiring diminutive suffix unlicensed in a mass environment. Bare mass nouns in (47b) are also ruled out as reference to kinds requires either the definite for kind interpretation or count syntax for subkind interpretation to emerge. Nor can (47b) be interpreted as (instantiated) mass as there is nothing available to license DimP for realization. Thus we predict the ungrammaticality of both bare diminutives and bare nouns from (41).

- (46) a. ($[_{DP} D \quad [_{\#P} \#]$ $[_{DivP} N-S_{DIV}]$ $[_{NP} \mathbb{N}]$ (subkind)
 b. ($[_{DP} D \quad [_{\#P} \#]$ $[_{DivP} N-tje_{DIM}-S_{DIV}]$ $[_{DimP} N-tje_{DIM}]$ $[_{NP} \mathbb{N}]$ (object)
- (47) a. $*([_{DP} D \quad [_{\#P} \#])$ $[_{DimP} N-tje_{DIM}]$ $[_{NP} \mathbb{N}]$
 b. $*([_{DP} D \quad [_{\#P} \#])$ $[_{NP} N]$

4.1.2 Mass quantifiers

Turning now to mass quantifiers and related structures, we start with the distinction between *many* and *much*, attempting to capture the fact that both are possible with object denotations, but only *many* permits kind denotations.

As a creature of the count system, *many* requires DivP to project, but appears powerless itself to force its projection, licensing only $\#P$ (and DP optionally). Instead, like many other quantifiers, *many* applies to a plural marked structure, using the dividing function of the plural to enable countable divisions in the denotation of the nominal. The structures in (48a) and (48b), therefore, are both ruled out as they lack DivP and have no way to interact with the counting function of *many*. The other two structures, however, are permissible. This suggests that English has a null head feature, \emptyset_{DIM} , that can license DimP, an option that appears to be unavailable with Dutch mass nouns.

- (48) a. $*([_{DP} D \quad [_{\#P} \text{many}\#])$ $[_{NP} \mathbb{N}]$
 b. $*([_{DP} D \quad [_{\#P} \text{many}\#])$ $[_{DimP} N-\emptyset_{DIM}]$ $[_{NP} \mathbb{N}]$
 c. ($[_{DP} D \quad [_{\#P} \text{many}\#]$ $[_{DivP} N-S_{DIV}]$ $[_{NP} \mathbb{N}]$ (subkind)
 d. ($[_{DP} D \quad [_{\#P} \text{many}\#]$ $[_{DivP} N-\emptyset_{DIM}-S_{DIV}]$ $[_{DimP} N-\emptyset_{DIM}]$ $[_{NP} \mathbb{N}]$ (object)

Mass quantifier *much*, however, appears to be a portmanteau of sorts, having both quantificational and realization functions which license the projection of both $\#P$, where it applies quantification, and also DimP, where it forces realization. Within the Exoskeletal system then, *much* initially merges in Dim, shifting the denotation of the nominal to the object domain, and then moves to $\#$ via head movement where it applies its quantification. This analysis permits the structure in (49b), but rules out the others. In (49a) and (49c), Dim fails to project even though its projection is forced in the presence of *much*.²²

tation undivided, and thus mass. In Dutch then, it may be important that whatever licenses the projection of DP, shown in (iii) to be existential closure which is presumably related to the post-verbal nature of bare nominal existential interpretations, may also license the projection of DimP, potentially optionally depending on the availability of subkind interpretations post-verbally in the presence of existential closure. On this approach, it may be some shared semantic property of existential closure and realization that allows existential closure to license Dim, though what this property is will have to be a matter for left to future research.

- (iii) $\exists^i \quad [_{DP} D^i \quad [_{Dim} Dim^i \quad [_{NP} N]]]$ (mass object)

Turning briefly to English and following then the analysis of existential interpretation in Borer (2005b), whatever mechanism is responsible for licensing an existential interpretation of English pre-verbal bare nominals might be extended to pre-verbal bare nominals specifically with mass interpretations, even in unergative constructions like (iia). While Borer (2005b) proposes this is a covert locative, I must again leave this as a matter for future research.

