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Reference to Subkinds

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Abstract

This thesis is about expressions which include a noun and are used to talk about subkinds of the kind corresponding to the noun. For example, the phrase *this kind of bird* includes the noun *bird*, and it can be used to talk about a certain kind of bird, e.g. the raven genus. This thesis addresses two research questions about such phrases.

The background to the first question is that certain nouns can be used to talk about subkinds without attaching to *kind*, e.g. *bird* in *the most widespread bird*. *Student* by contrast lacks this property, e.g. *I wonder which student is the most popular* cannot mean 'I wonder which kind of student is the most popular.' The first research question is: What decides which nouns can be used to talk about subkinds without attaching to *kind*? My answer has to do with: (Nearly) every bird specimen belongs to a kind of bird named by a noun, but not every student belongs to a kind of student named by a noun. For example, raven specimens belong to a kind of bird named by the noun *raven*, but 1st graders and BA students need not belong to kinds of students named by nouns (assuming *1st grader* and *BA student* are not nouns in the same sense as *raven*).

The background to the second research question is that certain phrases can be used to talk about either kinds or specimens. For example, *a kind of tree* is used to talk about a kind in *Oaks are a kind of tree*, but it is used to talk about a specimen in *This sapling (🌱) is a kind of tree*. Similarly, *this kind of animal* is used to talk about a kind in *This kind of animal is widespread*, but it is used to talk about specimens in *This kind of animal is sitting on my lawn*. The second research question is: What is the nature of the usage of such phrases for talking about specimens? My answer is divided in two; the first half is for (1) (with *every*), and the second is for (2) (without *every*).

(1) a. Fred is every kind of doctor. *predication*
b. There was every kind of local wine. *existential sentence*

(2) a. This sapling (🌱) is a kind of tree. *predication*
b. There's a kind of tree in the garden. *existential sentence*
c. This kind of animal is sitting on my lawn. *demonstrative*

My answer to the second research question for (1) has to do with the interaction between the meaning of *every* and the two constructions in (1) (predication and existential sentences).

My answer to the second research question for (2) has to do with: When using phrases like *kind of animal*, it can be unclear which kinds are being talked about. To illustrate, when a room consists of the animal specimens 🦅$_1$, 🦅$_2$, 🦉, 🐊, two possible answers to *How many kinds of animals are in this room* are: *Two (birds and reptiles)*, and *Three (owls, eagles and alligators)*. I propose that as part of this unclarity, *kind of animal* can be used to talk about specimens which share certain properties with kinds of animals.

As part of answering the second research question, I address the question of: What is the subkind relation? Put differently, what is the meaning of sentences of the form *Oaks are a kind of tree* and *Fishing is a kind of sport*? Part of my answer is that they convey the existence of an explanation to why instances of the subkind belong to the superkind, e.g. the first example expresses that there is an explanation to why oak tree specimens are trees (rather than bushes).

Table of Contents

Abstract iii
Acknowledgements iii
Table of Figures iv
Abbreviations v
1 Introduction 1
2 The subkind reading of nouns 8
2.1 The instance-subkind ambiguity 8
2.2 Relation between readings 14
2.3 Grammatical features: Animacy, countability 17
2.4 Denotation: Kinds, vagueness, disjointedness 23
2.5 Place in analyses 26
2.6 Appendix 30
2.6.1 Kind-level predicates 30
2.6.2 Reference to subkinds in mass morphosyntax 32
3 The availability of the subkind reading 36
3.1 The *jewel-jewelry* contrast 36
3.2 Previous analyses of subkind-countability 38
3.2.1 Grimm & Levin (2017): Not every letter is mail 38
3.2.2 Sutton & Filip (2018): Vanities overlap with chairs 40
3.2.3 Carlson (1980) and lexically-entered nominals 42
3.3 Partition analysis and remedies 44
3.3.1 Spreading over instead of partition 46
3.3.2 Unclassified specimens and ways of classification 48
3.3.3 Cumulative reference 51
3.4 The spreading over analysis 52
3.4.1 Availability of the subkind reading 52
3.4.2 Purpose 54
3.5 The subkind reading of object mass nouns 55
3.5.1 Survey 56
3.5.2 Analysis 61
3.6 Conclusion and discussion 63
4 Non-inclusion in the subkind relation 65
4.1 Background 65
4.1.1 Expressing the subkind relation 65
4.1.2 Sorts of non-inclusion in the subkind relation 68
4.1.3 Previous analyses 71
4.2 Analysis 72
4.2.1 Restricted subkind 73
4.2.2 Intended instantiation 76
4.2.3 Cumulative reference 78
4.2.4 The instance-level use of *a kind of N* 82
4.2.5 False subkind statements 85
4.3 Discussion 89
5 The subkind reading of nouns and binominal *kind* 94
5.1 Comparison 94
5.1.1 Similarities 94
5.1.2 Differences 98
5.2 Formulations 104

5.2.1 Denotation of binominal *kind* 104
5.2.2 Denotation of SUBK 107
5.3 Appendix: Carlson (1980) and disjointedness 108
6 Bare NPs and the kind-instance ambiguity 111
6.1 Sentential ambiguity without lexical ambiguity 112
6.2 Kind-reference and episodicity of bare NPs 116
6.3 Account 119
7 The instance-level use of subkind-denoting NPs 121
7.1 Predication 122
7.2 Existential sentences 136
7.3 Demonstratives 140
7.4 Conclusion 145
7.5 Appendix: Comments on alternative analyses 145
7.5.1 McNally (1997): Existential sentences 146
7.5.2 Wilkinson (1991): Demonstratives 147
7.5.3 Zamparelli (1998, 2000): Word order 150
8 Conclusion 154
9 Further issues on [$_{subk}$ N] 157
9.1 The subkind reading of nouns, animacy and gender 157
9.2 The subkind reading of lexical plurals 158
9.3 Kind- vs. subkind-reference of bare plurals as direct objects 160
References 163
Web examples 172
תקציר 1

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Table of Figures

Figure 1: McCawley's (1975) state of affairs. 32
Figure 2: Number of kinds distinct from pieces, weight and functionality. 33
Figure 3: Grimm & Levin (2017:ex.12). 39
Figure 4: Grimm & Levin (2017:ex.14). 39
Figure 5: Sutton & Filip (2018:fig.6). 41
Figure 6: Vanity. 41
Figure 7: Spreading over. 48
Figure 8: Photograph of an unidentified object (Agar 1930–58). 50
Figure 9: Example word preference task. 57
Figure 10: Mean ratings with 95%-confidence intervals. 59
Figure 11: Mean ratings of pairs. 59
Figure 12: Kay (1975:fig.2). 68
Figure 13: Impression. 91
Figure 14: Position relative to noun of *kind*, *type* and *sort* in COCA. 98
Figure 15: Oak leaves and acorns. 125
Figure 16: Wilkinson's (1991:§2.4) syntax 147
Figure 17: Wilkinson's (1991:§2) K use of *this kind of animal*. 148
Figure 18: Wilkinson's (1991:§2) Inst use of *this kind of animal*. 149
Figure 19: Zamparelli (2000:ex.304). 150
Figure 20: Mean ratings with 95%-confidence intervals. 159
Figure 21: Mean ratings of pairs. 159

Abbreviations

1	1st person
3	3rd person
dat	dative
def	definite
do	direct object
fem	feminine
inst	instance
msc	masculine
mf	masculine/feminine
n	neuter
nom	nominative
prf	perfect
pl	plural
prs	present
pst	past
sg	singular
ptcp	participle
refl	reflexive
sg	singular
subk	subkind

1 Introduction

A non-trivial fact about human language is that it can be used to talk about entities which exist outside of space but are instantiated by spatial entities. For example, the two subject nominals in (1) denote the raven genus (*Corvus*), which exists outside of space but is instantiated by raven specimens.

(1) a. The raven comes in several species. *definite singular*
 b. Ravens come in several species. *bare plural*

The subject nominals in (1) include *raven*, but nominals denoting the raven genus can also include nouns which name a superordinate kind of the raven genus, e.g. *animal* or *bird* in (2).

(2) a. This {animal, bird} comes in several species.
 b. This kind of {animal, bird} comes in several species.

In the terms of Krifka et al. (1995:§1.3), the subject nominals in (1) are nontaxonomic kind-referring NPs (*noun phrases*), and those in (2) are taxonomic kind-referring NPs. Put differently, the subjects in (1) and (2) respectively exhibit reference to kinds and to subkinds. The subjects in (2a) include nouns with the subkind reading (Carlson 1980:§6.1), notated as [$_{\text{subk}}$ N], and those in (2b) include binominal *kind* (Davidse et al. 2008:§4). These nominals are also in (3), where they are predicative rather than argumental as in (2).

(3) a. Ravens are a (widespread) bird. [$_{\text{subk}}$ bird]
 b. Ravens are a (widespread) kind of bird. *kind of bird*

Taxonomic kind-referring NPs are a sub-topic of genericity (Krifka et al. 1995:§1.3.3), and they feature in the analysis of various phenomena including existential sentences (McNally 1997) and definite generics (Dayal 2004:§3). However, few works treat them as a phenomenon in their own right. This thesis remedies the situation by addressing two research questions about reference to subkinds, a topic in natural language semantics whose primary focus is the nominal constructions in (2–3), i.e. [$_{\text{subk}}$ N] and *kind of N*. Deviating from the term of Krifka et al., I call them subkind-denoting NPs.

The background to the first research question is that not all nouns are like *bird* in (3a) in having access to the subkind reading in count morphosyntax, e.g.

the indefinite article. Six nouns like *bird* in this regard are in (4a) (§2.1), and four which reportedly are not are in (4b).

(4) a. bird, weapon, game, wine, emotion, crime (§2.1)
  b. i. airport (Carlson 1980:§6.1, ex.2c)
    ii. courage (Carlson 1980:§7.6.1, ex.109b)
    iii. student (Kwak 2012:ex.17a)
    iv. furniture (Cowper & Hall 2012:ex.8c, 8e)

Why is it that among the nouns in (4), only those in (4a) can occur in count morphosyntax with the subkind reading? Notably, there are (near-) synonyms differing in this property, e.g. *vehicles* vs. *transports* in (5) (Sutton & Filip 2018:ex.5).

(5) The brief [...] is to produce four $\left\{\begin{matrix}\text{vehicles}\\ \text{\#transports}\end{matrix}\right\}$ ranging in size from the Ford Fiesta to the Vauxhall Cavalier.

Transport in (5) is like *furniture* in (4b) in being uncountable but ranging over individuated entities (vehicles and pieces of furniture respectively). More such nouns which reportedly lack subkind-countability are *footwear*, *equipment* (Cowper & Hall 2012:§3.2.2) *jewelry* and *mail* (Rothstein 2017:§4.6).

With the preceding background in mind, (6) is the first research question of the thesis.

(6) What is the principle for the availability of the subkind reading?

To set the stage for (6), §2 is an introduction to the subkind reading of nouns, expanding on Carlson (1980:§6.1) and Krifka et al. (1995:§1.3.3). §2 argues that the subkind reading is available to many sorts of nouns, including ones whose instance reading is animate or inanimate, concrete or abstract, countable or uncountable. §2 also argues that [$_{\text{subk}}$ N] is derived (as opposed to basic), that [$_{\text{subk}}$ N] is inanimate and countable regardless of the animacy or countability of the same noun with the instance reading, that the extension of [$_{\text{subk}}$ N] is a set of subkinds (not *the* set), that these kinds can be realized by instances which do not exist in the circumstance of evaluation, and that the set is required to be disjoint. §2 also discusses the place of [$_{\text{subk}}$ N] in analyses, kind-level expressions like *widespread* and reference to subkinds in mass morphosyntax.

Next, the answer in §3 to (6) builds on two analyses. The first is Carlson's (1980:§6.1) appeal to lexically-entered nominals, under which a noun can get the subkind reading for a speaker only if the speaker's lexicon has nominals which name subkinds. Second, I build on Grimm & Levin's (2017) appeal to the taxonomy, under which a noun can be plural with the subkind reading only if it heads a taxonomy. My answer to (6) is that a noun can have the subkind reading if and only if it heads a certain hierarchical structure along with additional lexically-entered nominals. I argue that the nouns in (4a) meet this condition, but it is harder to meet for *airport*, *courage* and *student* in (4b). I further argue that *furniture* meets the condition, which explains why it can have the subkind reading in morphosyntax which is insensitive to countability (e.g. *the most widespread furniture*), but it cannot be used to count subkinds (or anything else) for non-semantic reasons.

The background to the second research question is that subkind-denoting NPs can be used to express propositions about instances of the subkind(s), as (7) shows with predication, existential sentences and demonstratives.

(7) a. This sapling (🌱) is a kind of tree. *predication*
b. There's a kind of tree in the garden. *existential sentence*
c. This kind of animal is sitting on my lawn. *demonstrative*
(Carlson 1980:§2, ex.82b)
(2b) This kind of animal comes in several species.

This kind of animal in (2b) denotes a kind, so how is it that in (7c) it is used to express a proposition about instances of a kind? The latter is an example of the (episodic) instance-level use of subkind-denoting NPs, which features in (8), the second research question of the thesis.

(8) What is the nature of the instance-level use of subkind-denoting NPs?

My answer to (8) is divided in two: (i) quantificational NPs in predication and existential sentences, and (ii) non-quantificational NPs in these constructions plus demonstratives. As background, McNally (1997) reports (9a) as ambiguous such that only one reading entails the existence of instances, while (9b) unambiguously entails that. The first pivot is non-quantificational (*a kind of wine*), and the second is quantificational (*every kind of wine*).

(9) a. There was a kind of wine that Chris disliked. (McNally 1997:ex.199a)

i. 'There was an instance of a kind.'

ii. 'There was a kind (no commitment to existence of its instances).'

b. There was every kind of local wine.

Entails the existence of instances (McNally 1997:ex.199b)

As an alternative to McNally analyzing the dual-usage in (9a) as an ambiguity, I analyze it as resolution of vagueness of the set denoted by *kind of wine* in particular and *kind of N* in general (Carlson 1980:§6.2). Under my analysis, the kind-level use in (9a.ii) comes from the set consisting of property-correlates of kinds, while the instance-level use in (9a.i) comes from it consisting of (rigid) property-correlates of instances. This analysis extends to predication with non-quantificational NPs and subkind-denoting demonstratives. Thus, the first half of my answer to (8) is (10).

(10) The instance-level use of subkind-denoting demonstratives and non-quantificational subkind-denoting NPs in predication and existential sentences comes from resolving the vagueness of ⟦kind of N⟧ as consisting of (rigid) property-correlates of instances.

The second half of my answer to (8) pertains to quantificational NPs in pivots of existential sentences (9b) and predication (11).

(11) Fred has been every kind of doctor. (McNally 1997:ex.122)

My answer to (8) for (9b) and (11) is: (i) quantificational subkind-denoting NPs must raise and leave a trace denoting a property-level variable, (ii) this variable is involved in type-mismatch in predication and existential sentences, and (iii) the only way to resolve the mismatch leads to a proposition about instances (Landman's 2004:§3). This is summarized in (12).

(12) The instance-level use of quantificational subkind-denoting NPs in predication and existential sentences comes from a certain resolution of type-mismatch involving the property-level variable denoted the trace of the raised quantificational NP.

The aforementioned answers to (8) are in §7, and §4–6 play the dual-role of setting the groundwork for §7 and answering their own questions. First, §4–§5 answer a fundamental question in reference to subkinds: What is the subkind relation? This is operationalized as (13).

(13) What are the truth-conditions of sentences of the form:
Oaks are a kind of tree. Fishing is a kind of sport.

§4 answers (13) from the perspective of non-inclusion in the subkind relation, exemplified by the sentences in (13) being interpretable as true despite the superkind not including the subkind. Specifically, not every case of fishing is sport, and not every oak specimen is a tree specimen; respective counterexamples are commercial fishing (Hampton 1982) and scrub oaks, which are bushes rather than trees in their adult stage (Kay 1975, Randall 1976). The subkind relation therefore tolerates exceptions, but in a limited manner; it tolerates those in (14.i), but not in the inverse (14.ii).[1]

(14) a. i. Oaks are a kind of tree. *true* (Kay 1975, Randall 1976)
ii. Trees are a kind of oak. *false*
b. i. Fishing is a kind of sport. *true* (Hampton 1982)
ii. Sport is a kind of fishing. *false*

With (14) in mind, part of my answer to (13) is that the subkind relation holds only if there is an explanation to why an instance of the subkind instantiates the superkind. Thus, the truth of (14a.i) is licensed by the existence of an explanation to why an oak tree specimen is a tree, e.g.: It instantiates a species which has responded to the selective pressures of habitation in low elevations by evolving into a kind of tree. Conversely, (14a.ii) is false because there is no explanation to why an oak tree specimen is an oak; instead, it simply is an oak. §4 gives a fuller answer to (13).

In answering (13), §4 also gives a partial answer to (15). §5 gives a more complete answer by comparing *kind of N* to $[_{\text{subk}}$ N], the two nominal constructions studied in this thesis.

(15) What is the denotation of binominal *kind*?

[1] (14b.ii) is false relative to an unrestricted domain. It is interpretable in true in:
There are palm trees, oak trees and oak bushes in the garden.
Trees are a kind of oak in this garden. *true*

§5 reviews similarities and differences between [$_{\text{subk}}$ N] and *kind of N*, and most are accounted for with a novel denotation of binominal *kind* and the operation which derives [$_{\text{subk}}$ N].

Next, §6 differs from the other sections in being about reference to kinds rather than subkinds. §6 sets the groundwork for the analysis of subkind-denoting demonstratives in §7 by discussing bare NPs, which are like demonstratives in having a kind-level use alongside an (episodic) instance-level use, (16).

(16)	a. i.	Ravens	come	in several species.	*kind*
	ii.	This kind of animal	comes	in several species.	*kind*
	b. i.	Ravens	are	sitting on my lawn.	*episodic instances*
	ii.	This kind of animal	is	sitting on my lawn.	*episodic instances*

(16) suggests a uniform analysis of the (episodic) instance-level use of bare NPs and subkind-denoting demonstratives. Indeed, such an analysis is given by Wilkinson (1991), where both nominals are ambiguous between kind- and instance-denoting. Thus, Wilkinson gives a positive answer to (17).

(17) Is the (episodic) instance-level use of subkind-denoting demonstratives the same as that of bare NPs?

Recall from (10) that under my analysis, the (episodic) instance-level use of subkind-denoting demonstratives comes from resolving the vagueness of ⟦kind of N⟧ as consisting of (rigid) property-correlates of instances. Under this analysis, the instance-level use of subkind-denoting demonstratives is not mediated by kind-reference, i.e. *this kind of animal* can refer to a sum of raven specimens without first referring to the raven genus. Thus, the answer to (17) depends on the answer to question (18), which is addressed in §6.

(18) Is the (episodic) instance-level use of bare NPs mediated by kind-reference?
a. Yes (Carlson 1980, Chierchia 1998b, Dayal 1992, 1999, 2004)
b. No (Wilkinson 1991, Krifka 2003, Cohen 2007, 2020)

§6 gives a new argument against (18), which relies on the aspect of Chierchia (1998b), Krifka (2003) and Dayal (2004) where episodicity of bare NPs is licensed by a last-resort type-repair mechanism. If episodicity of bare NPs were mediated by kind-reference, then it is predicted that episodicity should be impossible when kind-reference is possible. This prediction is not borne out by the reported ambiguity in (19).

(19) On June 28th, God created cows. (Carlson 1980:§7.4, ex.48)

a. ‘God created a number of cow specimens.’

b. ‘God created the cow species.’

The availability of (19a) is supported by (20) having a non-contradictory reading, showing that the negation of (19) can target (19a).

(20) God created the cow species, but
it is not the case that God created cows.
(It was the devil who created specimens.) *has non-contradictory reading*

My negative answer to (18) entails a negative answer to (17). The latter is empirically motivated by (21), which shows that replacing *cows* in (20) with *that kind of animal* yields a contradiction.

(21) God created the cows species, but
it is not the case that God created that kind of animal. *contradiction*

Next is an outline of my analysis of the difference between (20) and (21). For (20), I build on the aspect of Krifka (2003) and Cohen (2007, 2020) where episodicity of bare NPs comes from a type-shift, and I add that it is unranked with the type-shift responsible for kind-reference. Thus, the reading of (19) depends on which of two unranked type-shifts is used. By contrast, I argue for (21) that subkind-denoting demonstratives unambiguously range over properties which satisfy the predicate ⟦kind of N⟧, and that their (episodic) instance-level use comes from a certain resolution of the vagueness of ⟦kind of N⟧.

In conclusion, this thesis addresses two questions which I identify as central to the topic of reference to subkinds: What is the principle for the availability of the subkind reading of nouns? What is the nature of the instance-level use of subkind-denoting NPs? The next section sets the stage to the first question by reviewing the subkind reading of nouns.

2 The subkind reading of nouns

In introductory studies of formal semantics, one learns that the extension[2] of a noun is a set of entities (Partee 1975:§2.4). These entities are spatio-temporal in the leading examples, e.g. one might learn that the extension of *bird* is a set of bird specimens. However, assuming *ravens* in (1b) denotes the raven genus, (1b) shows that the set denoted by *bird* can include kinds of birds.

(1) a. <u>Moses the raven</u> is a **bird**. *specimen*
b. <u>Ravens</u> are a (widespread) **bird**. *genus*

Bird in (1b) has the subkind reading, which is not available to all nouns. This availability is the topic of §3, and this section introduces the reading itself, expanding on Carlson (1980:§6.1) and Krifka et al. (1995:§1.3.3). §2.1 argues that each token of *bird* in (1) has a different reading, notated as [$_{\text{inst}}$ bird] (*instance*) and [$_{\text{subk}}$ bird] (*subkind*). §2.2 discusses the relation between the readings and argues that [$_{\text{subk}}$ N] is derived. §2.3 argues that [$_{\text{subk}}$ N] is inanimate and countable regardless of the animacy or countability of [$_{\text{inst}}$ N]. §2.4 reviews three aspects of the denotation of [$_{\text{subk}}$ N]: Representation of kinds, vagueness and disjointedness. §2.5 discusses the place of [$_{\text{subk}}$ N] in analyses, and §2.6 discusses kind-level predicates and reference to subkinds in mass morphosyntax.

2.1 The instance-subkind ambiguity

Faced with (1), one might ask whether *bird* is ambiguous between ranging over specimens or subkinds. The alternative is that it ranges over both specimens and subkinds, as is repeated in (2).

(2) The extension of *bird*
a. is a set of specimens or a set of subkinds. *ambiguity*
b. can include both specimens and subkinds. *non-ambiguity*

(2a) is endorsed by Carlson (1980:§6.1, §7.6.1), Wilkinson (1991:§3.4.3), Krifka et al. (1995:§1.3.3) and Dayal (2004:§3), and one can read Ojeda (1993:§4.9) and Pelletier (2012:ex.20) as endorsing (2b). An argument for (2a) comes from Krifka's (1995) judgement that the grizzly, the polar bear and Albert

[2] The extension of an expression is its denotation relative to the circumstance of evaluation (including world, time, interlocutors and contextual restriction).

the bear cannot be called three bears (p.407), as is adapted in (3). (3d) shows that the conjunction in (3c) is not ruled out, which points towards the infelicity of (3c) being due to *two bears* rather than the conjunction.

(3) a. Winnie and Albert are two bears. *specimens*
b. The grizzly and the polar bear are two bears. *kinds*
c. #Winnie and the grizzly are two bears. *specimen and kind*
d. Winnie and the grizzly are popular. *specimen and kind*

(3) indicates that *two bears* is ambiguous; one reading ranges over pluralities of two bear specimens, and the other over pluralities of two kinds of bears. This ambiguity could be due to any number of the three expressions in *two bears*, namely *bear*, the plural morpheme or the numeral (see Kwak 2012:ex.24 and Grimm & Dočekal 2021 on the latter). Setting aside the latter two, that *bear* is ambiguous is supported by the judgement that replacing it with *specimen* or *species* disambiguates the nominal, (4).

(4) a. Albert and Winnie are two {specimens, #species}.
b. The grizzly and the polar bear are two {#specimens, species}.

I take (4) to sufficiently argue for *bear* having the ambiguity in (2a), but (5) is an additional argument, showing that whether *bear* ranges over instances of kinds affects compatibility with the relative pronoun *who* (cf. §2.3).

(5) a. Winnie is a bear { who, that} eats garbage.
b. Grizzlies are a bear {#who, that} eats garbage.

After arguing that each token of *bird* in (1) has a different reading, I review more nouns with this ambiguity. I discuss the six nouns in (6), which exemplify categories formed of the combinations of [±animate], [±concrete] and [±count] as features of [$_{\text{inst}}$ N]. (6) treats [$_{\text{inst}}$ animal] as countable, [$_{\text{inst}}$ emotion] as uncountable (Gillon 1999:§3.1) and [$_{\text{inst}}$ crime] as flexible (Grimm 2016), but this classification is not crucial; the goal is to consider a diverse group of nouns.

		[±animate]	[±concrete]	[±count]
(6)	a. animal	+	+	+
	b. weapon	–	+	+
	c. game	–	–	+
	d. wine	–	+	–
	e. emotion	–	–	–
	f. crime	–	–	±

(7) suggests that the nouns in (6) exhibit the same ambiguity as *bird* in (1). The optionality of the indefinite article is discussed in §2.3, and the labels of *instance* and *subkind* are motivated in the next paragraph.

(7)	a. i.	Moses the raven	is	an animal.	*instance*
	ii.	Ravens	are	an animal.	*subkind*
	b. i.	Napoleon's sword	is	a weapon.	*instance*
	ii.	Swords	are	a weapon.	*subkind*
	c. i.	Greco-NN, London 1623	is	a (chess) game.	*instance*
	ii.	Chess	is	a game.	*subkind*
	d. i.	The liquid in this glass	is	wine.	*instance*
	ii.	Merlot	is	(a) wine.	*subkind*
	e. i.	This outburst	is	(an) emotion.	*instance*
	ii.	Love	is	(an) emotion.	*subkind*
	f. i.	Cain's murder of Abel	is	(a) crime.	*instance*
	ii.	Murder	is	(a) crime.	*subkind*

In the (i) cases in (7), the extension of the predicative noun consists of animal specimens, pieces of weaponry, rounds of game, sums of wine, states of emotion and acts of crime respectively. These realize (aka instantiate) members of the extensions in (ii), namely kinds of animals, kinds of weapons, kinds of games, varieties of wine, kinds of emotion and kinds of crime. I opt for the term *instance* rather than *object* because the latter brings to mind individuated objects, but certain kinds (e.g. of wine) are instantiated by substances.

The nouns in (6) exhibit a superficially similar ambiguity, but this does not mean that it is the same ambiguity. As background, (8) shows *dish* can range over dish servings, dish titles or kinds of dishes.

(8) a. This serving of pho is a dish. *serving*
b. Gordon Ramsey's pho is a dish. *title*
c. Pho is a dish. *kind*

Dish titles and kinds of dishes are alike in existing outside of space but being instantiated by spatial entities (dish servings). Thus, it might not be surprising if language did not distinguish between kinds and titles. However, that English makes this distinction is suggested by my judgement that *two dishes* can range over pluralities of two kinds (as in 9a), or pluralities of two titles (as in 9b), but not pluralities of a kind and title (as in 9c). As in (3), (9d) shows that the conjunction in (8c) is not ruled out, which points towards the infelicity of (9c) being due to *two dishes* rather than the conjunction.

(9) a. Pho and borscht are two dishes. *kinds*
b. Gordon Ramsey's pho and his borscht are two dishes. *titles*
c. #Pho and Gordon Ramsey's borscht are two dishes. *kind and title*
d. Pho and Gordon Ramsey's borscht are popular. *kind and title*

A possible account of (9c) is that *dish* cannot range over entities in multiple levels of categorization (assuming kinds and titles co-exist in same hierarchy). However, the attested sentences in (10) indicate that *animal* and *mammal* can range over kinds in multiple levels, e.g. [$_{\text{subk}}$ animal] in (9a) ranges over the bird class and baboon genus. Attested cases are marked with [γ], and the webpage and retrieval date are in the appendix.

(10) a. We focused on the most populous **animal** from each category: birds for small animals and baboons for large animals. [γ]
b. There are only two **mammals**–one species and one genus–that can't instinctively swim [giraffes and apes]. [γ]

Following (10), I take (9) to indicate that each token of *dish* in (8) has a different reading (instance, title and subkind). Further indication of a distinction between titles and kinds comes from comparing *dish* to *soup*: The pho of a certain chef can be called a dish but not a soup in my judgement, given in (11).

(11) a. Gordon Ramsey's pho is a {dish, #soup}. *title*
b. Pho is a {dish, soup}. *kind*

My proposed account of (11) is that *dish* exhibits two ambiguities, which I call instance-subkind and copy-title (the instance and copy readings coincide). *Book* famously exhibits the latter ambiguity (Copestake & Briscoe 1995, Davies & Dubinsky 2003:§3.2), as seen in (12a–b). The subkind reading is perhaps not available to *book*, given my judgement that (12c) is odd (nouns lacking the subkind reading are the topic of §3).

(12)	a. This copy of Don Quixote	is	a book.	*copy*
	b. Don Quixote	is	a book.	*title*
	c. ?Novels	are	a (widespread) book.	*kind*

Dish, *soup* and *book* exemplify three categories of nouns pertaining to which of two ambiguities are exhibited. *Dish* exhibits the instance-subkind and copy-title ambiguities, *soup* only exhibits the former, and *book* exhibits the latter but perhaps not the former. This is summarized in (13), which includes the unambiguous *specimen* and *species*.

		instance-subkind	copy-title
(13)	a. dish	√	√
	b. soup	√	×
	c. book	?	√
	d. specimen, species	×	×

The two ambiguities in (13) are similar but distinct, so it is not trivial that the nouns in (6) exhibit the same ambiguity. I argue that they do by showing in (14) that a predicative noun in (7) is compatible with binominal *kind* if and only if it has the proposed subkind reading (binominal *kind* combines with nouns, as in *kind of animal* but not *kind of an animal*).[3]

[3] I judge that the contrasts in (14) are starker when *one* is unstressed, because stress licenses a reading where the instance is an example of one kind.
Moses the raven is ONE kind of animal. 'Moses is an example of one kind of animal.'
See §4.2.4 and §7 on the instance-level use of *kind of N*.

(14) a. $\begin{Bmatrix}\text{\#Moses the raven}\\ \text{Ravens}\end{Bmatrix}$ $\begin{Bmatrix}\text{is}\\ \text{are}\end{Bmatrix}$ one kind of animal.

b. $\begin{Bmatrix}\text{\#Napoleon's sword[4]}\\ \text{Swords}\end{Bmatrix}$ $\begin{Bmatrix}\text{is}\\ \text{are}\end{Bmatrix}$ one kind of weapon.

c. $\begin{Bmatrix}\text{\#Greco -- NN, London 1623}\\ \text{Chess}\end{Bmatrix}$ is one kind of game.

d. $\begin{Bmatrix}\text{\#The liquid in this glass}\\ \text{Merlot}\end{Bmatrix}$ is one kind of wine.

e. $\begin{Bmatrix}\text{\#This outburst}\\ \text{Love}\end{Bmatrix}$ is one kind of emotion.

f. $\begin{Bmatrix}\text{\#Cain's murder of Abel}\\ \text{Murder}\end{Bmatrix}$ is one kind of crime.