²² Borer (2005a) proposes that this violation is akin to vacuous quantification as *much* is unable to assign range to $\langle e \rangle_{DIM}$. See fn. 15 for further details.

A distinct issue arises in (49d). Assuming that DivP is somehow otherwise licensed, its presence in (49d) blocks head movement of *much* from Dim to #, independently ruling it ungrammatical. It is the ungrammaticality of (49d) which explains why mass quantifier *much* cannot co-occur with, e.g. the plural, **much beers*. The presence of the plural forces the projection of DivP preventing the movement of *much* from DimP to #P is blocked by the Head Movement Constraint.²³

- (49) a. * $[_{DP} D \ [_{\#P} \text{much}_{DIM-\#} \ [_{NP} N]$
 b. $[_{DP} D \ [_{\#P} \text{much}_{DIM-\#} \ [_{DimP} \text{much}_{DIM-\#} \ [_{NP} N]$ (mass)
 c. * $[_{DP} D \ [_{\#P} \text{much}_{DIM-\#} \ [_{DivP} Div \ [_{NP} N]$
 d. * $[_{DP} D \ [_{\#P} \text{much}_{DIM-\#} \ [_{DivP} Div \ [_{DimP} \text{much}_{DIM-\#} \ [_{NP} N]$

4.1.3 Nothing *much*? A refinement

This analysis, however, faces some challenges when expanded to include collective mass nouns like *furniture/wildlife*.²⁴ Unlike regular mass nouns like *beer*, these mass nouns appear to be somewhat count in their interpretation, allowing, for example, a distributive reading of size adjectives like *big/small* (Quine 1960; Rothstein 2010; Landman 2011; Schwarzschild 2011).

- (50) a. #The big mud is on your shoe.
 b. The big furniture is on the third floor.
 → The furniture items that are each individually big are on the third floor.
 ↯ The furniture items that collectively form a big group are on the third floor.

Further investigation with kind-level predicates reveals that *much/little* actually permit subkind interpretations with collective mass nouns. Thus the phrase (too) *much furniture* in (51a) can occur in a kind-level predicate where it receives an interpretation akin to ‘(too) many kinds of furniture’.

- (51) a. The Swedes invented (too) much furniture.
 (↗ (too) many kinds of furniture)
 b. (Too) little wildlife evolved during the early Triassic period.
 (↗ (too) few kinds of wildlife)

Given the nominal’s count-like interpretation as glossed with *many/few*, it appears that *much/little* with collective mass nouns are, in fact, fake mass quantifiers. They are, it seems, count quantifiers masquerading with the phonological form we associate with mass quantifiers. This suggests that the proportional count quantifier in English takes on

²³ The structure in (49d) is also problematic for movement of N to Div as Dim is occupied by *much* and movement of N to Div would violate the Head Movement Constraint.

²⁴ The category of mass nouns can be distinguished into at least two types, which Rothstein refers to as mass on the one hand and object mass on the other. Others like Landman make further cuts within Rothstein’s object mass category, though these further distinctions do not appear to play an important role in the licensing of subkinds.

(i)		Rothstein	Landman
a.	water, mud, coffee	mass	mess mass
b.	furniture, jewelry, pottery, silverware, luggage, mail	object mass	group neutral neat mass
c.	poultry, livestock	object mass	sum neutral neat mass

two forms: the familiar *many*_#/*few*_# which appears with normal plural-marked and DivP projecting count structures, and *much*_#/*little*_#, which appears with collective mass nouns. The difference between these, I will propose below, is that collective mass nouns, occurring as they do in structurally mass contexts, presumably fail to project DivP. A spell out rule like the one in (52) captures this idea, taking $Q_{\#}^{\text{prop}^+}$ to be the positive proportional count quantifier which is spelled out as *many* in the presence of DivP and *much* otherwise. Separately from these proportional count quantifiers, then, are regular mass quantifiers *much*_{DIM-#}/*little*_{DIM-#} which continue to force the projection of DimP independently.