Binominal *kind* distinguishes not only between the proposed instance and subkind readings of the nouns in (6), but also between the title and subkind readings of *dish*, (15).

(15) a. Gordon Ramsey's pho is one (#kind of) dish. *title*
b. Pho is one (kind of) dish. *kind*

Parallel to the argument from *kind* that the nouns in (6) exhibit the same ambiguity, this could be argued with expressions which are compatible with all cases of the proposed instance reading and only them. Such expressions would behave like the hypothetical *klud* of Carlson (1980:§5, ex.1), (16).

(16) a. Moses the raven is a klud animal. (cf. Carlson 1980:§5, ex.1)
b. #Ravens are a klud animal.

Carlson knows of no expression which behaves like *klud* in (16). One can read De Belder (2011) as proposing *whole* and *complete*, but they are incompatible with some proposed cases of the instance reading in (7), e.g. (7d.i) *The liquid in this glass is (#whole) wine*. Thus, my best argument for the nouns in (6) exhibiting the same ambiguity comes from *kind* (see §2.6.1 for why expressions like *widespread* are less helpful). If one wants to argue that they exhibit different ambiguities, one could show nouns which exhibit the proposed multiple ambiguities, parallel to the previous argument that *dish* exhibits two ambiguities.

Adopting Carlson's (1980:§6.1, §7.6.1) terminology, I say that the predicative nouns in the (ii) sentences in (7) have the subkind reading, also known as the

[4] *Napoleon's sword* is felicitous in (14b) if interpreted as naming a kind of weapon rather than a piece of weaponry.

taxonomic reading (Krifka et al. 1995:§1.3.3). This reading features relatively prominently in Wilkinson (1991:§3.4.3), Geurts (1996), Doetjes (1998:§2.1.2), Dayal (2004:§3), Le Bruyn (2007), Alrenga (2007), Oosterhof (2008:§3.5), Knittel (2009), Mueller-Reichau (2011), De Belder (2011), Weir (2012), Kwak (2012), Nomoto (2013:§2.4.2), Basso & Vogt (2013), Basso (2014), Basso & Pires de Oliveira (2015), Anderson (2018), Husband (2019), Despić (2019) and Kwapiszewski & Fuellenbach (to appear). To serve as a reference point to this diverse bibliography, the next subsections continue to introduce [$_{\text{subk}}$ N].

After identifying the instance-subkind ambiguity, the next subsection discusses the relation between the readings.

2.2 Relation between readings

What is the relation between the instance and subkind readings? This subsection discusses four options, according to which both are basic, both are derived, the first is derived from the second or vice versa, (17). I argue that the subkind reading is derived, i.e. (17a.ii) or (17b.ii) is correct.

(17) The instance and subkind readings of the nouns in (6)

a. have the same status;	(Nomoto 2013:§3.2.2)
i. both are basic.	not attested
ii. both are derived.	(Zamparelli 2000:ex.461-462)
	(Kratzer 2008:ex.2)
b. have different statuses;	
i. [$_{\text{inst}}$ N] is derived from [$_{\text{subk}}$ N].	not attested
ii. [$_{\text{subk}}$ N] is derived from [$_{\text{inst}}$ N].	(Carlson 1980:§6.1, §7.6.1)

Starting with (17a.i), Mueller-Reichau (2011:§1.5) writes that Zamparelli (1998:ex.80) and Dayal (2004:§3.2) adhere to it, but it is a more precise that they are silent about whether both readings are derived from a third more basic reading, and the same goes for Nomoto (2013:§3.2.2). In any case, a disadvantage of (17a.i) is that if both readings are basic, then it is mysterious why members of the extension [$_{\text{inst}}$ N] realize members of the extension of [$_{\text{subk}}$ N], e.g. bird specimens realize kinds of birds. This is remedied if both readings are derived from a third more basic reading, as discussed next.

Continuing to (17a.ii), Zamparelli (2000:ex.461–462) assumes that nouns basically denote kinds (as ontological primitives), and that [$_{\text{inst}}$ N] and [$_{\text{subk}}$ N] are derived via **KO** (*kind to object*) and **KSK** (*kind to subkind*) (cf. the **OU** and **KU** of Krifka 1995). The output of **KO** is the set of instances of the kind (in the circumstances of evaluation), and that of **KSK** is the set of subkinds. Assuming instances of a subkind also realize the superkind (e.g. raven specimens realize the raven and bird kinds), this explains why members of the extension of [$_{\text{inst}}$ N] realize members of the extension of [$_{\text{subk}}$ N].

As for (17b.i), I know of no analysis adhering to it. Borik & Espinal (2015) are part of a body of literature which assumes that nouns basically denote sets of kinds, but they adopt (17b.ii) for [$_{\text{subk}}$ N] (ibid. §5.1). I am amenable to an analysis where all nouns in English can denote sets of kinds in some capacity, but it is difficult to identify this denotation with [$_{\text{subk}}$ N]. For example, in McNally's (2017) analysis of *legal advisor*, ⟦legal⟧ combines with a set of kinds denoted by *advisor*. However, human nouns like *advisor* are proposed to lack the subkind reading (Kwak 2012). It is unclear how the instance reading of human nouns would be derived from a non-existent subkind reading, so I dismiss (17b.i).

Finishing with (17b.ii), Carlson (1980:§6.1) posits a lexical rule which derives [$_{\text{subk}}$ N] from the intension of [$_{\text{inst}}$ N]. This analysis and that of Zamparelli (2000:ex.461–462) are the best-developed ones that I know of for the relation between [$_{\text{inst}}$ N] and [$_{\text{subk}}$ N].

Related to (17b.ii) is the idea that [$_{\text{subk}}$ N] is coerced (aka last-resort), i.e. it is derived only to prevent ungrammaticality. This is endorsed by Borik & Espinal (2015:§5.1), which I discuss in relation to (18) (ex.47b). They write that *este tigre* 'this tiger' (Spanish) in (18) refers to a kind of tiger, but they omit the relevant fact that it is also interpretable as referring to a tiger specimen (as is the judgement of a Spanish consultant of mine).

(18) Este tigre vive en la selva.
this tiger lives in the jungle
'This tiger {specimen, type} lives in the jungle.'

Borik & Espinal propose that *este tigre* 'this tiger' basically denotes a tiger specimen and is coerced into denoting a subkind via individual-level predicates like *vive en la selva* 'lives in the jungle'. However, Borik & Espinal write that such predicates are true of specimens and kinds (fn.3), so the subkind reading in (18) is not needed to prevent ungrammaticality. The ambiguity of (18) indicates that [$_{\text{subk}}$ N] is not coerced, so I reject this aspect of their analysis.

Next I discuss Nomoto's (2013:§3.2.2) objection to (17b.ii). First, Nomoto argues that Carlson's (1980:§6.1, §7.6.1) data which motivates (17b.ii) is compatible with both readings having an identical status. Some of this data is in (19) (Carlson predicts degradation for speakers who do not know names for kinds of airports or courage; cf. §3.2.3).

(19) a. Which {plant, ?airport} is the most widespread?
b. many {virtues, *courages}

Motivated by (19), Carlson argues that *airport* and *courage* lack the subkind reading, and that the rule which derives [$_{\text{subk}}$ N] is inapplicable to these nouns (cf. §3.2.3). However, Nomoto argues that (19a) is compatible with *airport* having a subkind reading whose singleton extension consists of airports as a kind (cf. Geurts 1996).

Nomoto not only argues that (19) does not necessitate (17b.ii), but he also argues against (17b.ii) with a contrast from Carlson (1980:§7.6.1:ex.112), adapted in (20). Carlson's generalization is that modification increases the acceptability of *a(n) [$_{\text{subk}}$ N]* in argument position.

(20) At Seiko, they make a watch ?(that also serves as a juice squeezer).

Nomoto writes that (20) is puzzling under (17b.ii), because the rule deriving [$_{\text{subk}}$ N] should be either applicable or inapplicable to *watch*. Contra Nomoto, I argue that (20) is compatible with (17b.ii). First, the felicitous version of (20) might have *watch* with the title reading, as in (21b) (cf. §2.1). This leaves open the possibility of *watch* lacking the subkind reading. Alternatively, the oddness in (20) could be due to the false implicature that they make only one watch title at Seiko, which is highlighted by responding to (20) via "I am pretty sure they make more than one watch." Whether *watch* can have the subkind reading depends on the judgement towards (21c), but the false implicature suffices to explain (20).

(21) a. My present to you	is	a watch.	*copy*	
b. The Rolex Datejust	is	a watch.	*title*	
c. Chronographs	are	a (widespread) watch.	*kind*	(judgement withheld)

In sum, I agree with Nomoto that (19) is compatible with [$_{\text{inst}}$ N] and [$_{\text{subk}}$ N] having the same status, but I disagree that (20) argues against [$_{\text{subk}}$ N] being derived from [$_{\text{inst}}$ N].

The preceding discussion dismisses (17a.i) and (17b.i), so what remains are (17a.ii) and (17b.ii). Both posit that [$_{\text{subk}}$ N] is derived, and they differ in whether the input is [$_{\text{inst}}$ N] or a third denotation from which [$_{\text{inst}}$ N] is also derived. I do not know how to empirically distinguish between these options, but one's assumption regarding the basic denotation of a noun gives reason to prefer one over the other. If one assumes that nouns basically denote ontological primitives, then (17a.ii) is needed because two operations are needed to derive two sorts of sets (one of instances, another of subkinds). By contrast, if one assumes that nouns basically denote instance-level properties, then one operation suffices to get to [$_{\text{subk}}$ N]. There is no need to decide between these options here, but I opt for (17b.ii) in §5.

Given that [$_{\text{subk}}$ N] is derived, the question arises of what derives it. Carlson (1980:§6.1) opts for a rule of the following form: If English has a noun which ranges over instances and meets certain conditions, then English also has a homophonous noun which ranges over certain kinds. By contrast, this thesis conceives of [$_{\text{subk}}$ N] as derived via a covert element notated as SUBK, which is roughly-synonymous with binominal *kind*. This is done mainly to facilitate the comparison between [$_{\text{subk}}$ N] and *kind of N* in §5.

[$_{\text{subk}}$ N] being derived plays a role in the next subsection, which argues that the output is inanimate and countable.

2.3 Grammatical features: Animacy, countability

This subsection argues that [$_{\text{subk}}$ N] is inanimate and countable regardless of the animacy or countability of [$_{\text{inst}}$ N].

Animacy manifests in English in *wh*-words and relative pronouns. Starting with the latter, [$_{\text{inst}}$ animal] is compatible with *who* (animate) or *that* (unspecified for animacy), but [$_{\text{subk}}$ animal] is only compatible with *that*, (22).

(22) a. i.	Polly	is an	animal	{ who, that}	eats	garbage.
ii.	Parrots	are an	animal	{#who, that}	eats	garbage.
b. i.	Polly and Pingu	are two	animals	{ who, that}	eat	garbage.
ii.	Parrots and penguins	are two	animals	{#who, that}	eat	garbage.

Continuing to *wh*-words, the name of a kind is not a felicitous answer to a *who*-question, but it is felicitous to a *what*-question, (23).

(23) a. **Q**: Who loves who? **A**: An loves # parrots.
b. **Q**: Who loves what? **A**: An loves parrots.

Continuing to [$_{\text{subk}}$ N], (24) shows that as an answer to a *who*-question, *the most popular dog* cannot be built on [$_{\text{subk}}$ dog], but it can be built on that as an answer to a *what*-question.

(24) a. **Q**: Who did An study? **A**: She studied the most popular dog.
× 'An studied the most popular dog breed.' × [$_{\text{subk}}$ dog]
(√ 'An studied the most popular dog specimen.' √ [$_{\text{inst}}$ dog])
b. **Q**: What did An study? **A**: She studied the most popular dog.
√ 'An studied the most popular dog breed.' √ [$_{\text{subk}}$ dog]

My interpretation of (22) and (24) is that [$_{\text{subk}}$ N] is inanimate even if [$_{\text{inst}}$ N] is animate. Following §2.2 where [$_{\text{subk}}$ N] derived, I posit that the output is an inanimate noun (cf. McNally 1998:§2.3). (25) shows that (23) replicates in Hebrew, i.e. the English facts are not isolated. Thus, although kinds differ in whether their instances are animate, this does not affect the grammatical animacy of [$_{\text{subk}}$ N] in the present examples, which is uniformly [–animate].

(25) a. et mí máks xakár? et ha- kélev haxí popolári.
$_{\text{def.do}}$ who Max studied? $_{\text{def.do}}$ $_{\text{def}}$ dog most popular
'Who did Max study? The most popular dog {×breed, √specimen}.'
b. et má máks xakár? et ha- kélev haxí popolári.
$_{\text{def.do}}$ what Max studied? $_{\text{def.do}}$ $_{\text{def}}$ dog most popular
'What did Max study? The most popular dog {√breed, √specimen}.'

Continuing to countability, it is noted as early as Jespersen (1909:§5.211) that nouns which are uncountable under the instance reading are countable under the subkind reading (Baker 1978:§10, fn.1, Pelletier & Schubert 2002, Chierchia 1998a:ex.10, 2010:ex.10, Doetjes 2012:§4.1). Put differently, [$_{\text{subk}}$ N] can occur in (perhaps) any count morphosyntax, e.g. the nine contexts in (26) with count-occurrences of *wine* (cf. Koslicki 1999).

(26) a. Merlot is a wine. *a(n)* N_{SG}
b. Merlot is one wine that I like. *one* N_{sg}
c. Wines are often widespread. *inflectional plural*[5]
d. Merlot and cabernet are two wines. *two* N_{pl}
e. Both wines are widespread. *both* N_{pl}
f. Several wines are widespread. *several* N_{pl}
g. A number of wines are widespread. *a number of* N_{pl}
h. Each wine is widespread. *each* N_{pl}
i. Every wine is widespread. *every* N_{pl}

The previous paragraph has *perhaps* in brackets because Chesterman (1991:ex.93–94) writes that a certain view of genericity predicts that a plural noun with unstressed *some* (*sm*; Postal 1966) should lack the subkind reading. Against this, Chesterman reports (27).

(27) Continued destruction of the rainforest will lead to the extermination of sm rare insects. (Chesterman 1991:ex.94)

Given that [$_{\text{subk}}$ N] can occur in any count morphosyntax, one might ask whether it can occur in mass morphosyntax. If compatibility with *widespread* is considered a necessary condition for [$_{\text{subk}}$ N] (as is adopted in §2.6.1), then (28) gives a negative answer.

(28) a. A $\left\{\begin{matrix}\text{few}\\ \text{\#little}\end{matrix}\right\}$ widespread $\left\{\begin{matrix}\text{wines have}\\ \text{\#wine has}\end{matrix}\right\}$ been cultivated since prehistory.
b. A $\left\{\begin{matrix}\text{number}\\ \text{\#bit}\end{matrix}\right\}$ of widespread $\left\{\begin{matrix}\text{wines have}\\ \text{\#wine has}\end{matrix}\right\}$ been cultivated since prehistory.
c. ({All, Most, A lot of}) widespread $\left\{\begin{matrix}\text{wines have}\\ \text{\#wine has}\end{matrix}\right\}$ been cultivated since prehistory.

I propose to account for (28) as follows. First, the [±count] value of *wine* is affected by morphosyntax such that it is [+count] in *a lot of wines* but [–count] in *a lot of wine*. Second, *wine*$_{\text{[–count]}}$ unambiguously has the instance reading, i.e. it ranges over sums of wine, which are precluded from the extension of *widespread*. Thus, *widespread wine*$_{\text{[–count]}}$ is infelicitous due to a sortal mismatch. Conversely,

[5] *Inflectional* is specified to preclude the derivational plural morpheme, which perhaps occurs in e.g. *riches* (Acquaviva 2008, Gardelle 2016:ex.7).

one interpretation of *wine*$_{[+\text{count}]}$ is the subkind reading, so *widespread wine*$_{[+\text{count}]}$ is felicitous under this reading.

The link between [$_{\text{subk}}$ N] and countability is further revealed by pairs like *wild animal* and *wildlife* (Wisniewski et al. 1996, Casey 1997). Again, if compatibility with *widespread* is a necessary condition for [$_{\text{subk}}$ N], then (29) indicates that [$_{\text{subk}}$ wildlife] is precluded from mass morphosyntax.

(29) a. A $\left\{\begin{matrix}\text{few}\\ \text{\#little}\end{matrix}\right\}$ widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

b. A $\left\{\begin{matrix}\text{number}\\ \text{\#bit}\end{matrix}\right\}$ of widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

c. ({All, Most, A lot of}) widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

My proposed account of (29) parallels that of (28). First, *wildlife* in mass morphosyntax unambiguously has the instance reading, so it ranges over wild animal specimens (and sums thereof), which are precluded from the extension of *widespread*. Thus, *a little widespread wildlife* is infelicitous due to a sortal mismatch. Conversely, one interpretation of *wild animal* is the subkind reading, so *a few widespread wild animals* is felicitous under this reading.

Following the conclusion of §2.2 that [$_{\text{subk}}$ N] is derived, I posit that the output of the derivation is a [+count] noun. Indeed, this is Bunt's (1985:11) conception of the universal sorter, which can turn any uncountable noun to a countable one with the subkind reading (but see §3).

The preceding analysis has the positive outcome of accounting for the facts regarding the indefinite article in (7), expanded in (30).

(30) a. i.	Merlot	is	(a)	wine.
ii.	Merlot	is	#(a)	widespread wine.
b. i.	Love	is	(an)	emotion.
ii.	Love	is	#(a)	widespread emotion.
c. i.	Murder	is	(a)	crime.
ii.	Murder	is	#(a)	widespread crime.

I account for (30a) as follows. First, the indefinite article is optional in (i) because each version expresses a different proposition: *Merlot is wine* is roughly paraphrasable as 'Every bit of merlot is wine', while *Merlot is a wine* expresses the subkind relation (cf. §4). By contrast, the indefinite article is obligatory in (ii) because otherwise *wine* would be [–count], which combined with *widespread* is infelicitous for the reason discussed in relation to (28–29). A parallel explanation holds for the rest of (30).

As an aside, reference to subkinds can be achieved not only via $[_{\text{subk}}$ N]. Thus, $[_{\text{subk}}$ N] being [+count] does not preclude the possibility of [–count] nominals exhibiting reference to subkinds, as discussed in §2.6.2.

The proposal that $[_{\text{subk}}$ N] is precluded from mass morphosyntax offers a new perspective on cross-linguistic data where the subkind reading is available to bare singulars in Hebrew but not Brazilian Portuguese. The latter is shown in (31) (Pires de Oliveria & Rothstein 2011:ex.14–15, 17b)

(31) a.	Baleira	está	em	extinção.
	whale	$\text{be}_{\text{prs.3sg}}$	in	extinction.
	‘{√ The, × A kind of} whale is on the verge of extinction.’			
b.	Computador	foi	inventado	por Babbage.
	computer	$\text{be}_{\text{pst.prf}}$	$\text{invent}_{\text{pst.ptcp.pl}}$	by Babbage
	‘{√ The, × A kind of} computer was invented by Babbage.’			

Unlike (31), the subkind reading is available to the Hebrew bare singulars in (32). This contrast joins additional ones between bare countable singulars in Hebrew and Brazilian Portuguese (Doron 2003, Rothstein 2013, Cabredo Hofherr 2013; cf. Tonciulescu 2009).

(32) a.	livyatán	nimtsá	be-	sakanát	hakxadá.
	whale	$\text{be}_{\text{prs.3sg}}$	in	danger	extinction
	√ ‘A kind of whale is in danger of extinction.’				
b.	maxʃév	humtsá	al yadéy		bábedʒ.
	computer	$\text{invent}_{\text{pst.3sg}}$	by		Babbage
	√ ‘A kind of computer was invented by Babbage.’				

Mass morphosyntax is not a notion in Pires de Oliveira & Rothstein (2011), but it is reasonable to read them as arguing that bare N_{sg} is mass in Brazilian Portuguese. Thus, the contrast between (31) and (32) might be due to bare N_{sg} being mass in Brazilian Portuguese but not Hebrew. Therefore, it is a potential cross-linguistic generalization that $[_{\text{subk}}$ N] is precluded from mass morphosyntax, although what counts as that differs between languages.

As for grammatical features besides animacy and countability, I discuss gender in Hebrew, where only some animal nouns inflect for gender; there is *kélev* ‘dog_{msc}’ and *kalbá* ‘dog_{fem}’, but only *tsfardéa* ‘frog_{fem}’. Notably, the subkind reading is available to *tsfardéa* but not *kalbá*, as seen in (33). Thus, a preliminary generalization is that the subkind reading is not available to feminine nouns which inflect for gender.[6]

(33)	a.	ha-	akíta	hu	kélev	nafóts.
		the	Akita	is$_{msc}$	dog$_{msc}$	common$_{msc}$
		'The Akita is a common dog.'				
	b.	#ha-	akíta	hi	kalbá	nefotsá.
		the	Akita	is$_{fem}$	dog$_{fem}$	common$_{fem}$
	c.	ha-	ilanít	hi	tsfardéa	nefotsá.
		the	treefrog	is$_{fem}$	frog$_{fem}$	common$_{fem}$
		'The treefrog is a common frog.'				

In conclusion, [$_{inst}$ N] and [$_{subk}$ N] can have differing [±animate] and [±count] values, but in Hebrew they have the same gender, (34). It is not trivial that this should be the case, so the interaction between [$_{subk}$ N] and grammatical features is potential for future research (cf. §9.1).

			[$_{inst}$ N]	[$_{subk}$ N]
(34)	a.	*animal*	[+animate]	[–animate]
	b.	*wine*	[–count]	[+count]
	c.	*tsfardéa* 'frog'	feminine	feminine

To conclude this subsection, I mention a difference between nominals built on [$_{inst}$ N] and [$_{subk}$ N] which might pertain to grammatical features. Nemoto (2005) reports that in Korean and Japanese, plural-marking is optional in demonstratives referring to pluralities of instances, but obligatory in ones referring to pluralities of kinds (ex.7–10, 38–39). This might be due to [$_{inst}$ N] and [$_{subk}$ N] differing in the value of a grammatical feature in these languages.[7]

To complement the discussion of grammatical features in this subsection, the next one discusses the denotation of [$_{subk}$ N].

[6] A putative counterexample is *pará* 'cow'; it is feminine and inflects with the masculine *pár* 'bull', but [$_{subk}$ pará] is felicitous. I write *putative*, because perhaps (one reading of) *pará* ranges over male cows, which would make it an auto-hyponym (Horn 1984).

[7] I have hypothesized (but have been unable to support) that in languages with general number (Paul 2012), [$_{inst}$ N] is [+cumulative] and [$_{subk}$ N] is [–cumulative]. This feature is introduced in §3.3.3.

2.4 Denotation: Kinds, vagueness, disjointedness

This subsection discusses three aspects of the denotation of $[_{\text{subk}}$ N]: Representation of kinds, vagueness and disjointedness.

Given that the extension of $[_{\text{subk}}$ N] is a set of kinds, what can be said about them? I write *a set* rather than *the set* for reasons clarified after the upcoming (39). First, I argue that these kinds are not sums of specimens which exist in the circumstance of evaluation. As background, observe in (35) that *might die out* is compatible with $[_{\text{subk}}$ animal] but not $[_{\text{inst}}$ animal].

(35) $\left\{\begin{array}{c}\text{\#Moses the raven is}\\ \text{Ravens are}\end{array}\right\}$ an animal that might die out.

Say (35) is evaluated relative to world w, and $\vee\text{RAVEN}_w$ is the sum of all raven specimens in w. How is this sum related to the denotation of *ravens* in (35), notated as ⟦ravens⟧? Either ⟦ravens⟧ = $\vee\text{RAVEN}_w$, or ⟦ravens⟧ is instantiated by the specimens which are part of $\vee\text{RAVEN}_w$, alongside other raven specimens whose lifespan need not overlap with those of the former. The first option is ruled out by the contradiction (notated as '⊥') in (36).

(36) a. (Uttered in 2020) (The) ravens will die out by 2100.
b. ⊥ There will be living ravens in 2100.

(36) indicates that the extension of *will die out* is not a set of sums of specimens which exist in the circumstance of evaluation. If it were, then (36a) should have a reading paraphrasable as 'The living ravens in 2020 will die by 2100.' Thus, the extension of $[_{\text{subk}}$ animal] is not a set of sums of specimens which exist in the circumstance of evaluation, and the same goes for $[_{\text{subk}}$ N] in general. This contradicts Ojeda's (1993:§4.9) analysis of $[_{\text{subk}}$ camel], which works for cases like *There are four camels in America* (ibid. ex.1b) but is inadequate for other purposes (as is recognized by ibid. §4.19).

As for what the extension of $[_{\text{subk}}$ N] is, five options are in (37), alongside references to works with different representations of kinds. In the type-logical types, *e* stands for *entity* and *t* for *truth-value*, and my preferred mnemonic for *s* is *circumstance of evaluation*.

(37) a. ontological-primitive (Carlson 1980),
correlate of a function e (McNally 1997)
b. set of (possible) specimens <e,t> (Quine 1994, Kay 1971)
c. individual concept <s,e> (Chierchia 1998b, 2010)[8]
d. property <s,<e,t>> (Van Geenhoven 2000)
e. propositional function <e,<s,t>> (Kay 1975)

For present purposes, it suffices to note that every representation in (37) can be matched with a relation (e.g. the realization relations of Carlson 1980:§4) between members of the extension of [$_{subk}$ N] and instances in any circumstance of evaluation. §5 opts for (37d), but I do not reject the other options.

Next, recall that I write that the extension of [$_{subk}$ N] is a set of kinds rather than *the* set. This is because [$_{subk}$ N] is vague, i.e. its meaning does not determine its extension, even if all the information is known about the state of affairs. An introductory example of such vagueness is the deictic interpretation of pronouns. Consider *He's blonde* and a state of affairs where the men are 👴 (not blonde) and 👱 (blonde); even though the set of blondes is known, one cannot judge the truth-value without knowing who *he* is referring to, (38).

(38) [The extension of *man* is {👴, 👱}, and that of *blonde* is {👱}]
He's blonde.
a. True if *he* refers to 👱
b. False if *he* refers to 👴

Parallel to (38), one cannot judge the truth-value in (39) without specifying which kinds are in the extension of [$_{subk}$ animal] (cf. Ojeda 1993:§4.9).

(39) [The set of animals in this room is {🦅$_1$, 🦅$_2$, 🦉, 🐊}]
There are exactly two animals in this room.
a. True with the continuation *namely birds and reptiles*.
b. False with the continuation *namely eagles, owls and alligators*.

Vagueness as in (38–39) is standardly represented with a free variable, as Carlson (1980:§6.2) does with the vagueness of *kind of N* which parallels that of [$_{subk}$ N] (cf. §5).

[8] Chierchia (1998b) represents kinds as objects of type <s,e> which live in the interpretation domain of type e.

Next, both continuations in (39) are felicitous, indicating that the extension of [$_{\text{subk}}$ animal] can include the bird or owl kind. But can it include both? This brings us to disjointedness. As background, [$_{\text{subk}}$ pet] in (40b–d) ranges over kinds which overlap without one including the other, e.g. the finch kind overlaps with that of caged birds (some finches are caged), but neither includes the other (not every finch is caged, and not every caged bird is a finch).

(40) a. <u>Birds</u> are a popular **pet** because they're small. [γ]
b. <u>Finches</u> are a **pet** that won't get on the neighbors' nerves. [γ]
c. <u>Songbirds</u> are a popular **pet**. [γ]
d. <u>Caged birds</u> are a popular **pet** in Afghanistan. [γ]

Consider (41) for a first approximation of whether the extension of [$_{\text{subk}}$ pet] is required to be disjoint.

(41) <u>Finches</u> are a popular **pet**, and so are <u>caged birds</u>.

The felicity of (41) does not indicate whether the extension of [$_{\text{subk}}$ pet] can overlap, because perhaps the overlap is resolved by restricting the finch kind to not be instantiated by caged bird specimens, or restricting the caged bird kind to not be instantiated by finch specimens. If such restriction occurs, then a specimen should not be able to instantiate multiple overlapping kinds. Before checking this prediction, note that the attested sentences in (42) show that such overlap resolution need not occur with *kind of N* (cf. §5.1.2).

(42) a. In my opinion, there are two kinds of performers:
1 - Concert performers […] 2 - Club performers […]
For a lot of people, it's easy to be both **types of performers**. [γ]
b. I'd have to say I'm both **kinds of artist**,
and I don't see that as a contradiction. [γ]

My judgement in (43) suggests that the extension of [$_{\text{subk}}$ pet] is required to be disjoint, which in turn suggests that the felicity (41) is due to the subkinds undergoing overlap resolution via restriction.

(43) <u>Finches</u> are a popular **pet**, and so are <u>caged birds</u>,
so unsurprisingly Polly is both {#pets, kinds of pets}.

In conclusion, this subsection argues that the extension [$_{\text{subk}}$ N] is a set of kinds (not *the* set), that these kinds can be realized by instances which do not exist in the circumstance of evaluation, and that the set is required to be disjoint (no two kinds can share instances). The next subsection discusses the place of [$_{\text{subk}}$ N] in analyses.

2.5 Place in analyses

In addition to being a phenomenon in its own right, the subkind reading features in analyses of other phenomena. To illustrate, this subsection discusses Alrenga (2007) and Weir (2012), whose appeal to the instance-subkind ambiguity maintains that certain pre-nominal elements are unambiguous. First, Alrenga discusses the type-token identity ambiguity in (44).

(44) An owns the same car as Bo used to own.
a. 'An owns the same car **unit** as Bo used to own.' *token identity*
b. 'An owns a car of the same **kind** as Bo used to own.' *type identity*

Alrenga argues that the ambiguity in (44) stems not from *same* (contra Heim 1985:§4.2), but from the instance-subkind ambiguity of *car*. This makes a prediction which Alrenga does not check: If N lacks the subkind reading, then replacing *car* in (44) with N should eliminate the type-identity reading. Human nouns like *student* proposedly lack the subkind reading (Kwak 2012),[9] and this prediction is borne out in (45) in my judgement. (45) is not a major empirical claim of this thesis, but it is meant to illustrate the predictions of an analysis where an NP is built on [$_{\text{subk}}$ N].

(45) An met the same student as Bo met.
a. 'An met the same student **specimen** as Bo met.' √ *token identity*
b. 'An met a student of the same **kind** as Bo met.' × *type identity*

Notably, Alrenga limits his attention to cases where *same* comes with an *as*-clause. Otherwise, *same student* can express non-token identity, as in (46) where *same student* is intuitively paraphrasable as *same kind of student*. Thus, not all cases of non-token identity are due to [$_{\text{subk}}$ N], but Alrenga suggests that those with an *as*-clause are.

[9] But see Basso & Vogt (2013:ex.15) for the report that the Brazilian Portuguese *médico* 'doctor' can have the subkind reading.

(46) Why do all of my classes have the same student? √ *non-token identity*

Alrenga's appeal to the subkind reading is akin to that of Weir (2012), who observes that *some* N_{sg} can express speaker-ignorance towards which instance or subkind verifies the existential claim, (47).

(47) a. Some plant has infected the other plants. *instance*
 i. There's no telling which plant.
 ii. #It's the plant that I'm pointing at.
 b. Some plant is growing through my wall. *subkind*
 i. There's no telling which plant.
 ii. #It's ivy leaved toadflax.

Weir argues that in (47a–b), *some plant* is built on [$_{\text{inst}}$ plant] and [$_{\text{subk}}$ plant] respectively. Again, this makes a prediction which Weir does not check: If N lacks the subkind reading, then *some N* should not be able to express speaker-ignorance towards the subkind. This is borne out by my judgement that *student* is worse than *kind of student* in (48).

(48) Some #(kind of) student will increase in number this decade.
 There's no telling which.

The preceding discussion shows that linguists who study nominals stand to benefit from considering the instance-subkind ambiguity; it might underly the ambiguity of complex nominals, in which case other nominal elements are unambiguous, e.g. *same* with an *as*-clause or *some* N_{sg}. Similarly, the appeal to [$_{\text{subk}}$ N] by Carlson (1980:§7.3) and Zamparelli (1998:ex.84) allows them to maintain that *the* unambiguously denotes a maximality operator, including in definite generics. As background, *the* combines with [$_{\text{inst}}$ tiger] in (49.i), with [$_{\text{subk}}$ tiger] in (49.ii), and (49.iii) has *the tiger* as a definite generic (DG) (Vendler 1967:§2.13, Lawler 1973:§4, Carlson 1980:§7.3, Heyer 1985, Ojeda 1991, 1993, Koga 1992, Krifka et al. 1995, Houghton 2000:§3.2.2, Oosterhoff 2008).

(49) a. i. **The tiger** that is in danger of dying needs help. *instance*
ii. **The tiger** that is in danger of dying out needs help. *subkind*
iii. **The tiger** is in danger of dying out. *DG*
b. i. I pet a lion and a tiger and I fed **the tiger**. *instance*
ii. I learned about lions and Bengal tigers
and I described **the tiger**. *subkind*
iii. I learned about tigers and I described **the tiger**. *DG*

Under Carlson (1980:§7.3) and Zamparelli (1998:ex.84), *the tiger* as a DG is built on [$_{\text{subk}}$ tiger]; it denotes a set whose maximal element is the tiger kind, which is picked out by the maximality operator denoted by *the* (Landman 2020:§3.3). However, this analysis over-generates in allowing *the wine* to refer to wine as a kind; (50.ii) shows that [$_{\text{subk}}$ wine] is felicitous, so it should be able to denote a set whose maximal element is the wine kind, and in turn *the wine* should be able to denote the wine kind, contra the infelicity in (50.iii).

(50) a. i. **The wine** in this stain forms a nice shape. *instance*
ii. **The wine** that was invented most recently is disappointing. *subkind*
iii. **(#The) wine** was invented in prehistory. *DG*
b. i. I smelled vodka and wine and I tasted **the wine**. *instance*
ii. I love vodka and merlot and I'm inspired by **the wine**. *subkind*
iii. I love wine and I'm inspired by **(#the) wine**. *DG*

As an alternative to DGs being built on [$_{\text{subk}}$ N], Dayal (2004:§3) posits that *the* in DGs is the vocalization of the last-resort type-shift in (51), which involves reference to subkinds. Dayal assumes that *tiger* and *wine* basically denote instance-level properties, which cannot be arguments of kind-level predicates due to type-mismatch. Dayal follows Chierchia (1998b:ex.16) in assuming that the type-shift which maps properties to kinds ($^{\cap}$) is defined for properties denoted by mass nouns (e.g. *wine*) but not singular count nouns (e.g. *tiger*). Thus, the mismatch with *wine* is resolvable via $^{\cap}$, but that with *tiger* resolves via (51). Applied to the tiger property, (51) returns the maximal element in the set of proper and improper kinds of tigers, i.e. the tiger kind.

(51) $\lambda P.\iota(\lambda \mathbf{k}.P_{\text{taxonomic}}(\mathbf{k}))$ (cf. Dayal 2004:ex.77d)
'The function from properties P to the maximal element in the set of (proper and improper) kinds of P.'

Dayal's analysis is schematized in (52) (cf. Dayal 2004:ex.75; $Pred_K$ abbreviates *kind-level predicate*).

(52) a.	× $Pred_K$(WINE)	√ $Pred_K$(${}^{\cap}$WINE)	× $Pred_K$((51)(WINE))
		Wine is widespread.	# *The wine is widespread.*
b.	× $Pred_K$(TIGER)	× $Pred_K$(${}^{\cap}$TIGER)	√ $Pred_K$((51)(TIGER))
		# *Tiger is widespread.*	*The tiger is widespread.*

In conclusion, the first two analyses reviewed in this subsection maintain that certain pre-nominal elements are unambiguous by appealing to the instance-subkind ambiguity of nouns, namely *same* (with an *as*-clause) and *some* N_{sg}. Additional appeals to [$_{subk}$ N] (which are outside the scope of this thesis) are in relation to split scope (Geurts 1996), Dutch faded partitives (Le Bruyn 2007), weak demonstratives (Basso & Vogt 2013, Basso 2014, Basso & Pires de Oliveira 2015) and *some*-exclamatives (Anderson 2018). Thus, [$_{subk}$ N] is potentially relevant to a diverse group of phenomena. By contrast, Dayal's (2004:§3) analysis of definite generics is an example of appealing to reference to subkinds without appealing to [$_{subk}$ N] per se, and it has advantages over the appeal to [$_{subk}$ N] by Carlson (1980:§7.3) and Zamparelli (1998:ex.84).

This concludes the introduction to the subkind reading of nouns. §2.1 argues that this reading is available to many sorts of nouns, including ones whose instance reading is animate or inanimate, concrete or abstract, countable or uncountable. §2.2 argues that [$_{subk}$ N] is derived, while leaving open whether the input is [$_{inst}$ N] or a third denotation from which [$_{inst}$ N] is also derived. §2.3 argues that [$_{subk}$ N] is inanimate and countable regardless of the animacy or countability of [$_{inst}$ N], and §2.4 argues that the extension of [$_{subk}$ N] is a set of subkinds (not *the* set), that these kinds can be realized by instances which do not exist in the circumstance of evaluation, and that the set is required to be disjoint. Lastly, §2.5 reviews the place of [$_{subk}$ N] in Alrenga (2007) and Weir (2012), and the place of reference to subkinds in Dayal (2004).

After introducing [$_{subk}$ N] in §2, §3 addresses the first research question of the thesis: What is the principle for the availability of the subkind reading? Beforehand, the appendix discusses kind-level predicates and reference to subkinds in mass morphosyntax.

2.6 Appendix

2.6.1 Kind-level predicates

Recall that §2.1 proposes that compatibility with binominal *kind* is a necessary and sufficient condition for [$_{\text{subk}}$ N]. Thus, the lack of contrast in (53a) indicates that *soup* has the subkind reading, but the contrast in (52b–c) indicates the contrary for those tokens of *soup*.

(53) a. Pho is one (kind of) soup. *kind*
b. Gordon Ramsey's pho is one (# kind of) soup. *title*
c. This serving of pho is one (# kind of) soup. *serving*

With (53) in mind, consider the expressions in (54), which some consider to denote kind-level predicates, although not necessarily unambiguously (Carlson 1980:§3, ex.33, Krifka et al. 1995:§1.4.1, McNally & Boleda 2004:§4.4.2, Alrenga 2007:ex.8–9, Mueller-Reichau 2011:§6).

(54) a. <u>Quantificational</u>: Everywhere
b. <u>Adjective</u>: Abundant, best-selling, common, domesticated, endangered, extinct, indigenous (to), mass-produced, numerous, plentiful, populous, rare, rampant, scarce, sold out, staple, ubiquitous, widely-distributed, widespread
c. <u>Verb subject</u>: Abound, come in several versions, die off, die out, dwindle, fast disappearing, in short supply, increase in number, populate
d. <u>Verb direct object</u>: Breed, cultivate, decimate, design, discontinue, domesticate, eradicate, exterminate, extinguish, invent, (il)legalize, mass-produce, outlaw, patent, stamp out, wipe out
e. <u>Verb subject and indirect object</u>: Evolve (from)
f. <u>Verb indirect object</u>: Sell out (of)
g. <u>Noun genitive argument</u>: Evolution, extinction, invention, inventor

For completeness, in (55) are candidates for kind-level nouns.

(55) a. genus, species, breed (Kay 1975:tab.1)
b. make (of car), series, model, variant
c. halogen, metal, alloy, element (Krifka et al. 1995:§1.3.3)
d. part of speech, force of nature (Omri Mayrantz, Noa Bassel p.c.)
e. precipitation (Wisniewski et al. 1996:fn.1)
f. invention, patent

(54–55) are heterogenous lists due to prioritizing quantity over quality. Next, I argue that *widespread* and *come in several versions* are relatively high-quality due to being restrictive and general in the right ways. For the latter, (56) shows that they are compatible with the six nouns in (6).

(56) a. Ravens are a widespread animal that comes in several versions.
b. Swords are a widespread weapon that comes in several versions.
c. Chess is a widespread game that comes in several versions.
d. Merlot is a widespread wine that comes in several versions.
e. Love is a widespread emotion that comes in several versions.
f. Murder is a widespread crime that comes in several versions.

Continuing to restrictiveness, *widespread* and *come in several versions* are more restrictive than *exterminate* and *invent*, which (have readings that) are applicable to instances, paraphrased as 'kill' and 'build' (Krifka et al. 1995:71). They are also more restrictive than *common* and *rare*, whose arguments can be indefinites lacking the subkind reading as in *a rhino with blue eyes is common* 'The chance of encountering a blue-eyed rhino is common' (ibid. ex.152b). The latter paraphrase is accounted for by extending (not trivially) Gehrke & McNally's (2015) analysis of *rare* to *common*; *common* denotes a predicate over event-kinds, and the argument is the kind which is instantiated by all and only events of encountering a blue-eyed rhino.

Although *widespread* and *come in several version* are relatively restricted, they are not limited to kinds (cf. McNally & Boleda 2004:§4.4.2); (57) shows that they are compatible with *dish* and *book* with the title reading, which §2.1 argues is distinct from $[_{\text{subk}}$ N].

(57) a. Gordon Ramsey's pho is a widespread dish
that comes in several versions *title*
b. Don Quixote is a widespread book
that comes in several versions. *title*

(57) shows that compatibility with *widespread* and *come in several versions* is not a sufficient condition for $[_{\text{subk}}\ \text{N}]$. Still, I regard it as a necessary condition in §2.3 and the next subsection, i.e. incompatibility means that the noun lacks the subkind reading.

As an aside, I do not know of expressions in Hebrew with the generality and restrictiveness of *widespread* and *come in several versions*. One potential translation of *widespread* can function as a frequency adjective, namely *nafóts* 'common', and I have not found a good translation of the latter. Thus, not all languages are guaranteed to have expressions which can be regarded as necessary (but insufficient) conditions for (sub)kind-reference.

2.6.2 Reference to subkinds in mass morphosyntax

Although §2.3 argues that $[_{\text{subk}}\ \text{N}]$ is precluded from mass morphosyntax, this subsection suggests that NPs in this morphosyntax can refer to subkinds by means other than $[_{\text{subk}}\ \text{N}]$.

(58) is an adaptation of McCawley's (1975:ex.14) putative example of reference to subkinds by *furniture* in the mass morphosyntax *more* N_{sg}. McCawley can interpret (58) as true relative to the state of affairs in Figure 1, despite Fred having more pieces of furniture than James. This state of affairs does not control for intervening factors discussed next.

(58) James has more furniture than Fred.
McCawley (1975:ex.14) can interpret as true relative to Figure 1

furniture	
Fred's	James'
4 chairs 3 magazine racks 2 coffee tables 1 lamp	2 chairs 1 desk 1 bed 1 sofa 1 table
10	6

Figure 1: McCawley's (1975) state of affairs.

McCawley proposes that his judgement in (58) is due to interpreting *more furniture* as 'better functional furniture' (cf. Grimm & Levin 2012). Alternatively, Gafni & Rothstein (2014) and Gafni (2022) propose that such judgements come from the interpretation 'more kinds of furniture'. The latter's availability can be determined via states of affairs where more kinds does not coincide with greater functionality, e.g. Figure 2 (more pieces coincide with greater weight to control for the reading ‘heavier furniture’; Rothstein 2017:§5.2).

	furniture			
	Fred’s	kg	James’	kg
	1 futon mattress	40	1 bed frame	25
	1 dining table	100	1 rowing machine	50
	3 dining chairs	60	1 microwave stand	50
			1 speaker	20
pieces	5		4	
weight		200		140
functionality	x		x<	
kinds	3		4	

Figure 2: Number of kinds distinct from pieces, weight and functionality.

Interpreting (58) as true relative to Figure 2 would indicate that *more furniture* can mean ‘more kinds of furniture’. I cannot access this interpretation, but more work is needed to get to the bottom of this issue.

Next, an anonymous reviewer of a manuscript with a version of the present discussion reports that *lots of cheese* (with the mass morphosyntax of *lots of* N_{sg}) can mean ‘many kinds of cheese’, (59).

(59) John had lots of cheese at his party.
“I think it is perfectly reasonable to understand (on one reading) […] to indicate lots of different types of cheese.” (anonymous reviewer)

Whether *lots of cheese* can mean ‘many kinds of cheese’ can be determined by checking whether (59) is interpretable as true relative to a state of affairs where John’s party has 50 crumbs of cheese of 50 different kinds. I am unable to access this judgement. Relatedly, Fred Landman (p.c.) reports that in a state of affairs where he drank a sip of 15 different wines in a tasting, *Fred drank lots of wine* is false. Thus, when checking for reference to subkinds via truth-value judgements, one should control for other interpretive possibilities, e.g. reference to instances or comparison via weight or functionality.

Next, in response to the infelicity of *wildlife* in (29) below, the reviewer quoted in (59) notes the felicity of (60).

(29) a. A $\left\{\begin{matrix}\text{few}\\ \text{\#little}\end{matrix}\right\}$ widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

b. A $\left\{\begin{matrix}\text{number}\\ \text{\#bit}\end{matrix}\right\}$ of widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

c. ({All, Most, A lot of}) widespread $\left\{\begin{matrix}\text{wild animals have}\\ \text{\#wildife has}\end{matrix}\right\}$ evolved rapidly.

(60) Most wildlife is facing extinction. (anonymous reviewer)

The felicity of (60) does not definitively indicate that *most wildlife* can mean ‘most kinds of wild animals’, because (60) might unambiguously mean 'Most wildlife specimens are of a species facing extinction.' Relevantly, (61) shows that *face extinction* is applicable to specimens.

(61) Shelldon understands that not everyone knows he is **facing extinction**, so he swims to educate people on the plight of his species. [γ]

The felicity of (61) highlights the conclusion of §2.6.1 that compatibility with the expressions in (54) (*extinct* in this case) is not a sufficient condition for $[_{\text{subk}}$ N]. Even if *extinct* is limited to kinds, this is not guaranteed for expressions built on it, e.g. *face extinction*. Indeed, Fred Landman (p.c.) suggests that *I am facing extinction* can be paraphrased as *I am facing the extinction of my kind*, and he reports the contrast in (62).

(62) Shelldon {is facing extinction, #will go extinct}.

Issues with *face extinction* aside, it is perhaps relevant whether *most wildlife* in (60) can mean ‘most species’, parallel to the proposal by Gafni & Rothstein (2014) and Gafni (2022) that *more furniture* can mean ‘more kinds’. Thus, I ran a survey where I collected truth-value judgements regarding the sentences in (60) and (64) relative to the states of affairs in (63).

(63) The wild animal specimens in this safari are

🐅 $_1$, 🐅 $_2$ (two tigers)

🐘 $_1$, 🐘 $_2$ (two elephants)

🦍 $_1$, 🦍 $_2$, 🦍 $_3$, 🦍 $_4$, 🦍 $_5$ (five gorillas)

a. The only species facing extinction is the gorilla.

b. The species facing extinction are the tiger and the elephant.

(64) In this safari,

a. Most specimens are facing extinction. *true in (63a), false in (62b)*

b. Most species are facing extinction. *false in (63a), true in (63b)*

When collecting truth-value judgements, several commented on their own accord that *most wildlife* in (60) can mean 'most species.' However, given the conclusion of §2.6.1 that compatibility with *widespread* and *come in several versions* is a necessary condition for [$_{\text{subk}}$ N], the infelicity in (65b) indicates that *most wildlife* is not built on [$_{\text{subk}}$ wildlife]. Thus, interpreting *most wildlife* in (60) as 'most species' must come from a different source than [$_{\text{subk}}$ N], where two candidates are *most* and *face*. However, I leave this to future research.

(65) a. $\text{Most wild animals} \left\{ \begin{array}{c} \text{are facing extinction} \\ \text{are widespread} \\ \text{come in several species} \end{array} \right\}.$

b. $\text{Most wildlife} \left\{ \begin{array}{c} \text{is facing extinction} \\ \text{\#is widespread} \\ \text{\#comes in several species} \end{array} \right\}.$

With the appendix done, this completes the introduction to [$_{\text{subk}}$ N]. The next section addresses the first research question of the thesis: What is the principle for the availability of the subkind reading?

3 The availability of the subkind reading

A conclusion of §2.1 is that the subkind reading is available to many nouns, including ones whose instance reading is animate or inanimate, concrete or abstract, countable or uncountable. However, in (1) are reported cases of *airport*, *courage*, *furniture* and *student* lacking the subkind reading in respective combination with *which*, *many*, *one* and *two*.

(1) a. ?Which airport is the most widespread? (Carlson 1980:§6.1, ex.2c)
b. *many courages (× 'many kinds') (Carlson 1980:§7.6.1, ex.109b)
c. *If there's one furniture I can't stand, it's Louis XV. (Cowper & Hall 2012:ex.8e)
d. *Martin dislikes two students, namely elementary and middle school students. (Kwak 2012:ex.17a)

In (1), [$_{\text{subk}}$ N] is infelicitous in count morphosyntax (*which*, *many*, *one* and *two*). This section expands the scope to [$_{\text{subk}}$ N] as a whole, including in morphosyntax insensitive to countability. This is done by addressing (2), the first research question of the thesis.

(2) What is the principle for the availability of the subkind reading?

§3.1 presents the starting point to answering (2), §3.2 reviews previous analyses of subkind-countability, §3.3 integrates them and remedies their shortcomings, §3.4 answers (2), §3.5 discusses the subkind reading of nouns like *furniture* in (1c), and §3.6 is the conclusion.

3.1 The *jewel-jewelry* contrast

This subsection introduces the contrast where in certain (near-)synonyms of count and mass nouns, only the former has subkind-countability. I call it the *jewel-jewelry* contrast for a concise term. As background, in (3) are reported cases of *furniture* and *jewelry* lacking subkind-countability, and in (4) are Dutch nouns lacking the subkind reading with the indefinite article.

(3) a. *Of all the furnitures in the world, he had to pick Louis XV.
(Cowper & Hall 2012:ex.8c)
b. *If there's one furniture I can't stand, it's Louis XV. (ibid. ex.8e)
c. They sell many {#furnitures, kinds of furniture} in that store.
(Rothstein 2017:§4)
d. *This museum show features Roman and Greek jewelries.
(Grimm & Levin 2017:ex.9)

(4) *een {ondergoed, zilverwaar, huiswerk} (De Belder 2013:ex.22)
a {underwear, silverware, homework}
× 'a kind of {underwear, silverware, homework}'

In (3c), *furnitures* is compared to *kinds of furniture*. Nouns like *furniture* can also be compared to countable counterparts (if they exist; Wisniewski et al. 1996, Casey 1997), as in (5) with *vehicle*-*transport*.

(5) The brief [...] is to produce four $\begin{Bmatrix}\text{vehicles} \\ \text{\#transports}\end{Bmatrix}$ ranging in size from the Ford Fiesta to the Vauxhall Cavalier. (Sutton & Filip 2018:ex.5)

In an attempt to replicate (5) with *jewelries* in (3d), consider the subkind-countability of *jewels* in (6); a judgement like (3d) (Grimm & Levin 2017:ex.9) would presumably reject *jewelries*.

(6) Click ahead to recap the top 20 best-selling {jewels, #jewelries}. [γ]
"jewelries" rejected as in Grimm & Levin (2017:ex.9)

In idiolects where *jewelry* is uncountable, there are two differences between it and *jewel* which might underly (6): Instance-countability and cumulativity. (7) shows that only *jewel* can be used for counting instances, and (8) shows that only *jewelry* has cumulative reference (cf. §3.3.3).

(7) Four {jewels, #jewelries} got dirty.

(8) a. This jewel and that jewel are a jewel. *not tautology*
b. This jewelry and that jewelry are jewelry. *tautology*

As a starting point to answering research question (2), (5–6) suggest that the principle for the availability of the subkind reading appeals to at least one of the two differences in (7–8) between *jewel* and *jewelry*. Because they are (near-) synonyms, (6) is less likely due to dictionary meaning. However, §3.5 argues that nouns like *jewelry* can have the subkind reading, and that the degradation in (6) is due to count morphosyntax. Leading up to that, the next subsection evaluates (6) relative to previous analyses of subkind-countability.

3.2 Previous analyses of subkind-countability

This subsection reviews the analyses of subkind-countability of Grimm & Levin (2017), Sutton & Filip (2018) and Carlson (1980:§6.1).

3.2.1 Grimm & Levin (2017): Not every letter is mail

My restatement of Grimm & Levin's (2017:§3.2) analysis of subkind-countability is that plural [$_{\text{subk}}$ N] (what Grimm & Levin call *taxonomic plural*) is felicitous only if the noun heads a taxonomy in the sense of Murphy (2002:§7), whose three key properties are in (9).

(9) a. A sub-element bears a 'kind of' relation to the super-element.
b. A sub-element inherits properties from the super-element.
c. The super-/sub-element relation is transitive.

Under Grimm & Levin, [$_{\text{subk}}$ vehicles] in (5) is licensed by Figure 3 having the properties in (9). For (9a), they write that "each sub-element is intuitively a 'kind' of its super-element." (p.61). This is presumably an intuition about *kind*, which I begin discussing in §4. For (9b), an example of property inheritance is that *car* inherits from *vehicle* the property of providing transportation. For (9c), Grimm & Levin give lexical semantics of *car* and *vehicle* where every car is a vehicle, i.e. ⟦car⟧ ⊆ ⟦vehicle⟧. Their lexical semantics as a whole makes it so that the diagonal lines in Figure 3 represent the transitive relation ⊆, e.g. every sports car is a car and every car is a vehicle, so every sports car is a vehicle.

(12) Taxonomic Hierarchy for *vehicle*

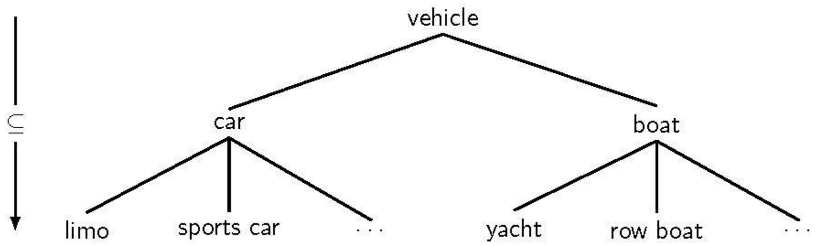


Figure 3: Grimm & Levin (2017:ex.12).

Next, Grimm & Levin's account of the infelicity of [$_{\text{subk}}$ mails] is that *mail* does not head a structure with the properties in (9). Figure 4 is an attempt, but it is said to not have these properties, as discussed next.

(14) Attempted Taxonomic Hierarchy for *mail*

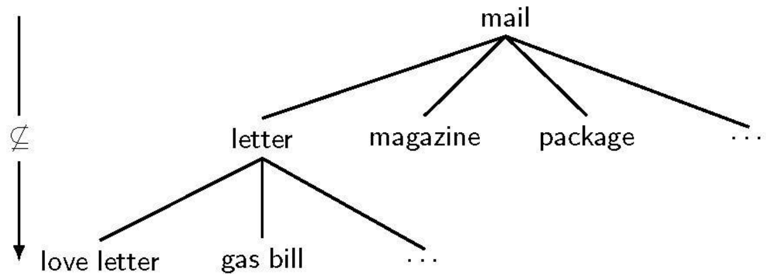


Figure 4: Grimm & Levin (2017:ex.14).

For (9a), Grimm & Levin write that "it seems strange to call *a magazine* or *a letter* a kind of *mail*" (p.62, italics in original). If they mean that it is strange to call a spatio-temporal letter a kind of mail, then this does not clearly distinguish between Figure 3 and Figure 4, since it is presumably equally strange to call a car unit a kind of vehicle. However, if failing at least one property in (9) is enough to rule out [$_{\text{subk}}$ mails], then it is less important whether Figure 4 satisfies (9a).

Second, Grimm & Levin write that Figure 4 fails (9b) because the letter and magazine sub-elements do not inherit from the mail super-element the property of being delivered. Put differently, being delivered is an essential property of mail, but not of letters or magazines. Indeed, certain letters and magazines are not candidates for delivery, e.g. ones in permanent exhibitions in museums.

Third, Grimm & Levin's appeal to transitivity in (9c) differs from that of Kay (1975), Randall (1976) and Hampton (1982), discussed in §4.1.2. The latter write that the relation intuitively expressed by *kind* is non-transitive, as seen in triplets like *Dogs are a kind of pet, stray dogs are a kind of dog, but stray dogs are* *not a kind of pet*. By contrast, Grimm & Levin do not construct such triplets from Figure 4, but they write that the diagonal lines do not represent a transitive relation because $\nsubseteq$ is non-transitive. This is proven by cases where X $\nsubseteq$ Y and Y $\nsubseteq$ Z but X $\subseteq$ Z, e.g. {1} $\nsubseteq$ {3} and {3} $\nsubseteq$ {1,2} but {1} $\subseteq$ {1,2}.

In my restatement of Grimm & Levin's analysis, the infelicity of [$_{\text{subk}}$ mails] is accounted for if *mail* does not head any structure with the properties in (9). Thus, to the extent that there are additional potential structures other than Figure 4, this is an incomplete account of the infelicity of [$_{\text{subk}}$ mails]. For one, Figure 4 includes the compound *love letter*, so one might wonder whether *mail* heads the right structure with compounds like *junk mail* and *air mail*. If so, then Grimm & Levin do not rule out [$_{\text{subk}}$ mails].

Crucially, Grimm & Levin's analysis is challenged by the *jewel*-*jewelry* contrast, exemplified in (5) below (Sutton & Filip 2018:ex.5).

(5) The brief […] is to produce four $\left\{\begin{matrix}\text{vehicles}\\ \text{\#transports}\end{matrix}\right\}$ ranging in size from the Ford Fiesta to the Vauxhall Cavalier.

To account for (5) under Grimm & Levin, it should be that *vehicle* but not *transport* heads a structure with the properties in (9). They argue that *vehicle* does, so why not *transport*? The approach suggested by Sutton & Filip (2018), reviewed in the next subsection, is to appeal to a property of the taxonomy other than those in (9), e.g. disjoint levels of categorization.

3.2.2 Sutton & Filip (2018): Vanities overlap with chairs

My restatement of Sutton & Filip's (2018) analysis is that if [$_{\text{inst}}$ N] is uncountable, then [$_{\text{subk}}$ N] can only count kinds in levels of categorization consisting of disjoint kinds. Thus, their analysis of *furniture* lacking subkind-countability is that every level of categorization has overlapping kinds. Their two examples of levels are in Figure 5. In level 1 ($l1$), bedroom furniture and kitchen furniture overlap in chairs which instantiate both kinds. In level 2 ($l2$), chairs, tables and mirrors overlap in vanities, shown in Figure 6. Such an account of the infelicity of *transports* in (5) would appeal to overlapping kinds of transport in given levels of categorization, although Sutton & Filip do not give examples.

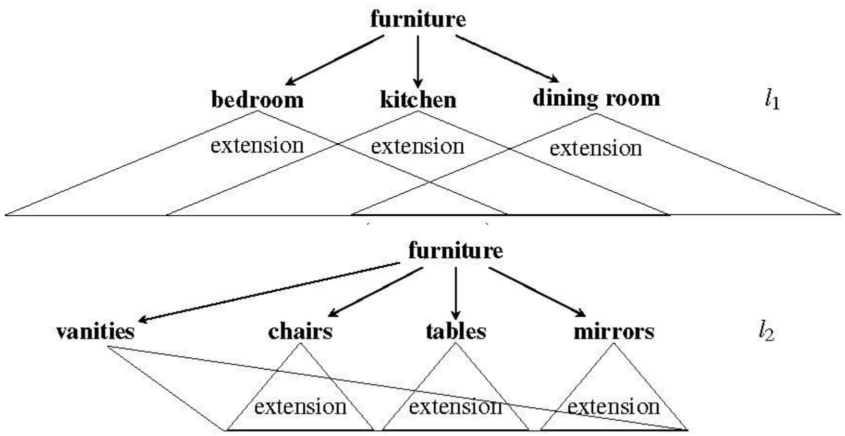


Figure 5: Sutton & Filip (2018:fig.6).

Figure 6: Vanity.

Sutton & Filip's account of (5) builds on their analysis of countability (Sutton & Filip 2016), summarized next. First, the denotation of a count noun has a built-in mechanism for overlap resolution, so its set-denotation is guaranteed to be disjoint. Second, the denotation of a mass noun lacks this mechanism, so its set-denotation will overlap if the domain of discourse has overlapping entities which count as one in different contexts. Third, a nominal is countable if and only if its set-denotation is disjoint. Thus, count nouns are countable regardless of overlap, but mass nouns are uncountable if the domain of discourse has overlapping entities which count as one in different contexts.

Building on the preceding summary, next is Sutton & Filip's (2018) account of (5). Because *transport* is uncountable, it lacks the mechanism for overlap resolution, so [$_{\text{subk}}$ transport] can only count kinds in levels of categorization consisting of disjoint kinds. There are proposedly no such levels, similar to *furniture*, so [$_{\text{subk}}$ transport] cannot count kinds. By contrast, the count noun *vehicle* has the mechanism guaranteeing a disjoint set-denotation, so the overlap between kinds of vehicles in given levels of categorization is resolved and [$_{\text{subk}}$ vehicle] can count kinds, e.g. Ford Fiesta and Vauxhall Cavalier in (5).

Sutton & Filip's appeal to overlap is challenged to the extent that *wildlife* lacks subkind-countability, as suggested by (10).

(10) I wonder what the two most widespread {wild animals, #wildlife(s)} are.

Crucial to (10) is that kinds of wildlife in given levels of categorization do not overlap in the same way as kinds of furniture, e.g. no two species of wildlife share specimens. Put differently, if kinds of wild animals constitute what Kay (1975) calls an academic taxonomy (Kay 1971), then levels of categorization consist of disjoint kinds by definition. Thus, if disjoint levels of categorization are a sufficient condition for subkind-countability, then [$_{\text{subk}}$ wildlife] should be countable, which is not clearly borne out. Therefore, Sutton & Filip might need to appeal to a notion other than overlap to rule out countability of [$_{\text{subk}}$ wildlife].

This subsection and the previous one review analyses of *furniture*, *mail* and *transport* lacking subkind-countability. These are object mass nouns, i.e. they range over individuated objects which cannot be enumerated with direct numeral modification (Barner & Snedeker 2005, Bale & Barner 2009, Landman 2011a:§8, 2020:§6, Rothstein 2017:§5, Erbach 2019). The next subsection shows that limited subkind-countability is not limited to such nouns.