$$(52) \quad Q_{\#}^{\text{prop}^+} \leftrightarrow \begin{array}{l} \textit{many} / [_{\#} Q_{\#}^{\text{prop}^+} [_{\text{DivP}} \text{Div} \\ \textit{much} / \textit{elsewhere} \end{array}$$

Addressing this wider range of observations, consider the following adjustments to the initial analysis, adding the structures in (53) to those in (48). Much like (48a) and (48b), DivP fails to project in (53a) and (53b), having no independent licenser assigning it range. Typically, this would be enough to rule such a structure ungrammatical, as the nominal appears to be undivided when trying to enter the count system as required by proportional count quantifiers. The noun, however, is a collective mass noun, here indicated by the collective affix, *aff_{coll}*, e.g. *-ure*, *-ry*, and *-ware*. Adopting a proposal from De Belder (2013), collective mass nouns denote salient individuals via their collective affix which divides their denotation. Having salient individuals in their denotation allows a proportional count quantifier to apply to them without requiring DivP to project. This also explains why collective mass nouns avoid the (ground) mass interpretation that typically results from a lack of DivP and why they cannot be marked with the plural or co-occur with other dividing elements that typically license DivP as their denotations are already divided.²⁵ The structures in (53), therefore, are DivP-less, but well-formed, with the proportional count quantifier pronounced as *much* given the spellout rule in (52).

$$(53) \quad \begin{array}{ll} \text{a. } [_{\text{DP}} \text{D} [_{\#P} \textit{much}_{\#} & [_{\text{NP}} \text{N-}\textit{aff}_{\text{coll}} \quad (\textit{subkind}) \\ \text{b. } [_{\text{DP}} \text{D} [_{\#P} \textit{much}_{\#} [_{\text{DimP}} \text{N-}\textit{aff}_{\text{coll}}-\emptyset_{\text{DIM}} & [_{\text{NP}} \text{N-}\textit{aff}_{\text{coll}} \quad (\textit{object}) \end{array}$$

4.2 Summary

Let us summarize the position we have found ourselves in. The proposal as it now stands, adopting part of Borik & Espinal (2012), is that common nouns denote properties of kinds. On their own then, common nouns do not denote objects, be they mass or count. They also cannot directly refer to kinds. Instead, reference to objects and kinds must be constructed using the functional machinery of the grammar. Nominals that ultimately refer to objects as token realizations of a kind, masses included, require projection of DimP to shift their denotation from the domain of kinds to the domain of objects, while those that fail to project DimP remain in the kind domain. From that point on, whether object- or kind-denoting, further functional specification must be called upon to divide, quantify, and establish nominal reference. Thus it is the functional vocabulary, the articles and quantifiers, the markers of plurals, indefinites, diminutives, etc., that ultimately determine the domain of a nominal and the possibilities of its quantity and reference.

²⁵ On a different analysis, collective affixes are alternative spellouts of a Div head feature. De Belder (2013) argues against this position, noting that nouns with a collective affix can be non-compositional and have many lexical gaps. Here, too, adopting such an alternative proposal would require the alteration of the spellout account in (52) as DivP would be licensed to project, suggesting additional evidence against a DivP account for collective affixes.

The focus here has been on subkinds and their count nature. Reference to subkinds in particular has been argued to emerge from count syntax, requiring DivP to divide kind denotation into countable divisions which are then selected with articles or quantifiers to specify their quantity and reference. Subkinds, then, are revealed to be creatures of the count system, with all the interpretative possibilities afforded by the general count system of the grammar. Definite kinds, on the other hand, with their reference to a unique kind, appear to be distinct in their grammatical construction as numberless nominals, lacking both DivP, as identified in [Borik & Espinal \(2012\)](#), as well as DimP, as required in the present analysis to remain in the kind domain. Importantly, much like reference to subkinds, reference to kinds is achieved only when the nominal enters into the determiner system of the grammar, requiring the definite article to shift the nominal's denotation from properties of kinds to their unique kind via the iota operator. It is this uniqueness perhaps that leads them to be numberless, potentially related to proposals of conceptual atomism ([Fodor 1998](#)) and other curious properties of the ways that our minds construct concepts and their related conceptions.²⁶