3.2.3 Carlson (1980) and lexically-entered nominals

Carlson (1980) complements the analysis of object mass nouns by Grimm & Levin (2017) and Sutton & Filip (2018) by analyzing count nouns (§6.1) and abstract nouns (§7.6.1). In (11) are his judgements, where the degradation in (11a–c) is in comparison to *kind of N* in (12) (ibid. §6, ex.3).

(11) a. Every {mineral, ?gas-well} is in short supply. (Carlson 1980:§6, ex.1b, 2b)
b. Which {plant, ?airport} is the most widespread? (ibid. ex.1c, 2c)
c. Three {cars, ?ball-bearings} are made in five different countries. (ibid. ex.1e, 2e)
d. many {virtues, *courages} (ibid. §7, ex.109)

(12) a. This kind of airport is the worst kind to land in.
b. Which kind of gas-well are you talking about?
c. You must have installed the wrong kind of ball-bearing.
(Carlson 1980:§6, ex.3)

(13) is Carlson's analysis of (11), from which it follows that his rejection of *airport* in (11b) is due to him not knowing lexically-entered nominals (henceforth *lexical nominals*) which name kinds of airport. I delay to §3.4.2 the discussion of why a principle like (13) should exist.

(13) A noun can get the subkind reading for a speaker only if the speaker knows lexical nominals which name subkinds. (Carlson 1980:§6.1)

(13) raises the question of what counts as a lexical nominal. If knowing *African elephant* and *Asian elephant* suffices to license [$_{subk}$ elephant], then maintaining (13) relies on assuming that they are lexical entries, which is at potential odds with analyses where the meaning of nominals like *Indian elephant* is derived compositionally (Knittel 2009, Wągiel 2014, Arsenijević et al. 2014). Abstracting away, the idea of (13) is that [$_{subk}$ N] is licensed by subkinds being named by a certain category of nominals. Perhaps *Indian elephant* fits the category because under its kind-naming reading, an Indian elephant is an instance of the subspecies *Elephas maximus indicus* rather than (just) an elephant who is Indian. In any case, §3.4.2 gives a conceptual argument for why [$_{subk}$ N] should be licensed by a certain category of nominals naming subkinds.

(13) predicts [$_{subk}$ animal] to be felicitous to many English speakers, specifically those who know names for kinds of animals (e.g. *bear*). By contrast, [$_{subk}$ airport] is predicted to be felicitous only to speakers who know lexical nominals which name kinds of airports. A parallel explanation holds for the other degraded nouns in (11). Also, (13) predicts inter-speaker variation stemming from different vocabularies. For example, Carlson (1980) writes that the subkind reading of *mallard* and *ball bearings* is unavailable to him, but that it might be available to zoologists who know names for kinds of mallards or car manufacturers who know names for kinds of ball bearings (p.206). This might be the nature of the inter-speaker variation noted by Doetjes (1997:§2.1.2) for Dutch.[10]

[10] "Other words that resist mass-to-count shift via the *type of* N_{mass} reading are *glas* 'glass', *zand* 'sand', *afval* 'waste' etc., though there might be some variation among speakers." (Doetjes 1997:23)

Next, Carlson is correct to not state (13) as a sufficient condition, because that would be too strong. For example, knowing the noun *chair* does not license [$_{\text{subk}}$ furniture] in (3). However, (13) is still too strong; I accept [$_{\text{subk}}$ mud] in (14) even though I do not know names for kinds of mud.

(14) One of the big draws of the Sherlock Holmes stories was Holmes's ability to make these huge logical leaps that depended only on his powers of observation and encyclopedic knowledge of different **muds**, tobacco varieties, and everything else. [γ]

Following (14), I propose that a better notion for (13) than lexical nominals known to the speaker is presumed lexical nominals in the language. This notion features in (15), from which it follows that [$_{\text{subk}}$ mud] in (14) is licensed by the presumption that there exist English speakers who know lexical nominals for kinds of mud.

(15) A noun can get the subkind reading for a speaker only if the speaker knows lexical nominals which name subkinds, or they presume that other speakers know such nominals.

Related to (15), Putnam (1973) observes that speakers can use [$_{\text{inst}}$ gold] without knowing how to recognize gold, and he proposes that this usage is licensed by other speakers (experts) knowing how to do that. (15) extends this idea from [$_{\text{inst}}$ N] to [$_{\text{subk}}$ N].

In conclusion, (15) modifies Carlson's analysis to account for the felicity of [$_{\text{subk}}$ muds] in (14), but it does not account for *furniture* lacking subkind-countability. To advance this goal, the next subsection integrates (15) with the two preceding analyses.

3.3 Partition analysis and remedies

A reasonable analysis to derive from Grimm & Levin (2017) about [$_{\text{subk}}$ N] as a whole (as opposed to only plural [$_{\text{subk}}$ N]) is that a noun has subkind-countability iff it heads a taxonomy. Their reference to the taxonomy is Murphy (2002:§7),[11] but my leading reference is Kay (1971), which has the advantage of including a

[11] Murphy (2002) argues that "The simplicity and elegance of a hierarchy like [the taxonomy] does not seem to be a property of human memory" (p.209). For this reason, I do not appeal to hierarchical structures of kinds.

formal definition. This definition includes a set of nouns, which allows to integrate Carlson's (1980:§6.1) analysis where the availability of the subkind reading to a given noun depends on other lexical nominals naming subkinds. This integrated principle is in (16).

(16) A noun can get the subkind reading iff it heads a taxonomy (along with other lexical nominals).
integration of Grimm & Levin (2017) and Carlson (1980:§6.1)

(16) has several shortcomings, and the first step to remedying them is to formalize (16), beginning with the representation of kinds. As background, Kay (1971) represents kinds as sets which are related to names via the naming relation. These sets are probably intended to consist of all possible specimens, e.g. the dog kind is the set of all possible dog specimens. Similarly, I conceive of kinds as related to nouns via the intension relation, i.e. kinds are the intensions of nouns. I therefore represent kinds as properties (type $<s,<e,t>>$), although I do not reject the other representations of kinds in §2.4.

A central notion in Kay's (1971) taxonomy is that of partition. Instead of Kay's appeal to set-partition, I appeal to property-partition, defined in (17). In words, a set of properties $\mathcal{R}$ partitions property P iff (i) every member of $\mathcal{R}$ is a strict sub-property of P, (ii) every member of every extension of P is in the extension of a member of $\mathcal{R}$ in the same index of evaluation, and (iii) no two distinct members of $\mathcal{R}$ have overlapping extensions.

(17) D_M is the interpretation domain of instances in model M.
W_M is the model's interpretation domain of indices of evaluation.
P is a property, a function from W_M s.t. for every $w \in W_M$, $P_w \subseteq D_M$
$\mathcal{R}$ is a set of properties. $\mathcal{R}$ partitions P iff
a. Every $Q \in \mathcal{R}$ is such that for every $w \in W_M$, $Q_w \subseteq P_w$ and
for some $w \in W_M$, $Q_w \subset P_w$
b. For every $w \in W_M$ and $d \in D_M$ such that $d \in P_w$,
there is a $Q \in \mathcal{R}$ such that $d \in Q_w$
c. $\mathcal{R}$ is disjoint, i.e. for every $Q_1, Q_2 \in \mathcal{R}$, if $Q_1 \neq Q_2$ then
there is no $d \in D_M$ s.t. for some $w \in W_M$, $d \in Q_{1w}$ and $d \in Q_{2w}$

With (17) at hand, (18) is a formalization of (16), according to which $[_{subk}$ N$]$ is felicitous iff $[\![_{inst}$ N$]\!]$ is partitioned by a set of properties which are the intensions of lexical nominals in the language of N.

(18) N is a noun in language L. Its intension under the instance reading is $[\![_{\text{inst}}\ \text{N}]\!]$.
[$_{\text{subk}}$ N] is felicitous iff
a. $[\![_{\text{inst}}\ \text{N}]\!]$ is partitioned by a set of properties $\mathcal{R}$ s.t.
b. every $Q \in \mathcal{R}$ is the intension of a lexical nominal in L

A noun can satisfy (18) only if there are other (presumed) lexical nominals in the language which denote subkinds, thus reflecting Carlson's extended analysis (1980:§6.1) in (15). Also, (18) accounts for the felicity of [$_{\text{subk}}$ vehicles] and the infelicity of [$_{\text{subk}}$ mails] parallel to Grimm & Levin (2017): [$_{\text{subk}}$ vehicle] is felicitous (and hence pluralizable) because English has enough lexical nominals to denote properties in a partition of $[\![_{\text{inst}}\ \text{vehicle}]\!]$, e.g. *car* and *boat* (Figure 3). Conversely, [$_{\text{subk}}$ mail] is infelicitous because English lacks enough nominals to denote properties in a partition of $[\![_{\text{inst}}\ \text{mail}]\!]$; $[\![_{\text{inst}}\ \text{letter}]\!]$ cannot be in such a partition because it is not a strict sub-property of $[\![_{\text{inst}}\ \text{mail}]\!]$ (Figure 4).

Recall from §3.2.2 that under Sutton & Filip (2018), [$_{\text{subk}}$ furniture] is uncountable because kinds of furniture in each level of categorization overlap. However, a set consisting of the vanity and chair properties is disjoint according to (17c); it is not that some chairs are vanities, but rather some chairs are parts of vanities. Sutton & Filip's analysis would be integrated by replacing (17c) with (19) (based on ibid. ex.13), but I do not dwell on this because the upcoming analysis does not appeal to disjointedness.

(19) $\leq_D$ is a partial order on D_M. $\mathcal{R}$ is disjoint^2 iff
for every $Q_1, Q_2 \in \mathcal{R}$, if $Q_1 \neq Q_2$ then there is no $d_1, d_2, d_3 \in D_M$ s.t.
for some $w \in W_M$, $d_1 \in Q_{1w}$, $d_2 \in Q_{2w}$, $d_3 \leq_D d_1$ and $d_3 \leq_D d_2$

In conclusion, (18) is an integration of Grimm & Levin (2017) and Carlson (1980:§6.1), as well as Sutton & Filip (2018) if (19) replaces (17c). The shortcomings of this analysis are remedied in the next subsections.

3.3.1 Spreading over instead of partition

This subsection remedies an incorrect prediction of (18) by weakening the notion of partition. First, consider [$_{\text{subk}}$ weapon] in (20).

(20) <u>Knives</u> are a prominent **weapon** in ancient Indian history. [γ]

For (18) to account for the felicity of [$_{\text{subk}}$ weapon], there should be a partition of $[\![_{\text{inst}}\ \text{weapon}]\!]$ where every property is named by a lexical nominal. Such a partition must include at least one property which (i) is instantiated by weapon knives, (ii) is a strict sub-property of ⟦$_{\text{inst}}$ weapon⟧, and (iii) is denoted by a lexical nominal. Crucially, ⟦$_{\text{inst}}$ knife⟧ fails (ii) due to instantiating non-weapon knives, e.g. plastic knives which have only ever been used for spreading butter. Likewise, ⟦$_{\text{inst}}$ weapon knife⟧ fails (iii) to the extent that it is not denoted by a lexical nominal. Thus, to the extent that there are no properties with these criteria, (18) incorrectly rules out [$_{\text{subk}}$ weapon] as in (20) and (21).

(21) <u>Artillery</u> is a **weapon** with two major roles. [γ]

Artillery in (21) gives another perspective to the incorrect prediction of (18). For (18) to account for the felicity of [$_{\text{subk}}$ weapon], there should be at least one property which (i) is instantiated by pieces of artillery, (ii) is a strict sub-property of ⟦$_{\text{inst}}$ weapon⟧, and (iii) is denoted by a lexical nominal. Crucially, ⟦$_{\text{inst}}$ artillery⟧ fails (ii) due to instantiating sums of two pieces of artillery, which need not count as singular weapons (they more likely count as two weapons). Likewise, ⟦$_{\text{inst}}$ singular piece of artillery⟧ fails (iii) to the extent that it is not denoted by a lexical nominal. Again, to the extent that there are no properties with these criteria, (18) incorrectly rules out [$_{\text{subk}}$ weapon].

I remedy the incorrect prediction of (18) by appealing to a notion which does not require strict sub-properties, namely (22) spreading over. In words, $\mathcal{R}$ spreads over P iff (i) every member of every extension of P is in the extension of a member of $\mathcal{R}$ in the same index, (ii) every member of $\mathcal{R}$ has an extension with a member which is in the extension of P in the same index, and (iii) $\mathcal{R}$ has more than one member. A spreading over set is akin to a cover in the sense of Schwarzschild (1996:ex.152), except members of $\mathcal{R}$ need not be sub-properties of P. This also distinguishes spreading over from partition, along with (22) not requiring $\mathcal{R}$ to be disjoint.

(22) $\mathcal{R}$ spreads over P iff
a. For every $w \in W_M$ and $d \in P_w$, there is a $Q \in \mathcal{R}$ such that $d \in Q_w$
b. For every $Q \in \mathcal{R}$, there is a $w \in W_M$ and $d \in D_M$ such that $d \in Q_w$
c. $|\mathcal{R}| > 1$

Spreading over is illustrated in Figure 7, where ⟦$_{\text{inst}}$ weapon⟧ is spread over by $\mathcal{R}$ consisting of ⟦$_{\text{inst}}$ knife⟧ and ⟦$_{\text{inst}}$ artillery⟧. The former's extension in w_1 includes a non-weapon knife which is not in ⟦weapon⟧$_{w1}$ (), and that of ⟦$_{\text{inst}}$ artillery⟧ includes a sum of two pieces of artillery which is not in ⟦$_{\text{inst}}$ weapon⟧$_{w1}$

(🚀$_1 \vee$ 🚀$_2$). Thus, $[\![_{\text{inst}}$ knife$]\!]$ and $[\![_{\text{inst}}$ artillery$]\!]$ cannot be in a partition of $[\![_{\text{inst}}$ weapon$]\!]$, but they can be in a spreading over set.

$$P = \quad [\![_{\text{inst}}\ \text{weapon}]\!] = \begin{bmatrix} w_1 \rightarrow & \{\text{🔪}, \text{🚀}_1, \text{🚀}_2\} \\ w_2 \rightarrow & \emptyset \end{bmatrix}$$

$$\mathcal{R} = \boxed{\{[\![_{\text{inst}}\ \text{knife}]\!] = \begin{bmatrix} w_1 \rightarrow & \{\text{🍴}, \text{🔪}\} \\ w_2 \rightarrow & \emptyset \end{bmatrix}, [\![_{\text{inst}}\ \text{artillery}]\!] = \begin{bmatrix} w_1 \rightarrow & \left\{\begin{matrix} \text{🚀}_1 \vee \text{🚀}_2, \\ \text{🚀}_1, \quad \text{🚀}_2 \end{matrix}\right\} \\ w_2 \rightarrow & \emptyset \end{bmatrix}\}}$$

Figure 7: Spreading over.

Once spreading over in (22) replaces partition in (18), the new principle accounts for the felicity of [$_{\text{subk}}$ weapon]: English has enough lexical nominals to denote properties in a set which spreads over $[\![_{\text{inst}}$ weapon$]\!]$, e.g. *knife* and *artillery*. The next subsection remedies another shortcoming of (18).

3.3.2 Unclassified specimens and ways of classification

Another shortcoming of (18) is that it incorrectly rules out [$_{\text{subk}}$ cheese]. The reason is that $[\![_{\text{inst}}$ cheese$]\!]$ is not partitioned (nor spread over) by a set of properties which are denoted by lexical nominals; its extensions including sums of cheese of multiple kinds, e.g. sums of cheddar and edam, but there are no lexical nominals (that I can think of) which name kinds of cheese and range over such sums. This issue does not arise with (singular) count nouns because they do not range over such heterogenous sums, e.g. [$_{\text{inst}}$ weapon] in Figure 7 does not range over 🔪$\vee$🚀$_1$.

A sum of cheddar and edam is an example of what I call an unclassified specimen. Specifically, it is a sum of cheese of multiple varieties, so it itself is unclassified for variety. Another example is that if one were to melt a piece of cheddar and edam together, then the result would be cheese unclassified for variety. Also, just as there might be parts of cheese which are too small to count as cheese (cf. Taylor 1977 on *fruitcake*), so there might be parts of cheddar which are big enough to count as cheese but too small to count as cheddar, and they too are unclassified for variety. Lastly, say one follows a recipe for cheddar but changes it such that the resulting cheese is not cheddar nor of any other recognized variety. Such unclassified specimens prevent $[\![_{\text{inst}}$ cheese$]\!]$ from being partitioned (and spread over) by a set with $[\![_{\text{inst}}$ cheddar$]\!]$ and $[\![_{\text{inst}}$ edam$]\!]$.

I accommodate unclassified specimens via the notion of classified subproperties. To illustrate, the cheese property is the function from worlds to the set of sums of cheese in that world, represented in (23a). Extensions of this property include sums of cheese which are unclassified for variety, which in turn are precluded from the extensions of the property of classified cheese, represented in (23b) (VAR stands for *variety*).

(23) a. $[\![_{\text{inst}}\ \text{cheese}]\!] = \lambda w \lambda x.\text{CHEESE}_w(x)$

b. $[\![_{\text{inst}}\ \text{cheese}]\!]_{\text{VAR}} = \lambda w \lambda x.\text{CHEESE}_w(x) \wedge \text{VAR}_w(x)$

To illustrate the difference between the properties in (23), say the cheese in w_1 is a piece of cheddar 🧀$_c$ and a piece of edam 🧀$_e$. They are in extensions of both properties in w_1, but only the former includes their sum (🧀$_c \vee$ 🧀$_e$), as is repeated in (24).

(24) The cheese in w_1 is a piece of cheddar 🧀$_c$ and a piece of edam 🧀$_e$.

a. {🧀$_c$, 🧀$_e$, 🧀$_c \vee$ 🧀$_e$} $\subseteq [\![_{\text{inst}}\ \text{cheese}]\!]_{w1}$

b. {🧀$_c$, 🧀$_e$} $\subseteq [\![_{\text{inst}}\ \text{cheese}]\!]_{\text{VAR},w1}$, 🧀$_c \vee$ 🧀$_e \notin [\![_{\text{inst}}\ \text{cheese}]\!]_{\text{VAR},w1}$

Independent of the present analysis, heterogenous sums like 🧀$_c \vee$ 🧀$_e$ must be addressed to maintain the assumption that mass nouns like *cheese* head taxonomies in the sense of Kay (1971).

In (24b), VAR (abbreviating $\lambda w \lambda x.\text{VAR}_w(x)$) is the property of instances which are classified for variety. In anticipation of discussing *weapon(ry)*, let CLS (*classified*) be the property which is instantiated by classified pieces of weaponry but not unclassified ones. An example of the latter is the object in Figure 8 used as a weapon; it would be in the extensions of $[\![_{\text{inst}}\ \text{weapon}]\!]$ and $[\![_{\text{inst}}\ \text{weaponry}]\!]$, but not in those of $[\![_{\text{inst}}\ \text{weapon}]\!]_{\text{CLS}}$ or $[\![_{\text{inst}}\ \text{weaponry}]\!]_{\text{CLS}}$.

Figure 8: Photograph of an unidentified object (Agar 1930–58).

The effect of CLS on ⟦$_{\text{inst}}$ weaponry⟧ is illustrated in (25). The extensions of ⟦$_{\text{inst}}$ weaponry⟧$_{\text{CLS}}$ preclude sums of weapons of multiple kinds and unclassified weapons, e.g. the object in Figure 8 used as a weapon (represented as 🛸).

(25) The weapons in w_1 are two rockets 🚀$_1$, 🚀$_2$ and a knife 🔪.
That in w_2 is the object in Figure 8, represented as 🛸.

a. $[\![\text{weaponry}]\!] = \begin{bmatrix} w_1 \rightarrow & \left\{ \begin{array}{ccc} & \text{🚀}_1 \vee \text{🚀}_2 \vee \text{🔪}, & \\ \text{🚀}_1 \vee \text{🚀}_2, & \text{🚀}_1 \vee \text{🔪}, & \text{🚀}_2 \vee \text{🔪}, \\ \text{🚀}_1, & \text{🚀}_2, & \text{🔪} \end{array} \right\} \\ w_2 \rightarrow & \{\text{🛸}\} \end{bmatrix}$

b. $[\![\text{weaponry}]\!]_{\text{CLS}} = \begin{bmatrix} w_1 \rightarrow & \left\{ \begin{array}{ccc} & \text{🚀}_1 \vee \text{🚀}_2, & \\ \text{🚀}_1, & \text{🚀}_2, & \text{🔪} \end{array} \right\} \\ w_2 \rightarrow & \emptyset \end{bmatrix}$

Appealing to classified sub-properties commits me to the ontological existence of properties like VAR and CLS, whose set I notate as $\mathbb{C}$ (*way of classification*). Under the upcoming analysis in §3.4, it is not ⟦$_{\text{inst}}$ cheese⟧ which is required to be spread over to license [$_{\text{subk}}$ cheese], but a classified sub-property, e.g. ⟦$_{\text{inst}}$ cheese⟧$_{\text{VAR}}$. This reflects that unclassified specimens do not rule out [$_{\text{subk}}$ cheese] in particular and of [$_{\text{subk}}$ N] in general.

This concludes the remedies to the partition analysis in (18), which are cashed out in §3.4. Beforehand, the next subsection spells out assumptions regarding cumulative reference.

3.3.3 Cumulative reference

In addition to appealing spreading over and classified sub-properties, the analysis in §3.4 relies on two standard assumptions regarding the effect of [±cumulative] on extensions of nominals (Quine 1960:§19, Link 1983, Krifka 1989, 2007). As background, (26) is a diagnostic for the [±cumulative] value of (an interpretation of) nominal N, and (27) is its application to three nominals, showing that only the last two are [+cumulative]; (27a) is not tautological because not every two suitcases are combinable into a suitcase.

(26) An interpretation of nominal N is [+cumulative] if and only if
embedding it in *N plus N* *BE N* is a tautology.

(27) a. A suitcase plus a suitcase is a suitcase. *not tautology*
b. Suitcases plus suitcases are suitcases. *tautology*
c. Luggage plus luggage is luggage. *tautology*

The assumed effect of [±cumulative] on nominal extensions appeals to the notion of a partial order; $\leq_X$ is a partial order on set X, a two-place relation on X which is reflexive, transitive and antisymmetric. Following Link (1983), I assume that the extension of a [+cumulative] nominal is a cumulative set, the definition of which appeals to the sum operation. The sum of a subset of X is the smallest member of X with which every member of the subset stands in the partial order, defined in (28a), and a cumulative set is one where the sum of each non-empty subset it itself a member, defined in (28c).

(28) X is a set, $\leq$ is a partial order on X, $Y \subseteq X$ and $\gamma_1,\gamma_2 \in X$
a. The sum of Y, $\vee Y$, is the unique element in X s.t.
for every $\beta \in Y$, $\beta \leq \vee Y$
for every $\alpha \in X$, if for every $\beta \in Y$, $\beta \leq \alpha$, then $\vee Y \leq \alpha$
b. $\gamma_1 \vee \gamma_2 = \vee\{\gamma_1, \gamma_2\}$ ($\gamma_1 \vee \gamma_2$ is the sum of γ_1 and γ_2)
c. Y is cumulative iff for every non-empty $Z \subseteq Y$, $\vee Z \in Y$

There are two competing analyses for the extensions of [–cumulative] nominals, under which they are quantized (Krifka 1989, 2007, Sutton & Filip 2017) or adhere to the stronger notion of disjointedness (Landman 2020, Sutton & Filip 2016; cf. §2.4). The choice of notion does not matter here, so I appeal to the simpler quantization; a set is quantized with respect to partial order $\leq$ iff no two distinct members stand in $\leq$, (29).

(29) $\leq$ is a partial order and Y is a set.
Y is quantized with respect to $\leq$ iff for every $\alpha, \beta \in Y$,
if $\alpha \neq \beta$ then it is not the case that $\alpha \leq \beta$.

To exemplify a quantized (and disjoint) set and a cumulative set, in (30) are extensions of ⟦$_{\text{inst}}$ weapon⟧ and ⟦$_{\text{inst}}$ weaponry⟧.

(30) The weapons in w_1 are 🔪$_1$, 🔪$_2$ and 🚀.

a. ⟦$_{\text{inst}}$ weapon⟧$_{w1}$ = {🔪$_1$, 🔪$_2$, 🚀} *quantized*

b. ⟦$_{\text{inst}}$ weaponry⟧$_{w1}$ = { 🔪$_1$ ∨ 🔪$_2$ ∨ 🚀, 🔪$_1$ ∨ 🔪$_2$, 🔪$_1$ ∨ 🚀, 🔪$_2$ ∨ 🚀, 🔪$_1$, 🔪$_2$, 🚀 } *cumulative*

With the effect of [±cumulative] in place, the next section gives the proposed principle for the availability of the subkind reading.

3.4 The spreading over analysis

(31) is the proposed principle for the availability of the subkind reading: [$_{\text{subk}}$ N] is felicitous iff ⟦$_{\text{inst}}$ N⟧ has a classified sub-property which is spread over by a set of properties which are the intensions of lexical nominals in the language of N.

(31) N is a noun in language L. Its intension under the instance reading is ⟦$_{\text{inst}}$ N⟧.
$\mathbb{C}_M$ is the model's set of ways of classification.
[$_{\text{subk}}$ N] is felicitous iff
a. For some $\mathbb{c} \in \mathbb{C}_M$
b. ⟦$_{\text{inst}}$ N⟧$_{\mathbb{c}}$ is spread over by a set of properties $\mathcal{R}$ s.t.
c. every $Q \in \mathcal{R}$ is the intension of a lexical nominal in L

§3.4.1 explains how (31) accounts for the availability of the subkind reading to nouns in English (delaying object mass nouns to §3.5), and §3.4.2 discusses why a principle like (31) should exist.

3.4.1 Availability of the subkind reading

Under (31), [$_{\text{subk}}$ weapon] is felicitous because ⟦$_{\text{inst}}$ weapon⟧$_{\text{CLS}}$ (a classified sub-property of ⟦$_{\text{inst}}$ weapon⟧) is spread over by a set of properties $\mathcal{R}$ which are intensions of lexical nominals in English. Because [$_{\text{inst}}$ weapon] is [−cumulative], $\mathcal{R}$ can spread over ⟦$_{\text{inst}}$ weapon⟧$_{\text{CLS}}$ whether its members are intensions of [−cumulative] nouns (e.g. *knife*) or [+cumulative] ones (e.g. *artillery*) (cf. Figure 7, p.48). Similarly, [$_{\text{subk}}$ plant] is felicitous under (31) because for some way of classification $\mathbb{C}$, $[\![_{\text{inst}}$ plant$]\!]_{\mathbb{C}}$ is spread over by a set of properties $\mathcal{R}$ consisting of intensions of lexical nominals in English. Again, because *plant* is [–cumulative], $\mathcal{R}$ can spread over $[\![_{\text{inst}}$ plant$]\!]_{\mathbb{C}}$ whether its members are intensions of [–cumulative] nouns (e.g. *orchid*) or [+cumulative] ones (e.g. *grass* or *bamboo*).

Continuing to mass nouns with subkind-countability, [$_{\text{subk}}$ cheese] is felicitous under (31) because English has enough [+cumulative] lexical nominals (e.g. *cheddar*, *edam*) to denote properties in a set which spreads over a classified sub-property of $[\![_{\text{inst}}$ cheese$]\!]$ (e.g. $[\![_{\text{inst}}$ cheese$]\!]_{\text{VAR}}$). Similarly, [$_{\text{subk}}$ virtue] is felicitous because English has enough [+cumulative] lexical nominals (e.g. *courage*) to denote properties in a set which spreads over a classified sub-property of $[\![_{\text{inst}}$ virtue$]\!]$. Notably, cheese and virtue as kinds differ in that only the former includes its subkinds: Every bit of cheddar is cheese, but not every instance of courage is virtue, e.g. courage exhibited by a robber in a robbery is not virtue. This difference does not matter to (31) due to appealing to spreading over rather than partition. More generally, it does not matter whether the superkind is instantiated by all instances of its subkinds, what matters is whether the language has enough lexical nominals to satisfy (31).

To conclude this subsection, I discuss whether (31) is the sole principle for the availability of the subkind reading. Relevantly, Kwak (2012) hypothesizes that "the higher position the NP denotations take in the animacy hierarchy, the [less][12] likely they will have subkind readings" (p.503). Kwak's example of a high-animacy noun lacking the subkind reading is *student* (e.g. #*I wonder which student is the most widespread*). However, (31) can perhaps account for this without appealing to animacy: English has several nouns for kinds of students (*freshman*, *sophomore*), but perhaps no lexical nominal counterparts of e.g. *1st grader* or *BA student*. Thus, 1st graders and BA students in the extensions of $[\![_{\text{inst}}$ student$]\!]$ might prevent it from satisfying (31), thus accounting for the infelicity of [$_{\text{subk}}$ student]. However, I do not wish to commit myself to the controversial assumption that *1st grader* is not a lexical nominal in the same sense as *freshman*, so I am amenable to human nouns lacking the subkind reading for reasons other than (31).

Kwak (2012) supports the hypothesized graded correlation between animacy and the availability of the subkind reading with the judgement that [$_{\text{subk}}$ two dogs] is slightly worse than [$_{\text{subk}}$ two insects] (her ex.17). I do not share this judgement, so I am doubtful about such a graded correlation. A feasible hypothesis however is that human nouns lack the subkind reading, but it should be

[12] Kwak (2012) mistakenly writes "more" (p.503).

checked with nouns in addition to *student*, which I leave to future research. Relevantly, Basso & Vogt (2013:ex.15) report that (32) (Brazilian Portuguese) is interpretable as true when John and Mary called different doctors of the same kind, suggesting that (32) can include [$_{subk}$ médico] 'doctor'.

(32) João chamou esse médico e Maria também.
João call$_{pst}$ this doctor and Mary too
'John called this doctor and Mary did it too.'

The next subsection discusses the purpose of (31), after which §3.5 discusses its application to object mass nouns.

3.4.2 Purpose

This subsection proposes that (31) is a manifestation of the principle of Avoid Empty Reference (AER) in (33).

(33) Set-denoting expressions should not denote the empty set.

As a detour, I demonstrate how (33) manifests in the domain of adjectives. First, (34) is interpretable as true when referring to a metallic chicken .

(34) This () is a bird and it's not a bird. *interpretable as true*

The true reading of (34) is paraphrasable as:  is a bird in one sense but not a bird in a different sense. The latter is the sense of a biological bird, since  is merely a depiction of a bird. Importantly, the true reading of (34) shows that *bird* can denote a set which precludes metallic birds like .

Let us assume that *metallic bird* refers to the intersection of the referents of *metallic* and *bird*. If *bird* had the same denotation of the second token of *bird* in (34) (precluding metallic birds), then *metallic bird* would denote the empty set. However, the true reading of (34) shows that the first token of *bird* denotes a set which includes metallic birds. Given the availability of these two choices, (33) guides addressees of *metallic bird* to interpret *bird* under the latter sense such that the referent of *metallic bird* is non-empty. Put differently, (33) is responsible for (35) being true under the prominent reading.

(35) This () is a metallic bird. *prominently true*

(33) is relevant to *metallic bird* because certain interpretations of *bird* would lead to empty reference. Similarly, (33) is relevant to [$_{\text{subk}}$ N] because certain nouns would lead to empty reference. The reason is that not every kind can be in ⟦$_{\text{subk}}$ N⟧ (cf. §5.1.2). As background, (36a) suggests that cheap wine as a kind cannot be in ⟦$_{\text{subk}}$ wine⟧ (Pelletier & Schubert 2002), and (36b) suggests that dogs that bite people as a kind cannot be in ⟦$_{\text{subk}}$ dog⟧ (Mendia 2019:ex.45).

(36) a. <u>Cheap wine</u> is a #(kind of) **wine**.
b. <u>Dogs that bite people</u> are a dangerous #(kind of) **dog**.

Alongside (36), ⟦$_{\text{subk}}$ wine⟧ and ⟦$_{\text{subk}}$ dog⟧ can respectively include merlot and collies as kinds. However, because not every kind can be in ⟦$_{\text{subk}}$ N⟧, it is logically possible that ⟦$_{\text{subk}}$ N⟧ will be empty for certain nouns. Thus, (31) is a manifestation of (33) under the rationale that if a language has enough lexical nominals to denote properties in a set which spreads over a classified sub-property of ⟦$_{\text{inst}}$ N⟧, then ⟦$_{\text{subk}}$ N⟧ is guaranteed to be non-empty.

This brings us to why (31) appeals to lexical nominals. I hypothesize that a sufficient condition for a kind to be in ⟦$_{\text{subk}}$ N⟧ is that it is named by a lexical nominal and it is in a set which spreads over a classified sub-property of ⟦$_{\text{inst}}$ N⟧. In this way, (31) appealing to lexical nominals prevents empty reference of ⟦$_{\text{subk}}$ N⟧. I do not regard being named by a lexical nominals as a necessary condition for being in ⟦$_{\text{subk}}$ N⟧, because ⟦$_{\text{subk}}$ pet⟧ and ⟦$_{\text{subk}}$ snack⟧ in (37) range over kinds not named by lexical nominals (cf. §5.1.2).

(37) a. <u>Caged birds</u> are a popular **pet** in Afghanistan. [γ]
b. <u>Filled pastries</u> are a common **snack** in Mexico. [γ]

In conclusion, certain nouns would lead to ⟦$_{\text{subk}}$ N⟧ being empty, but (31) prevents emptiness in line with (33). The next subsection returns to the *jewel-jewelry* contrast introduced in §3.1 by discussing the subkind reading of object mass nouns.

3.5 The subkind reading of object mass nouns

This subsection discusses the subkind reading of uncountable nouns with countable counterparts, specifically those in (38). This list prioritizes pairs studied by Wisniewski et al. (1996) and Casey (1997), so the nouns labelled as *uncountable* might be heterogenous with respect to e.g. pluralizability. I call them *object mass nouns*, but it is not crucial that they all fit the definition of Barner & Snedeker

(2005) or Landman's (2020) conception of neat mass nouns; what matters is that they have countable (near-)synonyms.

		countable	*uncountable*		*countable*	*uncountable*
(38)	a.	wild animal(s)	wildlife	b.	sea animal(s)	sealife
	c.	farm animal(s)	livestock	d.	farm bird(s)	poultry
	e.	plant(s)	vegetation	f.	vegetable(s)	produce
	g.	machine(s)	machinery	h.	weapon(s)	weaponry
	i.	bullet(s)	ammunition	j.	suitcase(s)	luggage
	k.	shoe(s)	footwear	l.	hat(s)	headgear

§3.1 shows that certain object mass nouns lack subkind-countability, which leaves open the possibility of the subkind reading being available to them in morphosyntax which is insensitive to countability. Six such contexts are in (39) (Chierchia 1998a:ex.7).

(39) a. This {weapon, weaponry} is dirty. *this* N_{sg}
b. Some {weapon, weaponry} just fell on the floor. *some* N_{sg}
c. Did any {weapon, weaponry} fall on the floor? *any* N_{sg}
d. No {weapon, weaponry} fell on the floor. *no* N_{sg}
e. The {weapon, weaponry} that I just mentioned is dirty. *the* N_{sg}
f. What {weapon, weaponry} just fell on the floor? *what* N_{sg}

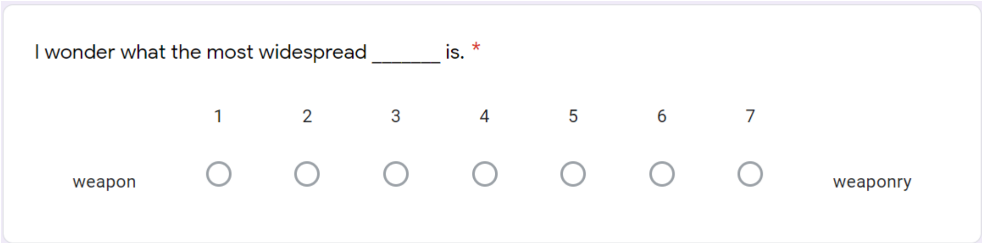
§3.5.1 presents survey results which I interpret as indicating that object mass nouns can have the subkind reading in the morphosyntax in (39), and §3.5.2 gives an analysis of the subkind reading being available to these nouns.

3.5.1 Survey

This subsection presents survey results which I interpret as indicating that object mass nouns can have the subkind reading in the morphosyntax in (39). More directly, the results indicate a lack of contrast between the pairs in (38) in contexts (40a–b), with the morphosyntax *the SUPERLATIVE N*.

(40) a. I wonder what the most widespread ______ is.
b. The scarcest ______ will go extinct.
c. Several ______ got dirty.
d. On the way back, we saw some interesting ______.
e. A bit of ______ can make a big difference.

The goal of the survey was to check whether the pairs in (38) differ in acceptability in combination with *widespread*, *scarce* and *extinct* in the morphosyntax *the SUPERLATIVE N*. The materials were the 12 pairs in (38) and the 5 contexts in (40). The survey consisted of word preference tasks as in Figure 9, where participants chose which option they prefer in the blank space by selecting between 1 and 7 according to the instructions in (41). The uncountable noun was singular in (40a) and plural in (40b–e).


I wonder what the most widespread _______ is. *

	1	2	3	4	5	6	7	
weapon	○	○	○	○	○	○	○	weaponry

Figure 9: Example word preference task.

(41) Please read carefully the following 30 sentences with blank spaces, and indicate which option you prefer in the blank space. Read each sentence at least twice, once with each option. Note that the difference between some of the options is small.
1. Left-hand option is absolutely better.
2. Left-hand option a lot better.
3. Left-hand option a little better.
4. No difference.
5. Right-hand option a little better.
6. Right-hand option a lot better.
7. Right-hand option absolutely better.

The 12 pairs in (38) multiplied by the 5 contexts in (40) gives 60 tasks. They were divided in 4 lists, each consisting of 15 target tasks and 15 fillers (hence (41) says *30 sentences*). Half of the targets had the countable noun on the left (as in Figure 9), and each list had two versions differing in which option was on the left. The 15 fillers came from three other experiments (one reviewed in §9.2), and the tasks were distributed across the lists to minimize similarity between targets and fillers. The order of the tasks was randomized via *Shuffle question order* in Google Forms.

48 participants were recruited via Prolific, which were pre-screened with the criteria in (42). Each list was completed by 12 participants.

(42) a. Current country of residence: United states
b. Nationality: United states
c. Country of birth: United states
d. First language: English
e. Fluent languages: English
f. English speaking monolingual: I only speak English

I had two predictions regarding (40c–e), which were borne out. First, I predicted the preference for the uncountable noun to be significantly greater in (40d) (*some*) compared to (40c) (*several*). This is predicted by participants with the judgments in (43a–b). Second, I predicted the preference for the uncountable noun to be significantly greater in (40e) (*a bit*) compared to (40d) (*some*). This is predicted by participants with the judgments in (43b–c), where (43c) follows the classification of *a bit* by Doetjes (1998) and Hoekstra (2000).

(43) a. Several {weapons, #weaponry} got dirty.
b. On the way back, we saw some interesting {weapons, weaponry}.
c. A bit of {#weapons, weaponry} can make a big difference.

Crucially, I planned to gauge the acceptability of the uncountable nouns in (38) with (40a) (*widespread*) and (40b) (*scarce*) by comparing these conditions to the other three. If the preference for the uncountable noun were significantly lower compared to (40d) (*some*), I would have surmised *weaponry* to be worse than *weapon(s)* in (44). By contrast, if the preference were significantly higher compared to (40c) (*several*) and significantly lower compared to (40e) (*a bit*), I would have surmised a lack of contrast in (44).

(44) a. I wonder what the most widespread {weapon, weaponry} is.
b. The scarcest {weapons, weaponry} will go extinct.

The mean ratings of the 5 contexts in (40) are in Figure 10, and those of the 12 pairs in (38) are in Figure 11 (closeness to 1 indicates preference for the countable option).

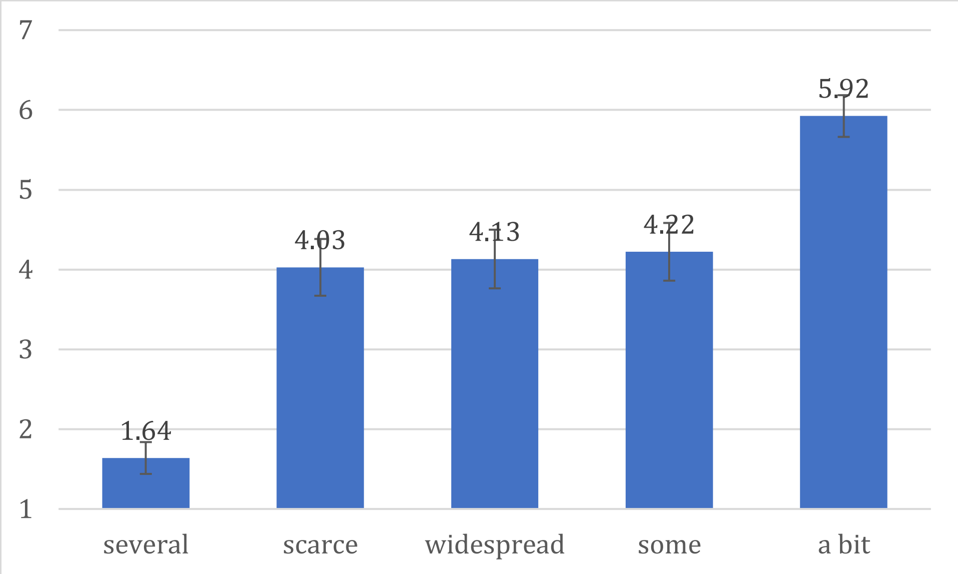


Figure 10: Mean ratings with 95%-confidence intervals.

	several	scarce	widespread	some	a bit
wild animal-wildlife	1.67	4.50	4.67	6.33	6.33
sea animal-sealife	1.58	4.08	3.67	5.25	6.00
farm animal-livestock	2.58	4.50	3.75	3.25	6.25
farm bird-poultry	2.08	4.33	3.42	3.25	5.83
plant-vegetation	1.75	3.08	4.00	3.08	6.08
vegetable-produce	1.67	2.92	3.50	3.58	4.67
machine-machinery	1.25	3.92	4.08	5.00	6.83
weapon-weaponry	1.33	4.17	3.42	4.75	5.92
bullet-ammunition	1.50	3.92	4.58	5.08	6.17
suitcase-luggage	1.75	4.75	4.58	5.33	6.58
shoe-footwear	1.33	4.08	5.67	2.92	4.83
hat-headgear	1.17	4.08	4.25	2.83	5.58
	1.64	4.03	4.13	4.22	5.92

Figure 11: Mean ratings of pairs.

To obtain *p*-values for comparisons between the means in Figure 10, I constructed a mixed-effects model in R (R Core Team 2015) using the lmerTest package (Kuznetsova et al. 2019). The model contained the context as a fixed effect, i.e. the 5 contexts in (40), plus by-subject random intercepts and slopes and by-pair random intercepts and slopes, which is the maximal random effects structure justified by the experimental design (Barr et al. 2013). The full model translates to: lmer(rating ~ context + (1+condition|subject) + (1+condition|pair), data=data). The six comparisons in (45) were obtained via the emmeans package (Lenth 2020); *SD* is the 95%-confidence interval, the degrees-of-freedom method is Kenward-Roger, and the *p*-values are not adjusted for multiple comparisons because the hypotheses were made before conducting the study (Bross 2019:§17).

		Context 1	mean	*SD*	Context 2	mean	*SD*	*t*	*p*
(45)	a.	several	1.64	0.2	some	4.22	0.36	−6.433	<.0001
	b.	some	4.22	0.36	a bit	5.92	0.26	5.176	.0001
	c.	several	1.64	0.2	widespread	4.13	0.37	−10.874	<.0001
	d.	widespread	4.13	0.37	a bit	5.92	0.26	5.550	<.0001
	e.	several	1.64	0.2	scarce	4.03	0.36	8.801	<.0001
	f.	scarce	4.03	0.36	a bit	5.92	0.26	7.283	<.0001

As predicted, (45a) the preference for the countable option was significantly greater with *several* compared to *some*, and (45b) this preference was significantly greater with *some* compared to *a bit*. (45c–d) show that *the most widespread* patterns with *some* in this regard, and (45e–f) show the same for *the scarcest*. I therefore surmise that on average, the pairs in (38) do not differ in acceptability in (40a) (*widespread*) and (40b) (*scarce*).

I regard the countable nouns in (38) as having the subkind reading in combination with *the most widespread* and *the scarcest* (although §2.6.1 does not regard combinability with *widespread* as a sufficient condition for [$_{\text{subk}}$ N]). (45) indicates a lack of contrast between the (near-)synonyms in these context, so I surmise that the uncountable nouns also have the subkind reading in these contexts. I do not suspect *the* SUPERLATIVE *N* to differ from the other contexts in (39), so I surmise that object mass nouns can have the subkind reading in countability-neutral morphosyntax.

The conclusion that the uncountable nouns in (38) can have the subkind reading is in apparent conflict with §3.1 and §2.3, which respectively conclude that (i) certain object mass nouns lack subkind-countability, and (ii) [$_{\text{subk}}$ N] is countable regardless of the countability of [$_{\text{inst}}$ N]. The next subsection resolves this conflict by proposing how it follows from (31) that the uncountable nouns in (38) can have the subkind reading, plus endorsing that the extent of their uncountability is independent of the instance or subkind reading.

3.5.2 Analysis

The principle for the availability of the subkind reading is repeated below.

(31) N is a noun in language L. Its intension under the instance reading is $⟦_{\text{inst}}$ N$⟧$.
$\mathbb{C}_M$ is the model's set of ways of classification.
$[_{\text{subk}}$ N$]$ is felicitous iff
a. For some $\mathbb{c} \in \mathbb{C}_M$
b. $⟦_{\text{inst}}$ N$⟧_{\mathbb{c}}$ is spread over by a set of properties $\mathcal{R}$ s.t.
c. every Q $\in \mathcal{R}$ is the intension of a lexical nominal in L

Whether object mass nouns meet (31) depends on which properties can be in $\mathcal{R}$. Crucially, a [+cumulative] $⟦_{\text{inst}}$ N$⟧$ can only meet (31) if every property in the spreading over set is [+cumulative]. This is because the extensions of a [+cumulative] $⟦_{\text{inst}}$ N$⟧$ include plural sums of a single kind (e.g. 🔪$_1 \vee$🔪$_2$), which in turn are precluded from the extensions of [–cumulative] nouns like $[_{\text{inst}}$ knife$]$. Thus, for $[_{\text{subk}}$ weaponry$]$ to be felicitous under (31), it must be that $\mathcal{R}$ can include a property which is instantiated by plural sums of knives. One option is that $\mathcal{R}$ can include the [+cumulative] $⟦_{\text{inst}}$ knives$⟧$, although this might stray from the aspect of Carlson (1980:§6.1) where the availability of the subkind reading depends on nouns (assuming *knives* is not a noun in the same sense as *knife*). Another option is that $\mathcal{R}$ can include the intension of *knife* in (46), which in the terms of Landman (2020:§8.2) is downshifted and hence [+cumulative].

(46) There is more knife than air in the box.

A third option is that $\mathcal{R}$ can include a sub-constituent of the [–cumulative] $⟦_{\text{inst}}$ knife$⟧$ which itself is [+cumulative]. This could be the Noun of Borer (2005:§4.3), under which $[_N$ knife$]$ is mass while $[\langle e \rangle_{DIV}$ knife$]$ is count, or it could be the N_{root} of Rothstein (2017:§4).

As an interim summary, I propose that the uncountable nouns in (38) meet (31) due to English having enough relevant expressions to denote [+cumulative] properties in a set which spreads over a classified sub-property, and I have given three options for what these expressions are. This accounts for the finding of §3.5.1 that these nouns (on average) are compatible with *wide-spread*, *scarce* and *extinct*. These nouns overlap in *footwear* with those in (47), which reportedly lack subkind-countability.

(47) a. furniture, footwear, equipment (Cowper & Hall 2012)
b. jewelry, mail (Rothstein 2017:§4.6)
(Grimm & Levin 2017)
c. transport (Sutton & Filip 2018)
d. ondergoed 'underwear', zilverwaar 'silverware',
huiswerk 'homework' (De Belder 2013)

Assuming the uncountable nouns in (38) are of the same class of those in (47), the question remains why the latter lack (or have limited) subkind-countability despite the availability of the subkind reading. Relevantly, §2.4, gives two arguments for $[_{\text{subk}}$ N] being countable regardless of the countability of $[_{\text{inst}}$ N]. First, cases like $[_{\text{subk}}$ wine] can occur in any count morphosyntax. Second, if compatibility with *widespread* is considered a necessary condition for $[_{\text{subk}}$ N] (as is adopted in §2.6.1), then (48) indicates that $[_{\text{subk}}$ N] is precluded from mass morphosyntax (e.g. *little* N_{sg}).

(48) a. A $\begin{Bmatrix}\text{few}\\ \text{\#little}\end{Bmatrix}$ widespread $\begin{Bmatrix}\text{wines have}\\ \text{\#wine has}\end{Bmatrix}$ been cultivated since prehistory.
b. A $\begin{Bmatrix}\text{few}\\ \text{\#little}\end{Bmatrix}$ widespread $\begin{Bmatrix}\text{wild animals have}\\ \text{\#wildife has}\end{Bmatrix}$ evolved rapidly.

§2.4 suggests the following sketch of an analysis for (48): *Little* and other elements of mass morphosyntax select for nouns which are semantically uncountable, so they are incompatible with semantically countable nouns like $[_{\text{subk}}$ N]. This sketch relies on $[_{\text{subk}}$ N] being semantically countable, so if only semantics were at play, then the nouns in (47) should be fully modifiable by numerals under the subkind reading, contra the references in (47).

Independently of each other and of the present research, Cowper & Hall (2012) and De Belder (2013) put forth analyses where the nouns in (47a) and (47d) respectively are uncountable due to morphosyntax, regardless of the instance or subkind reading. The present research also points in this direction, and adopting either of their analyses would solve the puzzle where (i) $[_{\text{subk}}$ N] is semantically countable, (ii) the uncountable nouns in (38) can have the subkind reading, and (iii) the same nouns lack (or have limited) subkind-countability. Thus, I hypothesize that the extent of the uncountability of object mass nous is independent of the instance or subkind reading. However, see Erbach & Schoenfeld (2022) for the instance and subkind readings affecting numeral modification of certain object mass nouns in Hungarian.

This concludes the subsection about object mass nouns. The next subsection is the conclusion and discussion.

3.6 Conclusion and discussion

(31) below is my answer to (2), the first research question of the thesis. To reiterate, $[_{\text{subk}}$ N$]$ is felicitous iff $[\![_{\text{inst}}$ N$]\!]$ has a classified sub-property which is spread over by a set of properties which are the intensions of lexical nominals in the language of N. For example, $[_{\text{subk}}$ virtue$]$ is felicitous because the property of classified virtue (which precludes sums of virtue of multiple kinds) is spread over by a set of properties denoted by English nouns, e.g. *courage*. By contrast, $[_{\text{subk}}$ courage$]$ is infelicitous to the extent that there is no classified sub-property of $[\![_{\text{inst}}$ courage$]\!]$ which is spread over by a set of such properties.

(2) What is the principle for the availability of the subkind reading?

(31) N is a noun in language L. Its intension under the instance reading is $[\![_{\text{inst}}$ N$]\!]$.
$\mathbb{C}_M$ is the model's set of ways of classification.
$[_{\text{subk}}$ N$]$ is felicitous iff
a. For some $\mathbb{c} \in \mathbb{C}_M$
b. $[\![_{\text{inst}}$ N$]\!]_{\mathbb{c}}$ is spread over by a set of properties $\mathcal{R}$ s.t.
c. every $Q \in \mathcal{R}$ is the intension of a lexical nominals in L

(31) is an integration of Grimm & Levin (2017) and Carlson (1980:§6.1); it takes from Carlson the appeal to nouns, and it builds on Grimm & Levin's appeal to the taxonomy. However, appealing to the taxonomy incorrectly predicts *weapon* and *cheese* to lack subkind-countability, which is remedied by (31) appealing to spreading over and classified sub-properties (§3.4). Lastly, §3.5 proposes that (31) appeals to lexical nominals to prevent empty reference of $[_{\text{subk}}$ N$]$.

This section is about the availability of the subkind reading, so one might wonder whether the instance reading warrants parallel attention. However, the latter's availability does not seem systematic, e.g. that it is available to *bird* but not *species* seems to be a basic (i.e. underived) fact about these nouns. By contrast, this section pursues the hypothesis that the availability of the subkind reading is systematic, and I propose that it is governed by (31).

I conceive of (31) as a means to prevent empty reference of $[_{\text{subk}}$ N$]$, so one might wonder whether $[_{\text{inst}}$ N$]$ has a parallel condition. However, appealing to lexical nominals would not be helpful, because the vast majority of (spatio-) temporal instances are not named by (proper) nouns; named humans, animal specimens and chess games are the exception to the vast majority of unnamed pieces of weaponry, sums of wine, game rounds, states of emotion, acts of crime etc. By contrast, there is feasibly a tight connection between being a kind and being named by a lexical nominal (Carlson 2010:§4), which might explain why the availability of [$_{\text{subk}}$ N] but not [$_{\text{inst}}$ N] depends on such nominals.

Lastly, (31) appeals to the notions of spreading over and classified subproperties, so one might wonder whether the interpretation domain of kinds is organized via these notions. I refrain from making this claim, following the doubts raised by Randall (1976) and Murphy (2002:§7) about the psychological reality of hierarchical structures of kinds (fn.11). I agree with Wilkinson (1991:§3.4.1) that the interpretation domain of kinds is organized via a sum operation (needed for plurals like *two kinds of animals*), but the present analysis has no further bearing on this interpretation domain in my estimation.

This concludes the half of the thesis about the subkind reading of nouns. The second half is about subkind-denoting NPs in general, although in practice it focuses on *kind of N*. The next sections build up to §7 addressing the second (and last) research question of the thesis: What is the nature of the instance-level use of subkind-denoting NPs? §4 builds towards that by starting to tackle the subkind relation, a fundamental topic in reference to subkinds.

4 Non-inclusion in the subkind relation

Consider the underlined NPs in (1), where the first includes [$_{\text{subk}}$ bird] and the second binominal *kind* (Davidse et al. 2008:§4).

(1) a. This bird is extinct. [$_{\text{subk}}$ bird]
b. This kind of bird is extinct. *kind of bird*

The underlined NPs in (1) include *bird*, and each denotes a kind which stands in the subkind relation with the bird class. This description makes it apparent that the subkind relation is fundamental to subkind-denoting NPs, and thus it is the focus of the next two sections. This section is about non-inclusion in the subkind relation, and the next one is about remaining issues.

Inclusion warrants its own section because it stands out in the limitation of existing analyses, where a necessary truth-condition of the subkind relation is that the superordinate kind includes the subkind (Carlson 1980:§6.2, Cruse 1986:§6, Krifka et al. 1995:ex.122). These analyses are at odds with inclusion being optional. For example, *Oaks are a kind of tree* is judged as true despite oak bushes (Kay 1975, Randal 1976), and *Dogs are a kind of pet* is true despite stray dogs (Hampton 1982). To these two sorts of non-inclusion I add a third, where *Grass is a kind of plant* is true although not every bit of grass is a plant organism. To accommodate such non-inclusion, this section offers a novel denotation of binominal *kind* which serves as an alternative to that of Carlson (1980:§6.2). §4.1 provides background, §4.2 gives the analysis and §4.3 is the discussion.

4.1 Background

This subsection is organized as follows. §4.1.1 introduces the construction which is the object of study of this section (*NP$_{bare}$ BE a kind of N*), §4.1.2 introduces three sorts of non-inclusion in the relation expressed by this construction, and §4.1.3 reviews existing analyses of the subkind relation.

4.1.1 Expressing the subkind relation

In *Oaks are a kind of tree* and *Grass is a kind of plant*, the subject is bare and the predicative phrase is built on binominal *kind*. These choices are not trivial, so they are motivated in this subsection.

In sentences expressing the subkind relation, the subject should be built on the noun which names the subkind. If countable, then three options for the form of the subject are (i) bare plural (*oaks*), (ii) indefinite singular (*an oak*) and

(iii) definite singular (*the oak*) (Lawler 1973:§4). However, only the first option works for NPs built on *fishing*, as shown in (2) (*the fishing* cannot be a definite generic, parallel to *the wine* discussed §2.5).

(2) a. Fishing is a kind of sport. *bare* (Hampton 1982:appx)
b. #A fishing is a kind of sport. *indefinite*
c. The fishing is a kind of sport. *definite* × 'fishing as a kind'
(√ 'the aforementioned subkind')

I know of no justification to exclude subkinds named by nouns like *fishing* from the study of the subkind relation, so I do not use a construction where the subject includes the definite or indefinite article. Instead, I use one where the subject is bare (bare plural if built on a count noun like *oak*). Bare NPs are a natural class regardless of whether they are built on a count or mass noun, as convincingly argued by Carlson (1980:§7.6.0) and Chierchia (1982). Indeed, potential criticism against Hampton (1982) and Cruse (1986) is that their subject NPs are bare if built on mass nouns and include the indefinite article if built on count nouns, but these forms might not constitute a natural class.

With the form of the subject in place, I continue to the predicative phrase. It should include the noun which names the superkind, e.g. *sport* in (2), and one option is for it to be built on a bare NP, as in (3).

(3) a. Oaks are trees. *bare plural*
b. Courage is virtue. *bare singular*

A concern with (3b) is that bare *virtue* is incompatible with *widespread* and *come in several versions*, as (4) shows. In expressing the subkind relation, it should be possible to express predication about the superkind, but this is impossible when the predicative phrase is built on bare *virtue*. Adding the indefinite article rescues (4), as mentioned in relation to the upcoming (8).

(4) a. #Courage is widespread virtue.
b. #Courage is virtue that comes in several versions.

The infelicity in (4) indicates that *virtue* in (3b) does not denote a set of kinds, so it is not clear that (3b) expresses a relation between kinds. Thus, I do not use a construction where the predicative phrase consists of a bare NP. Note that *Oaks are widespread trees* is paraphrasable as 'Generally, a species of oak is a widespread species of tree', which does not express the subkind relation.

Another option for the predicative phrase is to include a classifier which is compatible with only some nouns, e.g. *genus* (Kay 1975:tab.1) or *field* in (5).

(5) a. Oaks are a {genus, #field} of tree.
b. Fishing is a {#genus, field} of sport(s).

(5) is an improvement over (3) in that the predicative phrases are compatible with *widespread* and *come in several versions*, (6).

(6) a. Fishing is a widespread **field** of sport(s).
b. Fishing is a **field** of sport(s) that comes in several versions.

A concern with (5) is that not every subkind-denoting noun is guaranteed to have a classifier which is compatible with it but not other nouns. Thus, a better option is for the predicative phrase to include binominal *kind* (Davidse et al. 2008:§4), as in (7). Alternatively, the predicative phrase can include [$_{\text{subk}}$ N], as in (8). For one, both predicative phrases are compatible with *widespread* and *come in several versions*, as the reader is invited to check.

(7) a. Oaks are a kind of tree. *binominal 'kind'*
b. Courage is a kind of virtue.
(8) a. Oaks are a tree. [$_{\text{subk}}$ N]
b. Courage is a virtue.

Next, a subtle difference between [$_{\text{subk}}$ N] and *kind of N* leads me to focus on the latter in this section. Specifically, embedding *dog* and *pet* in (7) is unproblematic, but doing so in (8) results in the somewhat odd *Dogs are a pet*. It is not absolutely odd, because it is a felicitous answer in (9c) in my judgement, and modifying *pet* obviates the oddness, (9d–e).

(9) a. Dogs are a kind of pet.
b. ?Dogs are a pet.
c. **Q**: What are some pets? **A**: Dogs are a pet, and so are cats.
d. Dogs are a widespread pet.
e. Dogs are a pet that comes in many breeds.

(9) leads me focus on *kind of N* for two reasons: (i) The subkind relation should be studied with clearly felicitous sentences, unlike (9b), and (ii) it should

be studied with unmodified sentences, unlike (9d–e). Together with the subject being a bare NP, this section focuses on *NP*$_{bare}$ *BE a kind of N*.

The sentences in (7) are intuitively true, so *NP*$_{bare}$ *BE a kind of N* can express a relation between kinds where the superkind does not include the subkind, as proven respectively by adult oak bushes (which are not trees) and courage exhibited in a robbery (which is not virtue). Such non-inclusion is the topic of the next subsection.

4.1.2 Sorts of non-inclusion in the subkind relation

This subsection discusses three sorts of non-inclusion in the relation expressed by *NP*$_{bare}$ *BE a kind of N*, pertaining to a restricted subkind, cumulative reference and intended instantiation.

The first sort of non-inclusion is illustrated by the trios of nominals in (10) (Kay 1975, Randall 1976), where (10a) represents that the oak is a subkind of the tree even though not every oak specimen is a tree. Specifically, (adult) specimens of the several species named *scrub oak* are bushes. This non-inclusion is illustrated by the triplet *Scrub oaks are a kind of oak, oaks are a kind of tree, but scrub oaks are not a kind of tree*.

	superkind	*subkind*	*non-inclusion*	(Kay 1975, Randall 1976)
(10)	a. tree	oak	scrub oak (bush)	
	b. tree	willow	pussy willow (bush)	

According to Kay (1975), the non-inclusion in (10a) involves typicality. Consider Figure 12 (ibid. fig.2), a visual representation of a structure where a line represents that every typical instance of the subkind instantiates the superkind. Thus, every typical scrub oak is an oak, every typical scrub oak is a bush, every typical oak is a tree, but not every typical oak is a bush.

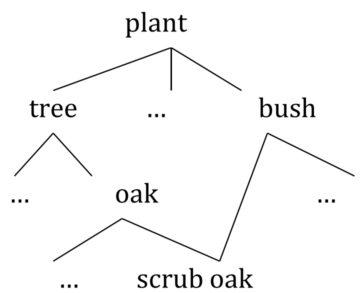


Figure 12: Kay (1975:fig.2).