Finally, the analysis here entails that object interpretations are grammatically more complex than kind interpretation. Object interpretations emerge only when DimP is licensed to project, while kind interpretation results from a failure to project DimP. Kind interpretations, on this view, are therefore a kind of grammatical default captured by analyzing common nouns as denoting properties of kinds. Such a perspective may be related to other properties of kinds and objects, reflecting some core relationship between the grammar and the constitution of our minds. For example, while objects are always related to a kind, in that tokens are always related to a type, kinds need not relate to any object token, a point stressed in particular in [Mueller-Reichau \(2011\)](#). This system captures the core intuition that object-referring nominals embed a kind-level representation, an idea similar in spirit to [Carlson \(1977\)](#), [Zamparelli \(2000\)](#), [Mueller-Reichau \(2011\)](#), and [Acquaviva \(2014; 2019\)](#), among others.²⁷

5 Extensions

Thus far, we have seen the distribution of kind and object interpretations in two paradigms, summarized back in [Table 1](#). The first is found in English, where count quantifiers are ambiguous between kind and object interpretations while mass quantifiers and associated mass contexts systematically block kind interpretations. The second is found in Dutch, where mass nominals are unambiguously interpreted as kinds unless they are marked by a diminutive, in which case they are obligatorily interpreted as objects. Interestingly, oppositions found within these two paradigms appear to be at work in other languages. Below I provide a brief sketch of these two patterns cross-linguistically. The first comes from a variety of classifier languages where optional classifiers appear to pattern much

²⁶ Proposing that kinds are integral entities and following [Beyssade \(2005\)](#), [Borik & Espinal \(2015\)](#) argue that the kind domain does not form the standard lattice structures typically proposed for objects ([Link 1983](#)), noting that, in their view, kinds can be conjoined but not pluralized or quantified. While I have argued for a distinct account for subkinds, the formal character of the kind domain does appear to be distinct from the object domain, in that the former is constructed from KIND-OF relations, forming a taxonomy, while the latter is constructed from PART-OF relations, forming a mereology. The consequent differences, however, fall outside the scope of the work here and will have to await further investigation.

²⁷ Whether all object-referring nominals contain a kind-level representation is up for debate. For example, [Acquaviva \(2014; 2019\)](#) suggests that nominals like *contents*, *shallows*, and *beginnings* do not encode what he calls a 'categorizing concept' which I take to be a kind-level representation.

like English mass quantifiers,²⁸ while the second appears in Arabic sound and broken plurals which *prima facie* appear to behave like bare and diminutive-marked Dutch mass nouns, respectively.

5.1 Kind/object ambiguity in optional classifier constructions

Nomoto (2010; 2013) provides evidence that the presence of optional classifiers blocks a subkind interpretation from a variety of languages. He begins with Malay as representative of the behavior of optional classifier languages. Classifiers in Malay are generally optional, but when present they prevent reference to kinds and only allow reference to objects.

- (54) *Malay*
- a. Kami menjual tiga (buah) majalah dan semua majalah itu (object)
 we sell three CL magazine and all magazine that
 majalah Mastika
 magazine Mastika
 ‘We have three magazines and all of them are *Mastika*.’
- b. Kami menjual tiga (#buah) majalah, iaitu majalah (subkind)
 we sell three CL magazine, namely magazine
 Mastika, Majalah PC dan Nona
 Mastika, magazine PC and Nona
 ‘We have three (kinds of) magazines, namely *Mastika*, *Majalah PC*
 and *Nona*.’

Nomoto (2010; 2013) also observes similar behavior in obligatory classifier languages where certain constructions allow for the classifier to be optional. In these optional classifier constructions, a similar blocking of subkind interpretations emerges. In Japanese, for example, classifiers can be optionally omitted in N-case Num CL constructions. However, when such optional classifiers are present, a subkind interpretation is not permitted.