If one were to derive truth-conditions from Figure 12, then *Oaks are a kind of tree* entails that every typical oak is a tree. However, this analysis incorrectly predicts the sentences in (11) to entail together that all typical lions both have a mane and lactate, contra the intuition that such lions are atypical. (11) is based on Carlson's (1980:§3.2.1) argument against the *all normal* approach to genericity, and it extends to Kay's *all typical* approach to the subkind relation.

(11) a. Lions are a kind of maned animal.
true despite lion specimens that lack manes
b. Lions are a kind of lactating animal.
true despite lion specimens who do not lactate

Crucially, the non-entailment in (12) indicates that the truth of *Oaks are a kind of tree* relies on restricting the oak genus to not be instantiated by bushes. The unrestricted oak genus is instantiated by oak bushes, but (12) shows that this genus as-a-kind-of tree does not, otherwise *There's a kind of tree* would be verified by the existence of an oak bush.

(12) There's an oak bush in this garden. ⇏ There's a kind of tree in this garden.

(12) shows that some cases of non-inclusion rely on a restricted subkind, as is analyzed in §4.2.1. However, not all do. This leads to the second sort of non-inclusion, involving cumulative reference. Two cases are in (13), with the pattern: If the superkind is named by a [–cumulative] noun (e.g. *plant*) and the subkind is named by a [+cumulative] noun (e.g. *grass* or *bamboo*), then the subkind has instances which do not instantiate the superkind. For *plant-grass*, non-inclusion is proven by bits of grass which are not plant organisms, and for *weapon-artillery* it is proven by plural sums of artillery, e.g. two rockets count as artillery but not necessarily as a (singular) weapon. Put differently, grass is a kind of plant even though not every bit of grass is a plant (organism), and artillery is a kind of weapon even though not every unit of artillery is a (singular) weapon.

	superkind	*subkind*	*non-inclusion*
(13)	a. plant	grass	non-organism grass
	b. weapon	artillery	plural sums of rockets

Unlike the non-entailment in (12), the entailment in (14) shows that the truth of *Grass is a kind of plant* does not rely on restricting the grass kind to only be instantiated by plants. Instead, grass as-a-kind-of-plant is instantiated by parts of plants which are not plants themselves, e.g. blades of grass.

(14) There's a blade of grass in this lawnmower bag.
⇒ There's a kind of plant in this lawn mower bag.
(⇏ There's a plant specimen in this lawn mower bag.)

A novel contribution of this thesis is noting the existence of non-inclusion due to cumulative reference and analysing it in §4.2.3. Also, §4.2.4 accounts for the contrast in entailment between (12) and (14).

Next, the leading example of the third sort of non-inclusion is *Dogs are a kind of pet*, which is true despite stray dogs. Four more such cases are in (15), where (15a) is illustrated by the triplet *Stray dogs are a kind of dog, dogs are a kind of pet, but stray dogs are not a kind of pet*.

	superkind	*subkind*	*non-inclusion* (Hampton 1982)
(15)	a. pet	dog	stray dog
	b. gem	diamond	rough diamond, diamond tool[13]
	c. sport	fishing	commercial fishing
	d. furniture	chair	chairlift chair
	e. utensil	knife	dagger

Parallel to (14), (16) shows that the truth of *Dogs are a kind of pet* does not rely on restricting the dog kind to only be instantiated by pets. Instead, the dog kind as-a-kind-of-pet is instantiated by merely intended pets, e.g. dogs up for adoption. This is analyzed in §4.2.2 under the heading *intended instantiation*.

(16) There's a dog up for adoption in this shelter.
⇒ There's a kind of pet in this shelter.
(⇏ There's a pet specimen in this shelter.)

In conclusion, this subsection identifies three sorts of non-inclusion, pertaining to restricted subkinds, cumulative reference and intended instantiation. The next subsection presents previous analyses of the subkind relation, which serve as the starting point for §4.2.

[13] "A diamond tool is a cutting tool with diamond grains fixed on the functional parts." (Wikipedia contributors 2020)

4.1.3 Previous analyses

This subsection reviews the analyses of the subkind relation of Carlson (1980:§6.2), Cruse (1986:§6) and Krifka et al. (1995:ex.122), where a necessary truth-condition is that the superkind includes the subkind. This is at odds with the cases of non-inclusion in §4.1.2.

For Cruse (1986), a subkind (aka taxonym) is a hyponym (§6.2), which is defined via asymmetric entailment. For example, *dog* is a hyponym of *animal* because *This$_i$ is a dog* asymmetrically entails *This$_i$ is an animal* (§4.4). However, hyponymy does not hold in *oak-tree*, *grass-plant* or *dog-pet*; *This$_i$ is an oak* does not entail *This$_i$ is a tree*, therefore *oak* is not a hyponym of *tree*. Still, these pairs are truthfully embeddable in *NP$_{bare}$ BE a kind of N*, so this construction does not (unambiguously) express Cruse's taxonymy.

Next, the subkind relation **T** (*taxonomic*) of Krifka et al. (1995) is such that if x is a subkind of y and z realizes x (via the realization relation **R**) then z also realizes y, (17) (ex.122).

(17) $[\mathbf{T}(x,y) \wedge \mathbf{R}(z,x)] \rightarrow \mathbf{R}(z,y)$ (Krifka et al. 1995:ex.122)

Crucially, **T** does not hold between the (unrestricted) kinds corresponding to *oak-tree*, *grass-plant* or *dog-pet*. For example, dogs are a kind of pet, and a stray dog realizes the dog kind but not the pet kind. Still, these pairs are truthfully embeddable in *NP$_{bare}$ BE a kind of N*, so this construction does not (unambiguously) express the **T** of Krifka et al.

Lastly, Carlson's (1980:§6.2) ⟦kind⟧ is a function from properties (denoted by the noun combined with *kind*) to a set of kinds (as ontological primitives). In every world, all of their realizations are in the extension of the property combined with ⟦kind⟧, (18) (ex.16, 24); superscript 'k' and 'o' stand for *kind* and *object*, and the ellipsis indicates omitted irrelevant conjuncts (cf. §5.2.1).

(18) $[\![\text{kind}]\!] = \lambda Q \lambda y^k.\Box\forall z^o[\mathbf{R}(z^o,y^k) \rightarrow {}^{\vee}Q(z^o)] \wedge \ldots$ (Carlson 1980:§6.2, ex.16, 24)
'Function from property Q to a set of kinds y^k
whose every possible realization is in the extension of Q.'

Crucially, *kind* in *NP$_{bare}$ BE a kind of N* does not uniformly denote (18), which incorrectly predicts falsity from embedding *oak-tree*, *grass-plant* or *dog-pet*. For example, grass as a kind is predicted to be precluded from ⟦kind of plant⟧ because not every possible realization is a plant organism, as is the case for blades of grass. Thus, (18) does not account for the truth of *Grass is a kind of plant* or the other non-inclusion facts in §4.1.2.

This concludes the background on inclusion in the subkind relation, and the next subsection presents the analysis.

4.2 Analysis

This subsection offers a novel denotation of binominal *kind* which serves as an alternative to (18) and accounts for the non-inclusion facts in §4.1.2, as well as data pertaining to the instance-level use of *kind of N* in predication and existential sentences. The first three subsections are about the three sorts of non-inclusion in §4.1.2 (restricted subkind, intended instantiation and cumulative reference), §4.2.4 is about the instance-level use of *kind of N* and §4.2.5 is about false subkind statements.

The starting point of the present analysis is $[\![\text{kind}_1]\!]$ in (19a), which follows the analyses in §4.1.3 in requiring every instance of the subkind Q to instantiate the superkind P. The plural morpheme in *dogs* makes no contribution in (19c), which is remedied in §4.2.3. Also, I follow Carlson (1980:§6.2), Wilkinson (1991:§2) in treating the preposition *of* as inert (cf. §7), and I do the same for the indefinite article (although McNally 1997:§3.4.2 proposes that it is ambiguous in *There's a kind of N*, as discussed in §7.2).

(19) a. $[\![\text{kind}_1]\!] = \lambda P\lambda Q.\forall w\forall x[Q_w(x) \rightarrow P_w(x)]$
'The relation between properties P and Q s.t. every possible instance of Q instantiates P.'
b. $[\![\text{kind}_1 \text{ of mammal}]\!] = \lambda Q.\forall w\forall x[Q_w(x) \rightarrow MML_w(x)]$
'The set of properties whose every possible instance is a mammal.'
c. $[\![\text{Dogs are a kind}_1 \text{ of mammal.}]\!] = \forall w\forall x[DOG_w(x) \rightarrow MML_w(x)]$
'Every possible dog is a mammal.'

(19c) does not reflect that inclusion is merely a necessary truth-condition in Kay (1971), Carlson (1980:§6.2) and Cruse (1986:§6). The necessary and sufficient conditions are in §5, which discusses aspects of $[\![\text{kind}]\!]$ which are orthogonal to inclusion.

With the starting point in place, the next subsection modifies $[\![\text{kind}_1]\!]$ to accommodate non-inclusion due a restricted subkind.

4.2.1 Restricted subkind

The background to non-inclusion due to a restricted subkind is that generic and subkind statements tolerate exceptions. This is shown in (20) with three generic statements from Nickel (2016:§3) and their subkind counterparts, where the exceptions respectively are non-red roses, lions without manes and snakes which give birth to live young (e.g. rattlesnakes).

	generic	*subkind*
(20)	a. Roses are red.	Roses are a kind of red flower.
	b. Lions have manes.	Lions are a kind of maned animal.
	c. Snakes lay eggs.	Snakes are a kind of animal that lays eggs.

I capture the affinity between generic and subkind statements by adapting to ⟦kind⟧ an analysis of what verifies the generic statements in (20) despite exceptions. I opt for Nickel (2016:§3.3), where (in an extensional version) *Lions have manes* is true iff there is a way to be normal in a respect such that every lion who is normal in that way has a mane. This is formalized in (21), where ∃N is proposedly satisfied by the way in which male lions are normal with respect to sex. The latter is notated as N_{male}, the property that x has if x has the characteristics which are normal for males of the species of x.[14] My main reason for adapting Nickel is that it derives a testable prediction for when the subkind relation should be false, as discussed in relation to the upcoming (26).

(21) $[\![\text{Lions have manes.}]\!] = \exists N \forall x[(\text{LION}(x) \wedge N(x)) \rightarrow \text{MANED}(x)]$

Following (21), (22) is a version of ⟦kind⟧ with existential quantification over ways of being normal.

(19a) $[\![\text{kind}_1]\!] = \lambda P \lambda Q. \quad \forall w \forall x[\ Q_w(x) \qquad\qquad \rightarrow P_w(x)]$

(22) $[\![\text{kind}_2]\!] = \lambda P \lambda Q. \exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow P_w(x)]$

‘There is a way to be normal in a respect s.t. every possible instance of the subkind Q which is normal in that way instantiates the superkind P.’

[14] Nickel’s ways of being normal are relativized to the kind, i.e. they are ways for instances of the kind to be normal, but I have not found such relativization necessary.

Next, recall from §4.1.2 that the non-entailment in (12) below indicates that the truth of *Oaks are a kind of tree* relies on restricting the oak genus to not be instantiated by oak bushes.

(12) There's an oak bush in this garden. $\nRightarrow$ There's a kind of tree in this garden.

Crucially, the truth of the conjunction in (23) indicates that the denotation of the subject can be unrestricted. (23) would be false otherwise, because no restriction of ⟦oaks⟧ can be in both ⟦kind of tree⟧ and ⟦kind of bush⟧; restricting ⟦oaks⟧ to not be instantiated by trees would falsify the first conjunct, and restricting it to not be instantiated by bushes would falsify the second conjunct.

(23) Oaks are a kind of tree and a kind of bush. *true*

The present account of (23) parallels Nickel's (2016:§3.3) of conjunctive generics like *Elephants live in Africa and Asia*, where each conjunct is verified by a different way of being normal (with respect to habitat). According to Randall (1976), "Oaks are typically trees at low elevations but are typically bushes at higher elevations" (p.550), so I propose that each conjunct in (23) is verified by a different way of being normal with respect to elevation, as summarized in (24); $N_{\text{low-elev}}$ is the property of having the characteristics which are normal for entities habitating in low elevations, and $N_{\text{high-elev}}$ is the property of having the characteristics which are normal for entities habitating in high elevations.

(24) a. ⟦kind_2 of tree⟧ $= \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \text{TREE}_w(x)]$
True of unrestricted ⟦oaks⟧, $\exists N$ satisfied by $N_{\text{low-elev}}$.

b. ⟦kind_2 of bush⟧ $= \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \text{BUSH}_w(x)]$
True of unrestricted ⟦oaks⟧, $\exists N$ satisfied by $N_{\text{high-elev}}$.

In addition to accounting for the truth of (23), ⟦kind_2⟧ in (22) accounts for the truth of the conjunctive subkind statements in (25). The righthand column has the respects relative to which the ways of being normal are proposed to satisfy $\exists N$ (Nickel 2016:§3.3), e.g. the two cases of $\exists N$ in (25a) are satisfied by different ways of being normal with respect to color.

(25) a. Roses are a kind of red flower and a kind of white flower. *color*

b. Lions are a kind of maned animal

and a kind of animal that gives birth to live young. *gender*

c. Snakes are a kind of animal that that lays eggs *offspring-*

and a kind of animal that gives birth to live young. *extrusion*

An advantage of ⟦kind$_2$⟧ in (22) is that it derives an account of asymmetric truth-value judgements, e.g. (26). The analyses in §4.1.3 would say that (26a.ii) is false because not every mammal is a dog, but this incorrectly predicts both sentences in (26b) to be false, because non-inclusion holds in both directions.

(26) a. i. Dogs are a kind of mammal. *true*

ii. Mammals are a kind of dog. *false*

b. i. Oaks are a kind of tree. *true*

ii. Trees are a kind of oak. *false*

I offer an account of (26b) which draws from Nickel's (2016:§7) correspondence between ways of being normal and explanations. Under this correspondence, $N_{\text{low-elev}}$ corresponds to the explanation to why a particular oak specimen is a tree, e.g. it instantiates a species which has responded to the selective pressures of habitation in low elevations by evolving into a kind of tree. With this in mind, consider the question *Why is this oak tree a tree?* It is answerable with a definition of a tree, but it is also answerable with said explanation. Next, consider the question *Why is this oak tree an oak?* It too is answerable with a definition (of an oak), but intuitively it is unanswerable with an explanation; an oak tree simply is an oak, and there is no explanation, (27).

(27) a. Why is this oak tree a tree? √ explanation (√ definition of tree)

b. Why is this oak tree an oak? × explanation (√ definition of oak)

I propose that the asymmetry in (27) in the availability of an explanation underlies the asymmetric truth-value judgements in (26b). *Trees are a kind of oak* would be verified by a way of being normal which corresponds to an explanation to why a particular tree specimen is an oak, but (26b) indicates that such a way of being normal does not exist. This account of (26b) is summarized in (28) (*Mammals are a kind of dog* in (26a.ii) is addressed in §4.2.5).

(28) a. $[\![\text{Oaks are a kind of tree.}]\!]_w = \exists N \forall w \forall x[(OAK_w(x) \wedge N_w(x)) \rightarrow TREE_w(x)]$
$\exists N$ is satisfied by $N_{low\text{-}elev}$.
b. $[\![\text{Trees are a kind of oak.}]\!]_w = \exists N \forall v \forall x[(TREE_w(x) \wedge N_w(x)) \rightarrow OAK_v(x)]$
$\exists N$ fails; there is no explanation for a tree specimen being an oak.

Lastly, $[\![kind_2]\!]$ in (22) should account for the truth of cases where the superkind includes the subkind, so I assume that the interpretation domain of ways of being normal includes that whose extensions are the sets of instances which exist in the world of evaluation, notated as N_{triv} (*trivial*) in (29). Thus, $\exists N$ can be satisfied by N_{triv} if the superkind includes the subkind (as in *Dogs are a kind of mammal*), but certain cases of non-inclusion are verified by non-trivial ways of being normal, e.g. $\exists N$ in (28a) is verified by $N_{low\text{-}elev}$.

(29) $\mathcal{N}_M$ is the interpretation domain of ways of being normal in model M.
For every model M, $N_{triv} \in \mathcal{N}_M$, where $N_{triv} = \lambda w \lambda x.EXIST_w(x)$

In conclusion, $[\![kind_2]\!]$ in (22) allows subkind statements to be evaluated relative to a subkind which is restricted via a way of being normal in a respect. The next two subsections are about two sorts of non-inclusion which do not rely on a restricted subkind, the first being intended instantiation.

4.2.2 Intended instantiation

Consider the true subkind statement and non-entailment in (30).

(30) a. Dogs are a kind of pet. *true*
b. There's a stray dog on this street. $\nRightarrow$ There's a kind of pet on this street.

As in the previous subsection, I interpret the non-entailment in (30b) as indicating that the truth of (30a) relies on restricting the dog kind to not be instantiated by strays. I propose that this is achieved by $\exists N$ in $[\![\text{kind of pet}]\!]$ being satisfied by N_{domest}, which is the property of having the characteristics which are normal for entities which habitate in domestic settings. Not all stray dogs have this property, which underlies the non-entailment in (30b).

That $\exists N$ in $[\![\text{kind of pet}]\!]$ is satisfied by N_{domest} is not the whole story, because the entailment in (16) below indicates that the truth of (30a) does not rely on restricting the dog kind to only be instantiated by pets. Instead, it is instantiated by merely intended pets, e.g. dogs up for adoption.

(16) There's a dog up for adoption in this shelter.
⇒ There's a kind of pet in this shelter.
(⇏ There's a pet specimen in this shelter.)

I diagnose intentionality as the relevant notion based on data regarding *diamond* and *gem*; (31) shows that whether the rough diamond is intended to become a gem affects whether *There's a kind of gem* is entailed.

(31) a. There's a rough diamond in this mine.
The rough diamond is intended to become a gem.
⇒ There's a kind of gem in this mine.
b. There's a rough diamond on this sawblade.
The rough diamond is not intended to become a gem.
⇏ There's a kind of gem on this sawblade.

To reiterate, I propose that *Dogs are a kind of pet* is true because every dog which is N_{domest}-normal is an actual or intended pet. To appeal to the notion of being actual or intended, I define INT_w as the set of worlds where the intentions in w (of the relevant intention holders) are fulfilled, and INT_w^+ as the union of INT_w and {w}, (32).

(32) a. $INT_w \stackrel{def}{=} \{v : \text{the intentions in w are fulfilled in v}\}$
b. $INT_w^+ \stackrel{def}{=} INT_w \cup \{w\}$

Next, I add to the consequent of ⟦kind⟧ existential quantification over worlds in INT_w^+, (33).

(22) $[\![kind_2]\!] = \lambda P \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow P_w(x)]$
(33) $[\![kind_3]\!] = \lambda P \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[INT_w^+(v) \wedge P_v(x)]]$
'There is a way to be normal in a respect s.t. every possible instance of the subkind Q instantiates the superkind P in its own world or in an intended one.'

(34) is the proposition of *Dogs are a kind of pet* resulting from (33). It entails that there is a way to be normal s.t. every possible dog specimen which is normal in that way is an actual or intended pet, which is proposedly N_{domest}.

(34) ⟦Dogs are a kind$_3$ of pet.⟧ =

$$\exists N \forall w \forall x[(DOG_w(x) \land N_w(x)) \rightarrow \exists v[INT_w{}^+(v) \land PET_v(x)]]$$

This concludes the account of intended instantiation. The next subsection is about non-inclusion due to cumulative reference.

4.2.3 Cumulative reference

The two representative cases of non-inclusion due to cumulative reference are repeated below.

	superkind	*subkind*	*non-inclusion*
(13)	a. plant	grass	non-organism grass
	b. weapon	artillery	strictly-plural sums of rockets

Recall from §3.3.3 that I assume that the extension of a nominal with a [–cumulative] interpretation is a quantized set, and one with a [+cumulative] interpretation is a cumulative set. To illustrate, in (35) are the extensions of *weapon* and *artillery* in w$_1$, where the weapons are three rockets and a knife.

(35) The weapons in w$_1$ are 🚀$_1$, 🚀$_2$, 🚀$_3$ and 🔪.

a. ⟦weapon⟧$_{w1}$ = {🚀$_1$, 🚀$_2$, 🚀$_3$, 🔪} *quantized*

b. ⟦artillery⟧$_{w1}$ = { 🚀$_1$ ∨ 🚀$_2$ ∨ 🚀$_3$,
🚀$_1$ ∨ 🚀$_2$, 🚀$_1$ ∨ 🚀$_3$, 🚀$_2$ ∨ 🚀$_3$,
🚀$_1$, 🚀$_2$, 🚀$_3$ } *cumulative*

Notably, (35b) is the closure under sum (Link 1983) of {🚀$_1$, 🚀$_2$, 🚀$_3$}. This operation is defined in (36); it takes a set Y and returns the set whose members are sums of non-empty subsets of Y, notated as *Y.[15]

(36) X is a set, $\leq_X$ is a partial order on X, ∨ is the sum operation defined via $\leq_X$ and $Y \subseteq X$

$*Y = \{\alpha \in X : \text{for some non-empty } Z \subseteq Y, \alpha = \vee Z\}$

Every set which is closed under sum is cumulative (Link 1983). Thus, one can characterize the extension of *grass* as the closure under sum of a certain set.

[15] See Landman (2011b) for the argument that *X should include the sum of the empty set.

Following Chierchia (2010) and Landman (2020:§7), I propose that it is the set of contextually atomic bits of grass, notated C-$\mathrm{AT}_{\mathrm{GRASS}}$. Atomic means that if anything is subtracted then the result is not grass, and contextual means that what counts as an atomic bit of grass varies between contexts of evaluation. For example, for the purpose of emptying a lawnmower bag, atomic bits of grass are ones where them being in the bag means that the bag is not empty of grass. Thus, in (37) are the extensions of *plant* and *grass* in w_1, where the plants are one palm tree and three grass organisms. The exact identity of C-$\mathrm{AT}_{\mathrm{GRASS}}$ is not important, what matters is that *C-$\mathrm{AT}_{\mathrm{GRASS}}$ is cumulative.

(37) The plants in w_1 are 🌴 and three grass organisms g_1, g_2, g_3.

a. $[\![\text{plant}]\!]_{w1} = \{g_1, g_2, g_3,$ 🌴 $\}$ *quantized*

b. $[\![\text{grass}]\!]_{w1} =$ *C-$\mathrm{AT}_{\mathrm{GRASS}}$ *cumulative*

In the analyses in §4.1.3, a necessary truth-condition of *Grass is a kind of plant* is that every bit of grass is a plant, but this does not hold. What does hold is that every bit of grass is a sum of parts of plants. This is true of bits which are smaller than organisms (e.g. blades of grass) and of bits which include organisms as proper sub-parts (e.g. the sum of g_1 and a blade of grass from g_2). I formalize the notion of a sum of parts by appealing to two notions. The first is the sum operation (defined in §3.3.3), and the second is that of a part-set, defined in (38). In words, the part-set of a member of X with respect to a partial order on X is the set of members of X which stand with the member in the partial order.

(38) $\alpha \in X$ and $\leq_X$ is a partial order on X.

$(\alpha] = \{\beta \in X : \beta \leq_X \alpha\}$

With the two notions in place, the modification to $[\![\text{kind}_1]\!]$ in (19a) below which verifies *Grass is a kind of plant* is in (39), where the consequent consists of $(\vee P_w](x)$ instead of $P_w(x)$. The former proposition is weaker, e.g. a blade of grass in w is in $(\vee \mathrm{PLANT}_w]$ (it is a sum of parts of plants) but not in PLANT_w (it is not a plant organism). Thus, unrestricted $[\![\text{grass}]\!]$ can be in $[\![\text{kind}_4 \text{ of plant}]\!]$ because in every world w, every member of GRASS_w is in $(\vee \mathrm{PLANT}_w]$, i.e. every possible bit of grass is a sum of parts of plants.

(19a) $[\![\text{kind}_1]\!] = \lambda P \lambda Q.\forall w \forall x[Q_w(x) \rightarrow P_w(x)]$

(39) $[\![\text{kind}_4]\!] = \lambda P \lambda Q.\forall w \forall x[Q_w(x) \rightarrow (\vee P_w](x)]$

(40) is the proposition of *Grass is a kind of plant* resulting from (39). The lack of a restricted subkind is indicated by (14) below, which shows that the grass kind as-a-kind-of-plant is instantiated by parts of plants that are not plants themselves, e.g. blades of grass.

(40) ⟦Grass is a kind$_4$ of plant.⟧ = $\forall w \forall x[\text{GRASS}_v(x) \rightarrow (\vee\text{PLANT}_v](x)]$
‘Every possible bit of grass is a sum of parts of plants.’

(14) There’s a blade of grass in this lawnmower bag.
⇒ There’s a kind of plant in this lawn mower bag.
(⇏ There’s a plant specimen in this lawn mower bag.)

An advantage of ⟦kind$_4$⟧ in (39) is that it allows the plural morpheme in bare plural subjects to be meaningful. As background, this morpheme is inert in (41a), but it denoting closure under sum (Link 1983) in (41b) incorrectly predicts falsity, because not every plurality of dog specimens is a mammal specimen. This is remedied in (41c) via the true proposition that every plurality of dog specimens is a sum of parts of mammal specimens.

(41) ⟦Dogs are a kind of mammal.⟧
a. $\forall w \forall x[\text{DOG}_w(x) \rightarrow \text{MML}_w(x)]$ (true, *-s* is meaningless)
‘Every dog specimen is a mammal specimen.’
b. $\forall w \forall x[{}^*\text{DOG}_w(x) \rightarrow \text{MML}_w(x)]$ (false, *-s* is meaningful)
‘Every plurality of dog specimens is a mammal specimen.’
c. $\forall w \forall x[{}^*\text{DOG}_w(x) \rightarrow (\vee\text{MML}_w](x)]$ (true, *-s* is meaningful)
‘Every plurality of dog specimens is a sum of parts of mammals.’

Next, a potential concern with (40) is that it does not entail that some bits of grass are plants. However, it is not clear that this entailment comes from *kind*, because it feasibly comes from the lexical semantics of *grass* (part of knowing the meaning of *grass* is knowing that grass is made up of plants). More generally, ⟦kind$_4$⟧ in (39) does not entail that the superkind and subkind share instances. This might be undesirable, because perhaps the falsity of (42a) is because no placenta is a mammal. However, ⟦kind$_4$⟧ leads to the true (42b).

(42) a. Placentas are a kind of mammal. *false*
b. $\forall w \forall x[{}^*\text{PLC}_w(x) \rightarrow (\vee\text{MML}_w](x)]$ *true*
‘Every possible plurality of placentas is a sum of parts of mammals.’

The incorrect prediction in (42) would be remedied by adding to $[\![\text{kind}]\!]$ the conjunct in (43), which requires the superkind and subkind to share an instance. However, §4.2.5 argues against (43) by building on the analysis of the instance-level use of *kind of N* in the next subsection.

(43) $[\![\text{kind}]\!] = \ldots \wedge \exists w \exists x[Q_w(x) \wedge P_w(x)]$
'The subkind (Q) and superkind (P) share an instance.'

As an interim summary, (44) is a version of $[\![\text{kind}]\!]$ which combines the part set of the sum in $[\![\text{kind}_4]\!]$ with the existential quantification over ways of being normal and actual or intended worlds in $[\![\text{kind}_3]\!]$.

(19a) $[\![\text{kind}_1]\!] = \lambda P \lambda Q.\forall v \forall x[Q_v(x) \rightarrow P_v(x)]$
(23) $[\![\text{kind}_2]\!] = \lambda P \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow P_w(x)]$
(33) $[\![\text{kind}_3]\!] = \lambda P \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge P_v(x)]]$
(39) $[\![\text{kind}_4]\!] = \lambda P \lambda Q.\forall w \forall x[Q_w(x) \rightarrow (\vee P_w](x)]$
(44) $[\![\text{kind}_5]\!] = \lambda P \lambda Q.\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee P_v](x)]]$
'There is a way to be normal in a respect s.t. every possible instance of the subkind Q which is normal in that way is a sum of parts of instances of the superkind P in its own world or an intended one.'

The proposition resulting from $[\![\text{kind}_5]\!]$ in (44) is strictly weaker than that resulting from $[\![\text{kind}_1]\!]$ in (19a), so $[\![\text{kind}_5]\!]$ accounts for the truth of cases where the superkind includes the subkind. To illustrate, (45) is the proposition of *Dogs are a kind of mammal* resulting from $[\![\text{kind}_5]\!]$, which is entailed by (45c) thanks two assumptions: (45b) $N_{triv} \in \mathcal{N}_M$, and (45c) $w \in \text{INT}_w{}^+$, as defined respectively in (29) and (32).

(45) $[\![$Dogs are a kind$_5$ of mammal.$]\!]$
a. $\exists N \forall w \forall x[(*\text{DOG}_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee \text{MML}_v](x)]]$
b. $\Nwarrow \forall w \forall x[\ *\text{DOG}_w(x) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee \text{MML}_v](x)]]$ $N_{triv} \in \mathcal{N}_M$
c. $\Nwarrow \forall w \forall x[\ *\text{DOG}_w(x) \rightarrow (\vee \text{MML}_w](x)\ ]$ $w \in \text{INT}_w{}^+$

Weakening the proposition raises the concern that the proposition is too weak, which is the topic of §4.2.5. Beforehand, recall that entailments of existential sentences are crucial in determining which cases of non-inclusion are due to a restricted subkind. Such sentences are examples of the instance-level use of *kind of N*, the topic of the next subsection.

4.2.4 The instance-level use of *a kind of N*

This subsection is about the instance-level use of *a kind of N* in predication and existential sentences. The former is exemplified in *This sapling is a kind of tree*, which is non-contradictory unlike *This sapling is a tree specimen*. Instead, it is true if the sapling should grow into a tree, (46).

(46) a. This sapling is a tree specimen. *contradiction*
b. This sapling is a kind of tree. *true if the sapling should grow into a tree, false if it should grow into a bush*

Another example of the instance-level use of *a kind of N* in predication is *This is a kind of plant* when referring to a blade of grass, which I judge as true even though the blade itself is not a plant specimen, (47).[16]

(47) (Pointing at a blade of grass.)
a. This is a plant specimen. *false*
b. This is a kind of plant. *true*

The preceding facts are accounted for by positing that the instance-level use of *kind of N* in predication is obtained by shifting the type-e denotation of the subject to <s,<e,t>> via (48), an intensional version of Partee's (1987) IDENT; λw does not bind anything, so $\lambda w \lambda y.y = x$ is rigid, i.e. its extension in every world is the singleton set consisting of x.

(48) $[\![\text{IDENT}]\!] = \lambda x \lambda w \lambda y.y = x \quad \langle e,\langle s,\langle e,t\rangle\rangle\rangle$

For simplicity, I assume that the type-e denotation of the demonstrative in (46–47) is the constant b (of type e), as is represented via the assignment function $[[\![\text{this}]\!] \rightarrow b]$ in (49). The application of (48) to b is of the right type to be the argument of $[\![\text{kind of N}]\!]$, and the result is the proposition in (49), whose simplification is paraphrased as 'In every world, b is a sum of parts of instances of N or is intended as such.' The simplification in (49f) is licensed by ∃N being satisfiable by N_{triv} (which is true of b), and that in (49g) is licensed by the equivalence between P(b) and $\forall x[x = b \rightarrow P(x)]$.[17]

[16] For reasons unclear to me, I judge *This is a kind of plant* as more acceptable than *This is a kind of tree* when referring to a tree branch.