²⁸ Although I do not pursue them here, mass plurals at least in English appear to also pattern with Type I constructions. Acquaviva (2008) observes that, contrary to one of their core diagnostics, a subset of English mass nouns can be marked plural, and when so marked, they cannot be interpreted as kinds, but rather must denote objects. This is shown in (i) where the regular mass noun *water* can be assigned both object and kind interpretations, but when marked plural, only an object interpretation is available. Importantly, these mass plurals are not countable, but are taken to have spatiotemporal dimension, often with a corresponding inference of being large in size or abundant in amount.

- (i) a. The river discharges its water / waters into the lake. (object)
 b. The formula of water / *waters is H₂O. (kind)

- (55) *Japanese*
- a. Uti-ni-wa haiburiddokaa-ga yon aru. (object/subkind)
 we-at-TOP hybrid.car-NOM four be
 ‘We have have four hybrid cars.’
 ↗ two Prius and two Insight (4 objects)
 ↗ two Prius, two Insight, one Sai, one Lexus HS (4 subkinds)
- b. Uti-ni-wa haiburiddokaa-ga yon dai aru. (object/*subkind)
 we-at-TOP hybrid.car-NOM four CL be
 ‘We have have four hybrid cars.’
 ↗ two Prius and two Insight (4 objects)
 ↗ two Prius, two Insight, one Sai, one Lexus HS (4 subkinds)

This can also be seen directly with kind-level predicates, where these optional classifiers are blocked as being incompatible with a subkind interpretation.

- (56) *Japanese*
- a. Zetumetusi-souna tora-ga sukunakutomo ni (*hiki) iru.
 extinct-likely tiger-NOM at.least two CL be
 ‘There are at least two tigers that are likely to become extinct.’

Nomoto reports further evidence from Piriyawiboon that optional classifiers in Thai demonstrative constructions can be omitted, with similar interpretative consequences.

- (57) *Thai*
- a. rót ní (object/subkind)
 car this
- b. rót khan ní (object/*subkind)
 car CL this

Optional classifiers in Hungarian have also been shown to block subkind interpretations. [Schvarcz & Nemes \(2021\)](#) observe that numeral constructions allow for an optional classifier, which they propose is sortal and individuating.

- (58) *Hungarian*
- a. Három újságot árul ez az újságárus. (object/subkind)
 three newspaper-ACC sells DEM the newsvendor
 ‘This newsvendor sells three types/pieces of newspaper.’
- b. Három darab újságot árul ez az újságárus. (object/*subkind)
 three CL_{GEN} newspaper-ACC sells DEM the newsvendor
 ‘This newsvendor sells three pieces of newspaper.’

They note that optional classifiers are not permitted in several contexts that are restricted to kind-level interpretations: kind-level predicates (59a), multiple instantiations (59b), and kind-referring anaphora (59c).

- (59) a. Három (*darab) / (fajta) újság a megszűnés szélénáll.
 three CL_{GEN} / CL_{KIND} newspaper the ceasing verge stand
 ‘Three (kinds of) newspapers stand on the verge of ceasing to exist.’
- b. János három (*darab) újság-ot vett. Összesen harmincat.
 John three CL_{GEN} newspaper-ACC bought in.total thirty-ACC
 ‘John bought three (kinds of) newspapers. 30 newspapers in total.’
- c. János három (*darab) újság-ot gyűjt. Ezek a fajta
 John three CL_{GEN} newspaper-ACC collects DEM-PL the CL_{KIND}
 kiadások ritkák.
 edition-PL rare-PL
 ‘John collects three (kinds of) newspapers. These kinds of editions are rare.’

From the viewpoint of the analysis we have been pursuing here, optional classifiers appear to be functional heads that force projection of DimP, shown in (60). Any structure lacking DimP when an optional classifier is present is ruled ungrammatical. In their absence, nominals must find some other way to license DimP, via a silent head feature as shown in (60b) or potentially by optionally extending the functional capacity of numerals, e.g. *három*_{DIM-DIV-#}. Otherwise, DimP fails to project and the nominal remains in the kind domain as in (60c).