[17] For an arbitrary model M and assignment function g,

(49) $[\![\text{This is a kind}_5 \text{ of N.}]\!]_{[[\![\text{this}]\!] \rightarrow b]}$

a. $[\![\text{kind}_5 \text{ of N}]\!] \quad ([\![\text{IDENT}]\!] \quad ([\![\text{this}]\!]) \;)$

b. $\lambda Q.\exists N \forall w \forall x[(Q_w(x) \quad \wedge N_w(x))$

$\rightarrow \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](x)](\lambda x\, \lambda v \lambda y.y = x \quad (b) \quad)$

$(\quad \lambda v \lambda y.y = b \quad) \quad \lambda x$

c. $\exists N \forall w \forall x[(\lambda v \lambda y.y = b\,(w)(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](x)]] \quad \lambda Q$

d. $\exists N \forall w \forall x[(\quad \lambda y.y = b \quad (x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](x)]] \quad \lambda w$

e. $\exists N \forall w \forall x[(\quad x = b \quad \wedge N_w(x)) \rightarrow \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](x)]] \quad \lambda y$

f. $\forall w \forall x[\quad x = b \quad \rightarrow \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](x)]]$

g. $\forall w \quad \exists v[\text{INT}^+_w(v) \wedge (\vee[\![N]\!]_v](b)]$

'In every world, b is a sum of parts of N or it is intended as such.'

Under (49g), *This is a kind of plant* is true when referring to a blade of grass because the blade is a sum of parts of plants in every world (although it is not a plant specimen in the world of evaluation). Likewise, *This oak tree sapling is a kind of tree* is true because in every world, b is either a tree specimen or intended as such (although it is not a tree specimen in the world of evaluation). Thus, *This is a kind of plant* does not entail that ⟦this⟧ is a plant specimen (it may be a non-plant part of a plant), and *This is a kind of tree* does not entail that ⟦this⟧ is a tree specimen (it may be a tree sapling), as desired.

Analysis (49), which I call *higher-order predication*, is an alternative to the instantiation analysis in (50). I do not know of proponents of (50), but it is akin to Landman's (2004:§3.4) analysis of predication with role-value predicates and McNally's (1997:§3.4.2) analysis of *There's a kind of N*, introduced shortly.

(50) $[\![\text{This is a kind of N.}]\!]_{w,\,[[\![\text{this}]\!] \rightarrow b]} = \exists P[[\![\text{kind of N}]\!](P) \wedge P_w(b)]$

'This is an instance of a kind of N.'

An issue with (50) is that it is too weak. Recall from (23) that the truth of *Oaks are a kind of tree and a kind of bush* indicates that ⟦kind of tree⟧ can include the unrestricted oak genus, which is instantiated by oak bushes (among other things). Thus, (50) predicts *This is a kind of tree* to be true when referring to an oak bush, contra intuition. This would be remedied by requiring ⟦this⟧ to instantiate the superkind, but this leads to propositions which are too strong in two respects: (i) *This is a kind of tree* requires ⟦this⟧ to be a tree specimen, contra the

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$[\![\forall x[x = b \rightarrow P(x)]]\!]_{M,g} = 1$ iff for every $d \in D_M$, $d \neq F(b)$ or $d \in F(P)$ (or both)
- Every $d \in D_M - \{F(b)\}$ verifies the first disjunct.
- $F(b) \in D_M$ does not verify the first disjunct, so it verifies the second, i.e. $[\![P(b)]\!]_{M,g}$

judgement that it can be a tree sapling, and (ii) *This is a kind of plant* requires ⟦this⟧ to be a plant specimen, contra the judgement that it can be a non-plant part of a plant. These propositions would be sufficiently weakened by requiring ⟦this⟧ to be a sum of parts of instances of the superkind or intended as such, but these are stipulations in an analysis based on (50) which come for free in (49).

Another way to evaluate (49) and (50) is in how much they deviate from introductory predication. As background, *this is a [$_{inst}$ tree]* claims that ⟦this⟧ is a member of the set of tree specimens ⟦$_{inst}$ tree⟧. (49) deviates from this in that the proposition of *This is a kind of tree* is not about the basic (type e) denotation of *this*, but its higher-order correlate (type <s,<e,t>>). By contrast, (50) deviates from introductory predication by appealing to existential quantification over the set and an instantiation relation. There is an argument to be made that (49) deviates less from introductory predication, but the main argument for (49) is that in the previous paragraph.

The instance-level use of *kind of N* in predication is expanded upon in §7.1, and the remainder of this subsection is about existential sentences (which in turn are expanded upon in §7.2). Below are the two leadings facts.

(51) There's a tree sapling in this garden.
⇒ There's a kind of tree in this garden.
(⇏ There's a tree specimen in this garden.)
(14) There's a blade of grass in this lawnmower bag.
⇒ There's a kind of plant in this lawn mower bag.
(⇏ There's a plant specimen in this lawn mower bag.)

Setting aside ambiguity and compositionality (cf. §7.2), I propose that (one reading of) *There's a kind of N* expresses (52), which is identical to (49g) below except instead of b is the existentially-bound variable x.

(49g) $[\![\text{This is a kind}_5 \text{ of N.}]\!]_{[[\![\text{this}]\!] \to \text{b}]} = \forall w \exists v[\text{INT}^+_w(v) \wedge (\vee[\![\text{N}]\!]_v](\text{b})]$
'In every world, b is a sum of parts of N or it is intended as such.'
(52) $[\![\text{There's a kind}_5 \text{ of N.}]\!] = \exists x \forall w \exists v[\text{INT}^+_w(v) \wedge (\vee[\![\text{N}]\!]_v](\text{x})]$
'Something is a sum of parts of N or intended as such.'

Under (52), *There's a kind of plant* is verified by a blade of grass because the blade is a sum of parts of plants in every world (although it is not a plant specimen in the world of evaluation). Likewise, *There's a kind of tree* is verified by a tree sapling because in every world, the sapling is either a tree specimen or intended as such (even though it is not a tree specimen in the world of evaluation).

Thus, *There's a kind of plant* is verified by non-plants which are parts of plants, and (shifting the example to pets) *There's a kind of pet* is verified by non-pets which are intended to become pets.

The analysis in (52) (higher-order predication) is an alternative to the instantiation analysis in (53), adapted from McNally (1997:§3.4.2).

(53) $[\![\text{There's a kind of N.}]\!]_w = \exists P[[\![\text{kind of N}]\!](P) \wedge \exists x[P_w(x)]]$
'There is an instance of a kind of N.'

As with (50), (53) is too weak because ⟦kind of tree⟧ can include the unrestricted oak genus which is instantiated by oak bushes, thus incorrectly predicting *There's a kind of tree* to be verified by oak bushes. This can be remedied in the manner detailed in relation to (50), but these remedies are stipulative in analyses based on (53) whereas they come for free in (52). Thus, non-inclusion in the subkind relation poses a challenge to McNally's instantiation approach to existential sentences, as is expanded upon §7.2.

In conclusion, this subsection supports the novel denotation of binominal *kind* in (44) by showing that it accounts not only for truth-value judgements regarding subkind statements, but also for data regarding the instance-level use of *kind of N*. Next, recall that $[\![\text{kind}_5]\!]$ in (44) leads to a weaker proposition than $[\![\text{kind}_1]\!]$ in (19a), but the next subsection shows that the former is strong enough to account for the falsity of select subkind statements.

4.2.5 False subkind statements

This subsection offers an account of the falsity of select subkind statements, the first of which is in (54).

(54) Books are a kind of paperback. *false* (cf. Nickel 2016:§3.5.4)

As background for (54), Nickel (2016:§3.5.4) writes that his analysis incorrectly predicts the false *Books are paperbacks* to be verified by the way in which paperbacks are normal with respect to format, and $[\![\text{kind}_5]\!]$ in (44) makes the same incorrect prediction for (54). I propose to account for this falsity by disallowing the cumulative counterpart of the superkind (*P) to be a strict subproperty of the subkind (Q), as is achieved by $*P \not\subset Q$ in (55).

(55) $[\![\text{kind}_6]\!] = \lambda P \lambda Q. {*P} \not\subset Q \wedge$
$$\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee P_v](x)]]$$

Under $*P \not\subset Q$ in (55), (54) is false because *PAPERBACK is a strict sub-property of *BOOK (recall the assumption that the plural morpheme in *books* denotes closure under sum). This addition maintains the truth of the previously discussed subkind statements in the manner summarized in (56).

			$*P$	$\not\subset$	Q
(56)	a. Dogs are a kind of mammal.	*true*	*MAMMAL	$\not\subset$	*DOG
	b. Grass is a kind of plant.	*true*	*PLANT	$\not\subset$	GRASS
	c. Oaks are a kind of tree.	*true*	*TREE	$\not\subset$	*OAK
	d. Dogs are a kind of pet.	*true*	*PET	$\not\subset$	*DOG

Next, $*P \not\subset Q$ in (55) preserves the analysis of the instance-level use of *kind of N* in §4.2.4. The added conjunct is the true proposition that $*[\![N]\!]$ is not a strict sub-property of a rigid singleton property, as shown in (57) (the only strict sub-property of a singleton property is the null property).

(57) a. $[\![\text{This is a kind}_6 \text{ of N.}]\!]_{[[\![\text{this}]\!] \to b]} = \ \ldots \wedge *[\![N]\!] \not\subset \lambda v \lambda y.y = b$

b. $[\![\text{There's a kind}_6 \text{ of N.}]\!] = \exists x[\ldots \wedge *[\![N]\!] \not\subset \lambda v \lambda y.y = x]$

An alternative to $*P \not\subset Q$ in (55) is to follow Carlson (1980:§6.2) in requiring the superkind (P) to have an instance which does not instantiate the subkind (Q), as is adapted in (58).

(58) $[\![\text{kind}]\!] = \ldots \wedge \exists w \exists x[P_w(x) \wedge \neg Q_w(x)]$ (cf. Carlson 1980:§6.2, ex.16)

'The superkind (P) has an instance
that does not instantiate the subkind (Q).'

Together with the analysis in §4.2.4 of the instance-level use of *kind of N* in predication, (58) results in propositions where the superkind has an instance which does not equal $[\![\text{this}]\!]$, as shown in (59). This is reasonable, so (58) is a workable alternative to $*P \not\subset Q$ in (55).

(59) $[\![\text{This is a kind of N.}]\!]_{[[\![\text{this}]\!] \to b]}$

a.	$[\![\text{kind of N}]\!]$	$([\![\text{IDENT}]\!]([\![\text{this}]\!]))$	
b.	$\lambda Q.\ \ldots \wedge \exists w \exists x[[\![N]\!]_w(x) \wedge \neg Q\ (w)(x)\ ]$	$(\lambda v \lambda y.y = b\ )$	
c.	$\ldots \wedge \exists w \exists x[[\![N]\!]_w(x) \wedge \neg(\lambda v \lambda y.y = b\ (w)(x))]$		λQ
d.	$\ldots \wedge \exists w \exists x[[\![N]\!]_w(x) \wedge \neg(\ \lambda y.y = b\ (x))]$		λv
e.	$\ldots \wedge \exists w \exists x[[\![N]\!]_w(x) \wedge \neg(\ x = b\ )]$		λx
f.	$\exists w \exists x[[\![N]\!]_w(x) \wedge\ x \neq b\ ]$		

One difference between *P ⊄ Q and (58) is that only the former is compatible with P and Q being identical. Thus, *P ⊄ Q strays from Carlson (1980:§6.2) in allowing ⟦kind of N⟧ to include (or consist of) ⟦N⟧. I lack an empirical argument for this, but it is independently assumed in three contexts that $[\![_{\text{subk}}\ \text{N}]\!]_{\text{w}}$ can include (or consist of) the non-proper subkind: (i) split scope (Geurts 1996:ex.29), (ii) definite generics (Carlson 1980:§7.3, Zamparelli 1998:ex.84) and (iii) nominal predicate generics (Nickel 2018:§6.1). I do not suspect $[_{\text{subk}}$ N] and *kind of N* to differ in this regard (cf. §5.1.2), so I think it is harmless to assume that ⟦kind of N⟧ can include the non-proper subkind.

A different approach to (54) is suggested by Nickel (2018:§6.1), where the failed condition involves P and N rather than P and Q. The idea is that ∃N can only be satisfied by an explanation which does not include the information that the instance in question instantiates P. However, it is not clear to me that this condition fails, because one can explain why a particular book copy is a paperback (by saying that it belongs to a medium which has responded to certain selective pressures) without mentioning that it is a book. At any rate, it seems to me that the desired result is achieved by *P ⊄ Q.

With (54) out of the way, four additional false subkind statements are in (60), which are counterparts of the true ones in (56) (the method of switching the superkind and subkind is due to Maribel Romero p.c.).

(60) a. Mammals are a kind of dog. *false*
b. Plants are a kind of grass. *false*
c. Trees are a kind of oak. *false*
d. Pets are a kind of dog. *false*

Under *P ⊄ Q in (55), (60a–b) are false because *DOG ⊂ *MAMMAL and GRASS ⊂ *PLANT. *P ⊄ Q does not account for (60c–d), because *OAK ⊄ *TREE and *DOG ⊄ *PET. The falsity of (60c) is accounted for in §4.2.1, and (60d) receives a parallel account: (60d) would be verified by a way of being normal which corresponds to the explanation to why a particular pet specimen is a dog, but there is no such explanation (*Why is this pet a dog* can be answered with a definition of what a dog is, but not an explanation).

The last false subkind statement discussed in this subsection is repeated below from §4.2.3.

(42a) Placentas are a kind of mammal. *false*

The falsity of (42a) is not accounted for by ⟦kind$_6$⟧ in (55), and recall that it is accounted for by (43) below.

(43) ⟦kind⟧ = … ∧ $\exists w \exists x[Q_w(x) \wedge P_w(x)]$
‘The subkind (Q) and superkind (P) share an instance.’

Crucially, (43) yields incorrect predictions in conjunction with the analysis in §4.2.4 of the instance-level use of *a kind of N* in predication. (43) results in propositions where ⟦N⟧ has a possible instance which is identical to the instance denoted by the subject, (61).

(61) ⟦This is a kind of N.⟧ $_{[⟦\text{this}⟧ \to b]}$

a.	⟦kind of N⟧	(⟦IDENT⟧ (⟦this⟧))	
b.	$\lambda Q. \ldots \wedge \exists w \exists x[⟦N⟧_w(x) \wedge Q \quad (w)(x)\ ]$	$(\lambda v \lambda y. y = b \quad)$	
c.	$\ldots \wedge \exists w \exists x[⟦N⟧_w(x) \wedge (\lambda v \lambda y. y = b\ (w)(x))]$		λQ
d.	$\ldots \wedge \exists w \exists x[⟦N⟧_w(x) \wedge (\quad \lambda y. y = b \quad (x))]$		λv
e.	$\ldots \wedge \exists w \exists x[⟦N⟧_w(x) \wedge (\quad x = b \quad)]$		λx

Following (61), *This is a kind of plant* (when referring to an instance) requires ⟦this⟧ to be a plant specimen in some world. This is contingent when ⟦this⟧ is a non-plant part of a plant because such parts can become plants via a process known as striking.[18] However, *This blade of grass is a kind of plant* intuitively does not entail that the blade is a possible plant specimen. Thus, I am committed to a version of ⟦kind⟧ which does not require the superkind and subkind to share instances. Such an account of the falsity of (42a) can be pursued in conjunction with a different analysis of the instance-level use of *kind of N* in predication, but §4.2.4 argues against one alternative.

Rejecting (43) necessitates an alternative account of the falsity of (42a). Whether this falsity stems from ⟦kind⟧ can be determined with nonce nouns. For example, one can be exposed to stimuli which categorizes *briff* and *chorb* as count nouns (Middleton et al. 2004) and judge whether (62) is contradictory.

(62) These things are called briffs. ꝺ ⌘ ✒ ⁂
We call these things chorbs. ❦ ꩜ & ✢
Chorbs are a kind of briff, even though no chorb is a briff.

[18] “If the conditions are suitable, the plant piece will begin to grow as a new plant […], a process known as striking.” (Wikipedia Contributors 2022).

I do not clearly judge (62) as contradictory, so the falsity of (42a) might not be due to ⟦kind⟧. I leave this to future research.

In conclusion, ⟦kind_6⟧ in (55) leads to truth-conditions which are strong enough to account for the falsity of select subkind statements. Some cases of falsity are due to failing $*P \not\subset Q$ (e.g. *Plants are a kind of grass*), and others are due to failing ∃N (e.g. *Trees are a kind of oak*).

This concludes the analysis of non-inclusion in the relation expressed by *NP_{bare} BE a kind of N*. To reiterate, ⟦kind_6⟧ in (55) accommodates the three sorts of non-inclusion discussed in §4.1.2. First, ∃N accommodates the conclusion that the truth of *Oaks are a kind of tree* relies on restricting the oak genus to not be instantiated by bushes, as indicated by the judgement that the instance-level use of *a kind of tree* is not verified by oak bushes. Parallel restriction occurs in generic statements, and this affinity is captured by adapting Nickel's (2016) analysis of kinds being restricted via ways of being normal. Second, the existential quantification over actual or intended worlds accounts for the judgement that the instance-level use of *a kind of pet* is verified by non-pets which are up for adoption. Third, the appeal to the part-set of a sum accounts for the truth of *Grass is a kind of plant* in that every bit of grass is a sum of parts of plants. This novel denotation of binominal *kind* also accounts for facts pertaining to the instance-level use of *a kind of N* in predication and existential sentences, and it leads to truth-conditions which are strong enough to account for the falsity of select subkind statements.

The next subsection discusses logical properties of two-place relations, lexical ambiguity, definite generics and generic statements.

4.3 Discussion

The present analysis of the relation expressed by *NP_{bare} BE a kind of N* differs from those in §4.1.3 in the logical properties of the relation. First, the present relation is not transitive, thus reflecting the observations of Kay (1975), Randall (1976) and Hampton (1982) regarding non-transitivity in the subkind relation.

Second, the subkind relation is right-linear under the analyses in §4.1.3, i.e. if x is a subkind of y and z, then y and z are identical or one is a subkind of the other. However, non-right-linearity is proven by true conjunctive subkind statements like *Oaks are a kind of tree and a kind of bush* (the tree and bush kinds do not stand in the subkind relation). The present ⟦kind_6⟧ accommodates the truth of such conjunctions (§4.2.1).

Lastly, the subkind relations in §4.1.3 are antisymmetric, but the present one is not. Instead, the present analysis predicts asymmetry when only one question in (63) is answerable with an explanation, and it predicts symmetry when both are. The first prediction is borne out in (27) and (26b).

(63) a. Why does this P Q count as P?
b. Why does this P Q count as Q?

(27) a. Why is this oak tree a tree? √ explanation (√ definition of tree)
b. Why is this oak tree an oak? × explanation (√ definition of oak)

(26b.i) Oaks are a kind of tree. *true*
(26b.ii) Trees are a kind of oak. *false*

The prediction of the present analysis for symmetry is borne out in my judgements regarding *pleasure* and *pain*. First, I judge both questions in (64) as answerable with explanations.

(64) Take a painful and pleasurable case of eating jalapeños.
a. Why is it painful? *answerable with explanation*
(appealing to the evolution which has made jalapeños painful to humans)
b. Why is it pleasurable? *answerable with explanation*
(appealing to the volution which has made humas experience certain cases of pain as pleasurable)

Note that the relevant judgement in (64) is whether an explanation exists, not whether it is known to the judger. The present $[\![\text{kind}_6]\!]$ contributes existential quantification over correlates of explanations (ways of being normal in a respect), and verifying such quantification is orthogonal to what satisfies it, e.g. (65) is true relative to Figure 13 regardless of knowledge of what left the impression. Thus, verifying subkind statements is licensed by the intuition that an explanation exists for why an instance of the subkind instantiates the superkind, regardless of whether it is known to the judger.

(65) Something has left an impression. *true relative to Figure 13*

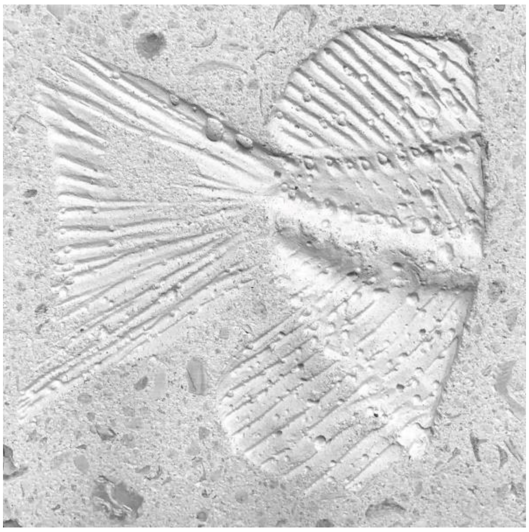


Figure 13: Impression.

(64) predicts the subkind relation to be symmetric with *pain* and *pleasure*, which is borne out by my judgements in (66) (I judge (66b) as verified by the fact that too much pleasure can be painful.). The analyses in §4.1.3 rule out symmetry as in (66), so this is another advantage of the present analysis.

(66) a. Pain is a kind of pleasure. *true*
b. Pleasure is a kind of pain. *true*

Next, the present analysis treats binominal *kind* as unambiguous, but it might not be surprising if it turned out to be ambiguous, given that *kind* (not just binominal) has multiple uses; the five uses identified by Davidse et al. (2008) are exemplified in (67).

(67)	a. Anthems are a **kind** of song.	*head (binominal)*
	b. The national anthem is a patriotic **kind** of song.	*modifier*
	c. These **kind** of songs are patriotic.	*post-determiner*
	d. The national anthem is **kind** of a song.	*qualifier*
	e. I listen to all **kinds** of songs.	*quantifier*

Related to (67), Umbach (to appear) argues that the German *Art* 'kind' and *Typ* 'type' are not synonyms. This gives precedent to posit that binominal *kind* has two homophones, one perhaps corresponding to *Art* and the other to

Typ. However, the proposed difference in meaning between *Art* and *Typ* does not seem parallel to anything discussed in this section.

When considering whether binominal *kind* is ambiguous, it should be kept in mind that every component of ⟦kind$_6$⟧ in (55) is needed to account for the facts regarding *kind of pet*. First, intended instantiation is needed for the judgement that the instance-level use is verified by non-pets which are up for adoption. Second, ∃N is needed for the judgement that stray dogs do not falsify *Dogs are a kind of pet*. Third, the part-set of the sum is needed to maintain that the plural morpheme in *dogs* denotes closure under sum. Thus, I see no reason to posit ambiguity of binominal *kind*.

Next, this section is about *NP$_{bare}$ be a kind of N*, but the present ⟦kind⟧ might account for facts regarding other constructions, e.g. that where the subject is a definite generic. Barring that definite generics cannot be built on (unmodified) mass nouns in English (cf. §2.5), and assuming that a definite generic denotes the kind corresponding to the noun (Carlson 1980:§7.3, Zamparelli 1998:ex.84, Dayal 2004:§3), ⟦kind$_6$⟧ in (55) accounts for the truth in (68) parallel to the bare plural subject counterparts.

(68) a. The oak is a kind of tree. *true*
b. The dog is a kind of pet. *true*

Definite generics are more restricted than kind-denoting bare plurals (references in Oosterhoff 2008:§6.2.4). Thus, it can be maintained that binominal *kind* is unambiguous, and any difference between bare plurals and definite generics in subkind statements stems from the latter's restricted distribution.

Lastly, the present analysis of the subkind relation benefits from the study of genericity, but the latter also stands to benefit. For example, nominal predicate generics like *Lions are mammals* are analysed by Nickel (2018:§6.2) as expressing false generic statements. The reason is that the explanation which verifies the generic statement must satisfy two incompatible constraints: The explanation to why a given lion is a mammal cannot include the information that it is a mammal, and it must include the information that it is a lion (which entails that it is a mammal). To account for *Lions are mammals* nevertheless being true, Nickel proposes that it expresses a true subkind statement. However, this strategy is unavailable to the present approach of identifying generic and subkind statements. Instead, the present approach suggests that *Lions are mammals* unambiguously expresses a generic statement which is verified by the explanation-correlate of the trivial way of being normal introduced in (29), which also verifies *Lions are a kind of mammal*.

In general, part of Nickel's (2018) goal is to account for the truth of *Lions are mammals* alongside the falsity of *Books are paperbacks*. §4.2.5 accounts for these judgements for the subkind-statement counterparts, thereby suggesting modifications to Nickel's analysis which, unlike Nickel, do not rely on distinguishing between generic and subkind statements.

This concludes the section about inclusion in the subkind relation. In addition to meeting the local goal of improving upon the analyses in §4.1.3, this section lays the foundations to §7, which delves deeper into the instance-level use of *kind of N*. Beforehand, the next section addresses aspects of the subkind relation which are orthogonal to inclusion.

5 The subkind reading of nouns and binominal *kind*

The denotation of binominal *kind* in the previous section accounts for non-inclusion data, and this section attends to additional data which is brought to light by comparing *kind of N* and [$_{\text{subk}}$ N]. This comparison is done in §5.1, and §5.2 formulates the final version of ⟦kind⟧ in this thesis, laying the foundations to the compositional analysis in §7.

5.1 Comparison

This subsection compares [$_{\text{subk}}$ N] and *kind of N* with two goals in mind. First, knowing the differences can help one decide which construction to use for certain purposes, e.g. how (1) gives reason to focus on *kind of N* in §4 (cf. §4.1.1).

(1) a. ?Dogs are a pet. [$_{\text{subk}}$ N]
b. Dogs are a kind of pet. *kind of N*

Second, comparing [$_{\text{subk}}$ N] and *kind of N* brings to light facts about these constructions which call into questions certain aspects of existing analyses, as is pointed out throughout this subsection.

§5.1.1 reviews the similarities between [$_{\text{subk}}$ N] and *kind of N*, and §5.1.2 reviews the differences. For a broader cross-linguistic picture, see Li (2017) and Umbach (to appear) for comparisons between (sub)kind-denoting constructions in Mandarin and German respectively.

5.1.1 Similarities

In certain cases, e.g. (2), [$_{\text{subk}}$ N] and *kind of N* are intuitively synonymous.

(2) a. Ravens are a (widespread) bird. [$_{\text{subk}}$ N]
b. Ravens are a (widespread) kind of bird. *kind of N*

This subsection reviews four similarities between [$_{\text{subk}}$ N] and *kind of N*, pertaining to representation of kinds, vagueness, levels of categorization and reflexivity. The last two call into question certain aspects of the analyses of Zamparelli (1998), Scontras (2017) and Sutton & Filip (2018).

First, recall from §2.4 that the extension of [$_{\text{subk}}$ N] can include kinds which are realized by instances that do not exist in the circumstance of evaluation. (3) motivates the same for *kind of N*, as explained next.

(3) a. Ravens are a kind of animal that might die out.
b. (Uttered in 2020) (The) ravens will die out by 2100.
$\perp$ There will be living ravens in 2100.

Say (3a) is evaluated relative to world w, and $\vee\mathrm{RAVEN}_{w}$ is the sum of all raven specimens in w. How is this sum related to the denotation of *ravens* in (3a), notated as ⟦ravens⟧? One option is that ⟦ravens⟧ = $\vee\mathrm{RAVEN}_{w}$, and another is that ⟦ravens⟧ is instantiated by the specimens which are part of $\vee\mathrm{RAVEN}_{w}$, alongside other raven specimens whose lifespan need not overlap with those of the former. The first option is ruled out by the contradiction in (3b), which indicates that the extension of *die out* is not a set of sums of specimens which exist in the world of evaluation. If it were, then (3b) should have a reading paraphrasable as 'The living ravens in 2020 will die by 2100.' *Die out* modifies *kind of animal* in (3a), so the extension of *kind of animal* in (3a) is not a set of sums of specimens which exist in the circumstance of evaluation, which extends to *kind of N* in general. This conclusion is accommodated by adopting any of the five representations of kinds in (4) (cf. §2.4), and §5.2 opts for <s,<e,t>>.

(4)	a. ontological-primitive correlate of function	e	(Carlson 1980), (McNally 1997)
	b. set of (possible) specimens	<e,t>	(Quine 1994, Kay 1971)
	c. individual concept	<s,e>	(Chierchia 1998b, 2010)[19]
	d. property	<s,<e,t>>	(Van Geenhoven 2000)
	e. propositional function	<e,<s,t>>	(Kay 1975)

Second, recall from §2.4 that $[_{\mathrm{subk}}$ N] is vague in the sense that its meaning does not provide all the information needed to determine its extension, even if all the information is known about the circumstance of evaluation. (5) motivates the same conclusion for *kind of N* (Carlson 1980:§6.2) by showing that the extension is not guaranteed to be determinable. This similarity between $[_{\mathrm{subk}}$ N] and *kind of N* is reflected by the formulations in §5.2 including free variables.

[19] Chierchia (1998b) represents kinds as objects of type <s,e> which live in the interpretation domain of type e.

(5) There are exactly two kinds of animals in this room.
[The set of animal specimens in this room is {🦅$_1$, 🦅$_2$, 🦉, 🐊}.]
a. True with the continuation *namely birds and reptiles*.
b. False with the continuation *namely eagles, owls and alligators*.

Third, recall from §2.1 that the extension of [$_{\text{subk}}$ N] can include kinds in multiple levels of categorization (e.g. the bird class and baboon genus). Relatedly, (6) is judged as "highly marked" by Sutton & Filip (2018:1205), which leads them to propose that the extension of *kind of furniture* cannot include kinds in multiple levels of categorization.

(6) I bought two kinds of furniture: tables and living room furniture.
highly marked according to Sutton & Filip (2018:1205)

Contra (6), (7) shows that ⟦kind of bird⟧ can include kinds in multiple levels of categorization, e.g. the pigeon subspecies and waterfowl order.

(7) Certain **kinds of birds** -- most obviously <u>pigeons</u> and <u>house sparrows</u>, but also, <u>raptors</u> and <u>waterfowl</u> as well -- actually thrive in urban areas. [γ]

Perhaps part of the markedness of (6) is due to overlap between tables and living room furniture, but §5.1.2 argues that ⟦kind of N⟧ can overlap. I speculate that the markedness of (6) depends on what was bought, e.g. it is marked if all that was bought was living room tables.

The reported markedness of (6) motivates Sutton & Filip's appeal to levels of categorization in their denotation of *kind of N*.[20] By contrast, the analysis of the availability of the subkind reading in §3.4 does not appeal to levels of categorization, and neither do the formulations in §5.2. I am reluctant to appeal to such levels following Murphy's (2002) argument that "The simplicity and elegance of a hierarchy like [the taxonomy] does not seem to be a property of human memory" (p.209). Thus, I am reluctant to posit (taxonomic) levels of categorization as linguistically relevant.

(7) is also at odds with Scontras (2017:ex.37), where ⟦kind of N⟧ cannot include kinds which are evaluated via multiple dimensions. However, waterfowl and raptors are evaluated via different dimensions (habitat and manner of feeding), and both are in ⟦kind of bird⟧ in (7). Thus, ⟦kind⟧ in §5.2.1 diverges from

[20] More precisely, Sutton & Filip's (2018:ex.20) [$_{\text{subk}}$ N] appeals to levels of categorization, and their *kind of N* is built on [$_{\text{subk}}$ N] and inherits the appeal to such levels.