- (60) a. [_{#P} három_{DIV-#} [_{DivP} három_{DIV-#} [_{DimP} *darab*_{DIM} [_{NP} újság (object)
 b. [_{#P} három_{DIV-#} [_{DivP} három_{DIV-#} [_{DimP} újság-Ø_{DIM} [_{NP} újság (object)
 c. [_{#P} három_{DIV-#} [_{DivP} három_{DIV-#} [_{NP} újság (subkind)

5.2 Alternations in Arabic broken/sound plurals and -AH

The second pattern we have seen involves Dutch diminitives, where mass nouns unambiguously refer to subkinds unless they are diminutive marked, in which case they unambiguously refer to objects. Similar behavior is reported in Modern Arabic. [Ouwayda \(2014\)](#) observes that an unmarked mass noun like *Tabšuur* ‘chalk’ only has a subkind interpretation.²⁹ To be assigned an object interpretation, these mass nouns need to be AH marked.

- (61) a. saami štara Tabšuur weeHed. (subkind)
 Sami bought chalk one.MASC
 ‘Sami bought exactly one type of chalk.’ (regardless of amount)
- b. saami štara Tabšuur-ah weeHed (be-z-zabet). (object)
 Sami bought chalk-AH one.FEM (to-the-exact)
 ‘Sami bought exactly one piece of chalk.’

The plural of these mass nouns come in two forms: the broken plural where there is a stem change to the nominal root and the nominal patterns with the bare noun in triggering masculine agreement, and the sound plural which is marked by an affix and patterns with the AH-marked nominals in triggering feminine agreement. [Ouwayda \(2014\)](#) observes that these two plural forms also differ in terms of their interpretation. The broken plural can only receive a subkind interpretation, whereas the sound plural can only receive

²⁹ [Ouwayda \(2014\)](#) refers to this class of mass nouns as “batch nouns”, which also includes *raml* ‘sand’, *samak* ‘fish’, *šajar* ‘tree’, and *tefeeH* ‘apple’, which all pattern like (63) and (64).

an object interpretation, again patterning with bare nouns and AH-marked nominals, respectively.

- (62) a. fii arba? Tbaašiir be-z-zabet ?a-T-Taawlah. (subkind)
 exist four chalk.PL_{BR} in-the-exact on-the-table
 ‘There are exactly four types of chalk on the table.’
 b. fii arba? Tabšuur-aat be-z-zabet ?a-T-Taawlah. (object)
 exist four chalk-PL_{SF} in-the-exact on-the-table
 ‘There are exactly four pieces of chalk on the table.’ (even if fewer
 than four types)

To account for the relationship between the bare noun and broken plurals on the one hand and the AH-marked nominal and sound plurals on the other, [Ouwayda \(2014\)](#) proposes that the sound plural is underlyingly AH-marked, taking the sound plural affix to be composed of AH and the plural.

- (63) a. tabšuur chalk ‘chalk’ (masculine,
 b. tbaašiir chalk.PL_{BR} ‘types of chalk’ (broken) subkind only)
 (64) a. tabšuur-ah chalk-AH ‘piece of chalk’ (feminine,
 b. tabšuur-aat chalk-AH.PL_{SF} ‘pieces of chalk’ (sound) object only)

The analysis we pursued for Dutch mass diminutives in this paper may be extended to Modern Arabic if we take AH to project DimP, equating its behavior to that of the Dutch diminutive. Thus both AH-marked and sound plural structures in (66), which are underlyingly AH-marked, both license DimP and force the nominal to be interpreted as object. The structures in (65), lacking some way of licensing DimP, remain in the domain of kinds.

- (65) a. [_{DivP} weeHad_{Div-#}] [_{NP} tabšuur] (subkind)
 b. [_{DivP} tbaašiir.PL_{BR}Div] [_{NP} tabšuur]
 (66) a. [_{DivP} weeHad_{Div-#}] [_{DimP} tabšuur-AH_{DIM}] [_{NP} tabšuur] (object)
 b. [_{DivP} tabšuur-AH_{DIM}.aat_{Div}] [_{DimP} tabšuur-AH_{DIM}] [_{NP} tabšuur]

5.3 A typology for realization

As seen in Sections 5.1 and 5.2, the distributions of kind and object interpretation found within the English quantifier and Dutch mass constructions appear to be extendable to other languages and constructions. There are paradigms in languages like English quantifiers and Malay, Japanese, Thai, and Hungarian optional classifiers where one part of the paradigm allows for both kind and object interpretation while the other is restricted to object interpretations only. There are also paradigms in languages like Dutch mass diminutives and Modern Arabic mass AH-marking and plurals where one part of the paradigm allows only for kind interpretation while the other is restricted to object interpretations. These are summarized in Table 2.

What emerges from this cross-linguistic comparison, therefore, are two possible ways that the grammar encodes the kind/object distinction, which I label Type I and Type II in Table 3. Interestingly, when considered from this perspective, we can identify two other patterns which, while logically possible, nevertheless appear to be unattested. First, no language appears to have a paradigm given as Type III in Table 3 where one part allows for both kind and object interpretation while the other is restricted to kind interpretations only. Second, no language appears to have a paradigm given as Type IV in Table 3 where

Table 2: Summary of the distribution of kind and object interpretations

		kind	object
English	count quantifier	✓	✓
	mass quantifier	*	✓
Malay	optional classifier absent	✓	✓
	optional classifier present	*	✓
Japanese	optional classifier absent	✓	✓
	optional classifier present	*	✓
Thai	optional classifier absent	✓	✓
	optional classifier present	*	✓
Hungarian	optional generic classifier absent	✓	✓
	optional generic classifier present	*	✓
Dutch	unmarked mass	✓	*
	diminutive mass	*	✓
Modern Arabic	unmarked mass	✓	*
	AH mass	*	✓
	mass broken plural	✓	*
	mass sound plural	*	✓

the unmarked form receives obligatorily object interpreted and requires a marked form to be assigned a kind interpretation.

The lack of Types III and IV suggests that no language has dedicated functional structure required for kind interpretation. Instead, as discussed above, kind interpretations arise as default interpretation, occurring as the more grammatically unmarked case, here resulting from structures that fail to project DimP. Object interpretation, however, requires some additional structure which can be licensed in a number of ways, making them more grammatically complex. In the system proposed here, object interpretation requires the projection of DimP, with DimP coinciding with a more marked structure.

Table 3: Typology for the distribution of kind and object interpretations

			kind	object
Type I	English	ambiguous morphology (count quantifier)	✓	✓
		object only morphology (mass quantifier)	*	✓
Type III	<i>unattested</i>	ambiguous morphology	✓	✓
		kind only morphology	✓	*
Type II	Dutch	unmarked is kind only (unmarked mass)	✓	*
		marked is object only (diminutive mass)	*	✓
Type IV	<i>unattested</i>	unmarked is object only	*	✓
		marked is kind only	✓	*

6 Conclusions

Whether the kind/object distinction has a grammatical or extra-grammatical source has been up for debate. Starting from the Number Realization Hypothesis extracted from

Borik & Espinal (2012) and their subsequent work, I have proposed that it is more profitable to separate grammatical number from realization. While these appear to be related, in part because subkinds denote only countable entities and must, therefore, enter into the count system of the grammar, realization is itself a separable functional projection, here labeled DimP. Such an analysis addresses the conceptual and empirical difficulties of the Number Realization Hypothesis, the latter coming especially from English mass quantifiers and Dutch mass diminutives. The two paradigms discussed there also appear to find expression more widely in a number of unrelated languages and seemingly unrelated constructions, suggesting that object interpretations are, indeed, more grammatically complex while kind interpretations arise by default from the core meaning of common nouns. Such an analysis may reflect how we think about kinds and objects, the latter being token cases of the former's type, suggesting that our minds are cognitively constituted to think about kinds independently of objects and grammatically structured to incorporate a kind-level representation inside every nominal, even those that are ultimately object-referring.

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