Scontras in not appealing to dimensions of evaluation. One of Scontras' motivations is to reflect Carlson's (1980:§6.2) argument that ⟦kind of N⟧ is disjoint, but §5.1.2 rejects this.

Fourth, I judge no contrast between [$_{\text{subk}}$ N] and *kind of N* when it comes to reflexivity, (8).

(8) a. #The tiger is the most widespread tiger.
    b. #The tiger is the most widespread kind of tiger.

The lack of contrast in (8) calls into question the aspect of Zamparelli's (1998:§4) analysis where ⟦kind of tiger⟧ precludes the tiger kind due to *of* being the partitive preposition as in (9a). This preposition is absent in (8a), but I judge no contrast between (8a) and (8b). This aspect of Zamparelli's analysis, which extends to *of* in *size of N* in (9b), is (partly) motivated by the three sorts of NPs in (9) being incompatible with *the* without a relative clause.

(Zamparelli 1998)

(9) a.	The two of John's friends	??(that you met yesterday) are here.	(ex.44a)
b.	The size of elephant	*(you are hunting) scares me.	(p.267)
c.	The type of tiger	??(we just talked about) is in danger of extinction.	(ex.40a)

To evaluate whether *of* in *kind of N* is meaningful, it is useful to look beyond *kind*, although it is the leading example in the literature following Carlson (1980:§6.2) (Lumsden 1988:§4.3, Wilkinson 1991:§2, McNally 1997, Zamparelli 1998, 2000, Scontras 2017:§2.1, Sutton & Filip 2018:§4). Specifically, the flexible position of *type* relative to the noun derives an argument for *of* being inert. Figure 14 shows that among *type*, *kind* and *sort*, the first has the highest proportion of post-nominal occurrences (~23%) in COCA (Davies 2008–). The results include non-binominal cases like *Tea Party Types*, but they converge with my judgement that *Anthems are a song type* is better than *Anthems are a song kind*.

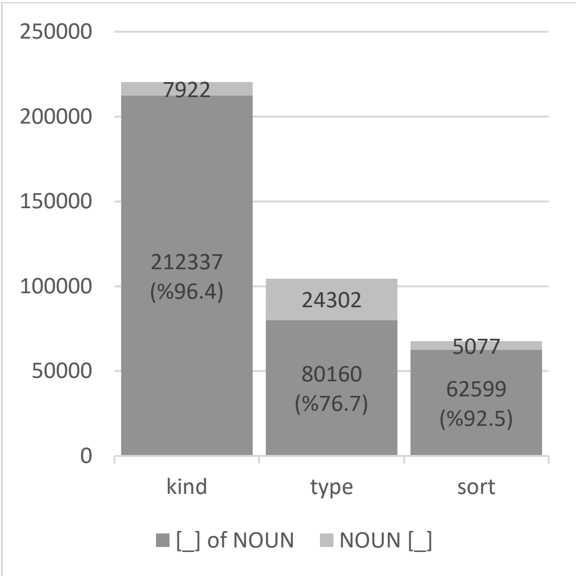


Figure 14: Position relative to noun of *kind*, *type* and *sort* in COCA.

Crucially, the lack of contrast in (8) extends to (10), where the order of *type* and *tiger* affects the occurrence of the preposition *of*. Likewise, the behavior of *type of tiger* in (9c) is likely not due to *of*, because (11) shows that *tiger type* behaves the same.

(10) a. #The tiger is the most widespread tiger type.
b. #The tiger is the most widespread type of tiger.

(11) The $\left\{\begin{matrix}\text{tiger type}\\ \text{type of tiger}\end{matrix}\right\}$??(we just talked about) is in danger of extinction.

Following (8) and (10), I reject the aspect of Zamparelli's (1998) analysis where the infelicity in (b) is due to *of*. What matters here is the lack of contrast between [$_{\text{subk}}$ N] and *kind of N* in (8), and I do not offer an account of the infelicity (recall that $[\![\text{kind}_6 \text{ of N}]\!]$ in §4.2.5 can consist of $[\![\text{N}]\!]$).

This concludes the review of the similarities between [$_{\text{subk}}$ N] and *kind of N*. They might seem trivial, but their non-triviality is highlighted by the differences reviewed in the next subsection.

5.1.2 Differences

This subsection reviews three differences between [$_{\text{subk}}$ N] and *kind of N*, pertaining to overlap, ranged-over kinds and the availability of the subkind reading. Beginning with the latter, (12) shows that the degradation reported by Carlson (1980) for [$_{\text{subk}}$ N] is absent from *kind of N*.

(12) a. Every ?(kind of) gas well is in short supply.
b. Which ?(kind of) airport is the most widespread?
c. Three ?(kinds of) ball-bearings are made in five different countries.
d. many {*courages, kinds of courage}

The account of (12) in §5.2 is that ⟦$_{\text{subk}}$ N⟧ has a definedness condition which is absent from ⟦kind of N⟧. I discuss why this should be the case after the upcoming (21).

(13) is the background to the second difference between [$_{\text{subk}}$ N] and *kind of N*. Note that the noun is plural in (13a) and singular in (13b).

(13) a. In my opinion, there are two kinds of performers:
1 - Concert performers [...] 2 - Club performers [...]
For a lot of people, it's easy to be both **types of performers**. [γ]
b. I'd have to say I'm both **kinds of artist**,
and I don't see that as a contradiction. [γ]

Setting (13) aside for a moment, I have the impression that the number pattern in *both kinds of artist* is more common in British English than American, although I lack quantitative data.[21] Among speakers (such as myself) who generally prefer *both kinds of artists*, I hypothesize that predicative *both kinds of artist* in (13b) is licensed by the singular argument (denoted by the first person pronoun). I further hypothesize that a plural argument as in *The three of them are both kinds of artist(s)* would push the preference towards the plural option. This thesis does not analyze plural subkind-denoting NPs like *kinds of artists*, but I take the plural morpheme on the noun to be inert, so I do not consider the difference in number in (13) to affect the denotation of the subkind-denoting NP.

The second difference between [$_{\text{subk}}$ N] and *kind of N* is that the latter tolerates more overlap, (14) (cf. §2.4).

(14) Finches are a popular **pet**, and so are caged birds, so unsurprisingly Polly is both {#pets, kinds of pet(s)}.

[21] https://forum.thefreedictionary.com/postst32350_question-about--type-of-.aspx

(14) is at odds with the aspect of Sutton & Filip (2018) where if N is count (e.g. *pet*), then ⟦$_{\text{subk}}$ N⟧ and ⟦kind of N⟧ are disjoint to the same extent (their ⟦kind⟧ (ex.20) resolves overlap in a way that count nouns do independently). However, (14) indicates that ⟦$_{\text{subk}}$ N⟧ must be disjoint while ⟦kind of N⟧ need not be. The latter is also at odds with the output of Carlson's (1980:§6.2) ⟦kind⟧ being disjoint; I take the felicity of *kind of pet(s)* in (14) to rule this out, alongside the attestedness of (13) (see §5.3 for a more comprehensive rebuttal).

The third difference between [$_{\text{subk}}$ N] and *kind of N* is that certain kinds can be ranged over by the former but not the latter. To illustrate, the contrasts in (15) are based on Pelletier & Schubert (2002) and Mendia (2019:ex.45) respectively, where the first suggests that cheap wine as a kind can be in ⟦kind of wine⟧ but not ⟦$_{\text{subk}}$ wine⟧. Pelletier & Schubert (2002) judge *Cheap wine is a wine* as false (p.62), but I present it as infelicitous for uniformity.

(15) a. Cheap wine is a #(kind of) **wine**.
b. Dogs that bite people are a dangerous #(kind of) **dog**.

The subkinds in (15) are named by syntactically derived NPs (underlined), and Carlson (1980:§6.1–2) proposes that such kinds are precluded from ⟦$_{\text{subk}}$ N⟧ (cf. Pelletier & Schubert 2002:fn.61). However, in (16) are potential counter-examples.

(16) a. Caged birds are a popular **pet** in Afghanistan. [γ]
b. Filled pastries are a common **snack** in Mexico. [γ]

The previous paragraph has *potential* because one might deny (16a) being a counter-example to Carlson's generalization by denying that it includes [$_{\text{subk}}$ pet]. In support, one might cite the oddness of *Dogs are a pet* discussed in §4.1.1 and repeated in (17).

(17) a. Dogs are a kind of pet.
b. ?Dogs are a pet.
c. **Q**: What are some pets? **A**: Dogs are a pet, and so are cats.
d. Dogs are a widespread pet.
e. Dogs are a pet that comes in many breeds.

The bold nouns in (16) are modified by *popular* and *common*, and (17) shows that *Dogs are a pet* is improved by *widespread*, so perhaps such modification would improve [$_{\text{subk}}$ N] in (15). My judgement in (18) is that it slightly improves [$_{\text{subk}}$ wine] but not at all [$_{\text{subk}}$ dog].

(18) a. ?Cheap wine is a widespread wine.
b. #Dogs that bite people are a widespread dog.

The effect of modification on [$_{\text{subk}}$ N] is unclear to me, but the preceding discussion derives the data that even with modification, caged dogs as a kind can be in ⟦$_{\text{subk}}$ pet⟧ but not ⟦$_{\text{subk}}$ dog⟧, (19).

(19) Caged dogs are a widespread {pet, #dog}.

(19) indicates that whether a kind can be in ⟦$_{\text{subk}}$ N⟧ depends on N. Such dependence is capturable by a generalization of the form: A kind which is x can be in ⟦$_{\text{subk}}$ N⟧ iff N is y (and perhaps x = y). In (20) are candidates for x and y in the form of distinctions between kinds offered in the literature.

	notion$_1$	*notion$_2$*	*references*
(20)	a. lexically-entered	syntactically-derived	(Carlson 1980:§6.1)
	b. natural	nominal	(Cruse 1986)
	c. conventional	formal	(Pelletier & Schubert 2002:fn.61)
	d. kind	concept	(Krifka 1995)
	e. well-established	not well-established	(Krifka et al. 1995:§1.1.3)
			(Oosterhoff 2008:§6.2.4)
			(Rothstein 2013)

I hesitate to offer an analysis of (19) via the notions in (20) because (19) is part of a small data set. Also, the effect of modification on [$_{\text{subk}}$ N] is unclear, which stands in the way of collecting clear data on which kinds can be in ⟦$_{\text{subk}}$ N⟧. I therefore leave this to future research.

As an interim summary, the three preceding differences between [$_{\text{subk}}$ N] and *kind of N* are summarized in (21).

(21) a. Some nouns which lack subkind-countability can combine with *kind*.
b. Some kinds can be in ⟦kind of N⟧ but not ⟦$_{\text{subk}}$ N⟧.
c. ⟦$_{\text{subk}}$ N⟧ must be disjoint, but ⟦kind of N⟧ need not be.

Next I discuss whether some or all of the differences in (21) are related. Under Carlson (1980:§6.1–2), (21a–b) are related in that the rule which derives

[$_{\text{subk}}$ N] is lexical, so its application depends on the existence of lexical nominals which name subkinds, and its output is a set of kinds named by such nominals. However, the latter is at odds with (16) if it indeed includes [$_{\text{subk}}$ N]. Thus, (21a–b) are not clearly related in this way.

§3 suggests a different relation between (21a–b). Recall that the principle for the availability of the subkind reading is conceived as a means for preventing empty reference, which is a possibility because not every kind can be in ⟦$_{\text{subk}}$ N⟧. Conversely, any kind can be in ⟦kind of N⟧, and thus there is no risk of empty reference. (16) below is compatible with this explanation under the following story: ⟦$_{\text{inst}}$ pet⟧ and ⟦$_{\text{inst}}$ snack⟧ pass the definedness condition of ⟦SUBK⟧ thanks to the existence of subkinds named by lexical nominals (e.g. *bird* and *pastry* respectively), which guarantee non-empty reference. After passing the condition, the defined ⟦$_{\text{subk}}$ pet⟧ and ⟦$_{\text{subk}}$ snack⟧ can include kinds denoted by non-lexical nominals, e.g. those underlined in (16).

(16) a. <u>Caged birds</u> are a popular **pet** in Afghanistan. [γ]
b. <u>Filled pastries</u> are a common **snack** in Mexico. [γ]

Continuing to (21c), Sutton & Filip (2018) relate it to (21a) by proposing that if [$_{\text{inst}}$ N] is [–count] (e.g. [$_{\text{inst}}$ furniture]), then ⟦$_{\text{subk}}$ N⟧ is empty if every level of categorization has overlapping subkinds (cf. §3.2.2). While it is true that vanities overlap with chairs and bedroom furniture overlaps with living room furniture, kinds in levels of categorizations of wildlife (e.g. species) are disjoint (by Kay's 1971 definition of what Kay 1975 calls an academic taxonomy), and thus the infelicity of [$_{\text{subk}}$ wildlife] is not accounted for by appealing to overlap. Presently, I do not know how (21c) might be related to (21a–b).

Regardless of the relation between the differences in (21), they follow the pattern where ⟦$_{\text{subk}}$ N⟧ is more restricted than ⟦kind of N⟧. This raises the question of why, plus whether this pattern holds with other (assumed) pairs of overt and covert (near-)synonyms. One such pair is *only* and EXH (Chierchia et al. 2011), where four differences are summarized in (22).

(22) a. EXH asserts the prejacent, presupposes the negation of the alternatives.
Only presupposes the prejacent, asserts the negation of the alternatives. (Bassi et al. 2021)

b. EXH can act as an upper-bounding or lower-bounding exclusive.
Only can only act as the former. (Buccola 2018)

c. EXH invariably gives rise to scalar implicatures.
Only need not. (Crnič 2012)

d. EXH cannot contribute low noteworthiness.
Only can (in a cancellable manner). (Greenberg 2019)

Of the differences in (22), only (22c–d) fit the pattern of EXH being more restrictive than *only*. (22a) is not ordered by restrictiveness, and in (22b) EXH is less restrictive than *only*. I therefore hesitate to attribute the differences between [$_{\text{subk}}$ N] and *kind of N* in (21) to covertness versus overtness, and I leave an explanation to future research.

Next, I raise two broad options for the relation between [$_{\text{subk}}$ N] and *kind of N*. First, [$_{\text{subk}}$ N] is derived via a covert element roughly synonymous with *kind*, notated as SUBK. Alternatively, *kind* combines with [$_{\text{subk}}$ N], as in Zamparelli (1998:ex.83) and Sutton & Filip (2018:ex.20–21). Schematically, the first option is SUBK($[\![_{\text{inst}}\ \text{N}]\!]$) ≈ $[\![\text{kind}]\!]([\![_{\text{inst}}\ \text{N}]\!])$, and the second is $[\![\text{kind}]\!]([\![_{\text{subk}}\ \text{N}]\!])$. I opt for the first, although I have no argument against the second.

For completeness, I mention another difference between [$_{\text{subk}}$ N] and *kind of N* reported by Zamparelli (2000), whose consultants judged that *kind of N* is more natural in (23). My guess is that the oddness of the unmodified noun stems from interpreting it under the instance reading, e.g. [$_{\text{inst}}$ insect] instead of the intended [$_{\text{subk}}$ insect].

(23) a. There are those ?(kinds of) insects in the Amazonic forest.
b. There was every ?(kind of) car in the exhibition.
c. There was each ?(kind of) product individually wrapped. *(Zamparelli 2000:ex.151–152)*

Next, I mention a potential difference between [$_{\text{subk}}$ N] and *kind of N* derivable from Zamparelli (1998), who rejects *the kind of N* as anaphoric in (24) (ex.73b–c). To the extent that [$_{\text{subk}}$ N] is better, i.e. *the dog* in (24a) and *the roses* in (24b), this is another difference between [$_{\text{subk}}$ N] and *kind of N*.

(24) a. Among pets, [the Greyhound]$_i$ is as common as the Siamese cat, even though [#the kind of dog]$_i$ requires large spaces. (Zamparelli 1998:ex.73c)
b. [Pink Delight]$_i$ and [Waverly]$_j$ were bred in England by Mr. Pinkerton. [#The kinds of roses]$_{i+j}$ are quite popular nowadays in Scotland. (ex.73b)

Next, I mention a difference between [$_{subk}$ N] and *kind of N* in Hebrew. [$_{subk}$ N] has the same grammatical gender as [$_{inst}$ N] (cf. §2.3), but *súg N* 'kind of N' is masculine, (25).

(25) a. zot tsfardéa nefotsá.
That$_{fem}$ frog$_{fem}$ common$_{fem}$
'That (kind of) frog is common.
b. ze súg tsfardéa nafóts.
That$_{msc}$ kind$_{msc}$ frog$_{fem}$ common$_{msc}$
'That kind of frog is common.'

A possible interpretation of (25) is that SUBK does not combine with N at the same structural level as *kind*. Specifically, the former combines at a level where the gender of [$_{subk}$ N] is inherited from that of [$_{inst}$ N], but *kind* combines at a level which overrides the gender of [$_{inst}$ N]. This is reminiscent of Carlson's (1980:§6.1–2) proposal that [$_{subk}$ N] is derived in the lexicon while *kind* attaches in the syntax, and (25) might help to pinpoint the levels of combination in a more precise manner. At any rate, the levels of combination of SUBK and *kind* are not discussed further in this thesis.

This concludes the review of the three differences in (21) between [$_{subk}$ N] and *kind of N*. The next subsection formulates ⟦SUBK⟧ and ⟦kind⟧ in a way which accounts for (21a) and (21c), which respectively are (i) some nouns which lack the subkind reading can combine with *kind*, and (ii) ⟦$_{subk}$ N⟧ must be disjoint whereas ⟦kind of N⟧ need not be.

5.2 Formulations

§5.2.1 formulates the final version of ⟦kind⟧ in this thesis, and §5.2.2 formulate ⟦SUBK⟧, the operation which derives [$_{subk}$ N].

5.2.1 Denotation of binominal *kind*

Recall from §4 that ⟦kind$_6$⟧ in (26) (repeated from §4.2.5) is geared towards non-inclusion data. This subsection presents a version which also accommodates the facts regarding *kind of N* in §5.1.

(26) $[\![\text{kind}_6]\!] = \lambda P\lambda Q.{*P} \not\subset Q \wedge$

$\exists N\forall w\forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[INT_w{}^{+}(v) \wedge ({\vee}P_v](x)]]$

'The cumulative counterpart of the superkind P is not a strict sub-property of the subkind Q, and there is a way to be normal in a respect s.t. every possible instance of Q which is normal in that way is a sum of parts of instances of P in its own world or an intended one.'

The first issue raised by $[\![\text{kind}_6]\!]$ in (26) is the type-logical type. The input follows Carlson (1980:§6.2) in being of type <s,<e,t>>, but the output diverges from Carlson in that the set is of properties rather than ontological primitives. Taking a step back, (27) shows that members of the extension of *kind of N* can be denoted by bare NPs or definite countable singulars.

(27)	a. Grass	is a kind of plant.	*bare mass singular*
	b. Orchids	are a kind of plant.	*bare count plural*
	c. The orchid	is a kind of plant.	*definite count singular*

There is dependence between the assumed denotation of the subjects in (27) and the assumed output of $[\![\text{kind}]\!]$. The former denote ontological primitives (e^k) under Carlson (1980), and thus his output of $[\![\text{kind}]\!]$ is of type $<e^k,t>$, (28a). Alternatively, the subjects in (27) denote objects of type <s,e> which live in the interpretation of type e under the neo-Carlsonian approach of Dayal (2004), which implies that the output of $[\![\text{kind}]\!]$ is a set of such objects. Lastly, the output of $[\![\text{kind}_6]\!]$ being a set of properties implies that the subjects in (27) denote properties, (28c).

		bare mass	definite generic	bare plural	output of $[\![\text{kind}]\!]$
(28)	a. Carlson (1980)	e^k (§7.6.0)	e^k (§7.3)	e^k	$<e^k,t>$ (§6.2)
	b. Dayal (2004)	e	e	e	<e,t>
	c. $[\![\text{kind}_6]\!]$	<s,<e,t>>	<s,<e,t>>	<s,<e,t>>	<<s,<e,t>>,t>

I have no reason (from reference to subkinds) to prefer one option in (28) over the other, so I default to properties as in (28c), which I consider more introductory than ontological primitive correlates of functions.

The second issue raised by $[\![\text{kind}_6]\!]$ in (26) is the vagueness of *kind of N* indicated by (5) below.

(5) There are exactly two kinds of animals in this room.

[The set of animals in this room is {🦅$_1$, 🦅$_2$, 🦉, 🐊}.]

a. True with the continuation *namely birds and reptiles*.

b. False with the continuation *namely eagles, owls and alligators*.

To accommodate vagueness, $⟦\text{kind}_7⟧$ in (29) differs from $⟦\text{kind}_6⟧$ in (26) in including a free variable $\mathcal{C}$ over sets of properties (cf. S_0 of Carlson 1980:§6.2, ex.24). $\mathcal{C}$ receiving a value which includes the bird and reptile properties leads to (5) expressing a true proposition, but other values lead to falsity.

(29) $⟦\text{kind}_7⟧ = \lambda P \lambda Q.\mathcal{C}(Q) \wedge {}^*P \not\subset Q \wedge$
$$\exists N \forall v \forall x[(Q_v(x) \wedge N_v(x)) \rightarrow \exists u[INT_v^+(u) \wedge (\vee P_u](x)]]$$

(29) is the final version of ⟦kind⟧ in this thesis, which serves as an alternative to that of Carlson (1980:§6.2). To summarize, next are the differences in descending order of importance: (i) $⟦\text{kind}_7⟧$ accounts for the non-inclusion data in §4, (ii) the output of $⟦\text{kind}_7⟧$ can overlap (cf. §5.3), (iii) the output of $⟦\text{kind}_7⟧$ can consist of the input (cf. §4.2.5), (iv) the output of $⟦\text{kind}_7⟧$ need not partition (nor spread over) the input, and (v) the output of ⟦kind⟧ is a set of properties rather than ontological primitives. I have no objection to a partition or spreading over requirement, but it would not serve a role in this thesis.

I conclude this subsection by noting that (29) does not account for *kind* being combinable with *species* and *invention*, (30).

(30) a. i. There are two kinds of **species**, specialists and generalists. [γ]

ii. There are two kinds of **species**:
those that go extinct and those that hit the carrying capacity. [γ]

b. i. Two kinds of **Inventions**. Incremental and Disruptive. [γ]

ii. There are two kinds of **inventions**:
Labor-saving and labor creating inventions. [γ]

If one assumes that ⟦species⟧ is a property-level property, then $⟦\text{kind}_7⟧$ in (29) cannot combine with it. More nouns like *species* are in (31).

(31) a. genus, species, breed (Kay 1975:tab.1)
b. make (of car), series, model, variant
c. halogen, metal, alloy, element (Krifka et al. 1995:§1.3.3)
d. part of speech, force of nature (Omri Mayrantz, Noa Bassel p.c.)
e. precipitation (Wisniewski et al. 1996)
f. invention, patent

A simple way to extend ⟦kind$_7$⟧ in (29) to cases like *kind of species* is to posit that it is of type $<_{<s,<\tau,t>>},^{<<s,<\tau,t>>,t>}>$, where τ = e if the argument is of type $<_s,^{<e,t>}>$ (e.g. ⟦dog⟧), but τ = <s,<e,t>> if the argument is of type $<_s,^{<<s,<e,t>>,t>}>$ (e.g. ⟦species⟧).

In conclusion ⟦kind$_7$⟧ in (29) lays the foundations to the compositional analysis in §7 of NPs built on *kind*. To cash in the comparison between *kind of N* and [$_{subk}$ N] in §5.1, the next subsection formulates ⟦SUBK⟧.

5.2.2 Denotation of SUBK

Recall that §5.1.2 opts for SUBK being roughly-synonymous with *kind* rather than *kind* combining with [$_{subk}$ N]. Thus, the present ⟦SUBK⟧ is identical to ⟦kind$_7$⟧ in (29) all but two ways.

First, ⟦$_{subk}$ N⟧ is defined only if the condition in §3.4 is met, repeated in (32). In words, [$_{subk}$ N] is felicitous iff ⟦$_{inst}$ N⟧ has a classified sub-property which is spread over by a set of properties which are the intensions of lexical nominals in the language of N. For example, [$_{subk}$ virtue] is felicitous because the property of classified virtue (which precludes sums of virtue of multiple kinds) is spread over by a set of properties denoted by English nouns, e.g. *courage*. By contrast, [$_{subk}$ courage] is infelicitous to the extent that there is no classified sub-property of ⟦$_{inst}$ courage⟧ which is spread over by a set of such properties.

(32) N is a noun in language L. Its intension under the instance reading is ⟦$_{inst}$ N⟧.
$\mathbb{C}_M$ is the model's set of ways of classification. [$_{subk}$ N] is felicitous iff
a. For some $\mathbb{c} \in \mathbb{C}_M$
b. ⟦$_{inst}$ N⟧$_{\mathbb{c}}$ is spread over by a set of properties $\mathcal{R}$ s.t.
c. every $Q \in \mathcal{R}$ is denoted by a lexical nominal in L

Next, recall from §5.1.2 that ⟦$_{subk}$ N⟧ is required to be disjoint. The definition of disjointedness from §2.4 is repeated in (33).

(33) $\mathcal{P}$ is disjoint, DISJ($\mathcal{P}$), iff there is no P,Q ∈ $\mathcal{P}$ such that P ≠ Q and
for some w ∈ W, $Q_w \cap P_w \neq \emptyset$ (otherwise $\mathcal{P}$ overlaps)

With (33) at hand, ⟦SUBK⟧ in (34) is identical to ⟦kind_7⟧ in (29) except when it comes to disjointedness and the definedness condition.

(34) $[\![\text{SUBK}]\!] = \lambda P\lambda Q.\mathcal{C}(Q) \wedge \text{DISJ}(\mathcal{C}) \wedge {}^*P \not\subset Q \wedge$
$\exists N\forall v\forall x[(Q_v(x) \wedge N_v(x)) \rightarrow \exists u[\text{INT}_v{}^+(u) \wedge (\vee P_u](x)]]$
(defined only if P meets (32), where $P = [\![_{\text{inst}}\ N]\!]$)

(34) incorporates the analysis of the availability of the subkind reading in §3. Also, recall from §2.2 that Carlson (1980:§6.1) and Zamparelli (2000:ex.461–462) have relatively well-developed analyses of [$_{\text{subk}}$ N]. However, both require the superkind to include its subkinds, so (34) is an improvement in accounting for the non-inclusion in (35).

(35) a. Oaks are a (widespread) tree. *true*
b. Grass is a (widespread) plant. *true*
c. Fishing is a (widespread) sport. *true*

The facts regarding [$_{\text{subk}}$ N] which are not accounted for by (34) are summarized below and are left to future research.

(17) a. ?Dogs are a pet.
(19) Caged dogs are a widespread {pet, #dog}.

(34) lays the foundations to a compositional analysis of complex nominals built on [$_{\text{subk}}$ N]. However, *kind of N* is generally easier to work with (cf. §4.1.1), so it is the focus of the rest of the thesis. Beforehand, the next subsection rebuts Carlson's (1980:§6.2) argument for ⟦kind of N⟧ being disjoint.

5.3 Appendix: Carlson (1980) and disjointedness

Carlson's (1980:§6.2) argument that ⟦kind of N⟧ is disjoint is accepted by Lehrer (1986:ex.37), Kratzer (1989:§1), Scontras (2017:ex.20) and Mendia (2019:§3.1), although their analyses do not clearly hinge on this. This subsection scrutinizes the arguments and reinforces the conclusion of §5.1.2 that ⟦kind of N⟧ can overlap. Carlson's first argument comes from the truth-value judgment in (36).

(36) a. State of affairs: Fido, a watchdog collie, is the only dog in the next room.
b. Sentence: Two kinds of dogs are in the next room (collies and watchdogs).
c. Carlson's truth-value judgment: False.

The judgement in (36) does not definitively indicate that ⟦kind of dog⟧ must be disjoint, because the sentence strongly implies that there is more than one dog in the next room. To control for this, the state of affairs should include at least three dogs (a watchdog collie, a non-watchdog collie and a non-collie watchdog). I judge (36b) as true in such a state of affairs, and a parallel judgement is given by Schwarzschild (1996:fn.22). At any rate, that disjointedness is cancellable (or enforced via a mechanism other than restriction) is indicated by the felicity of (37), based on the attested (13) below.

(37) Collies and watchdogs are two kinds of dogs. Fido is **both kinds of dog(s)**.

(13) a. In my opinion, there are two kinds of performers:
1 - Concert performers [...] 2 - Club performers [...]
For a lot of people, it's easy to be both **types of performers**. [γ]
b. I'd have to say I'm both **kinds of artist**,
and I don't see that as a contradiction. [γ]

Carlson's second argument for disjointedness is that (38) (§6, ex.21) is a "jibe at the quality of Ford automobiles." (p.213).

(38) There are two kinds of cars in the world, cars that run right, and Fords.

(38) being a jibe at Ford does not warrant the conclusion that it entails that no Ford runs right, because an implication is also a jibe. Indeed, the felicity of (39) indicates that disjointedness is cancellable.

(39) There are two kinds of cars in the world, cars that run right, and Fords.
As it happens, my car is **both kinds of car(s)**.

Carlson's last argument is that speakers use *different* in phrases like *two different kinds of dogs* (p.213). For this argument to hold, one should show that *x and y are different* entails that x and y are disjoint. Indeed, Carlson (1987) would analyze (40) (cf. ex.76) as entailing that no movie was seen by both An and Bo. However, Fred Landman (p.c.) and I judge that (40a) is not entailed, but the weaker (40b) is. Thus, the felicity of *different* in *two different kinds of dogs* does not argue for a disjointedness requirement on ⟦kind of N⟧.

(40) An and Bo saw different movies. ⇒
  a. No movie was seen by An and Bo. (Carlson 1987)
  b. An saw a movie that Bo didn't, Bo saw one that An didn't. (Landman p.c.)

In conclusion, I reject Carlson's argument for ⟦kind of N⟧ being disjoint. I take this aspect of his analysis to be ruled out by (13), unless disjointedness is enforced via a mechanism other than restriction (Landman 2020:§10.1).

With disjointedness out of the way, the next section begins the compositional portion of the thesis.

6 Bare NPs and the kind-instance ambiguity

This section marks the beginning of the compositional part of the thesis. The next section (§7) is about the (episodic) instance-level use (Inst) of subkind-denoting NPs, exemplified in (1.ii) alongside the kind-level use (K) in (1.i).

(1) a.	i.	This kind of animal is widespread.	K	(Carlson 1980:§2, ex.94c)
	ii.	This kind of animal is sitting on my lawn.	Inst	(Carlson 1980:§2, ex.82b)
b.	i.	This kind of precipitation is widespread.	K	
	ii.	This kind of precipitation is falling on the city.	Inst	

(2) shows that bare NPs also exhibit the dual-usage in (1).

(2) a.	i.	Dogs are widespread.	K	(cf. Carlson 1980:§1, ex.5)
	ii.	Dogs are sitting on my lawn.	Inst	(Carlson 1980:§1, ex.4)
b.	i.	Snow is widespread.	K	(Carlson 1980:§7, ex.99)
	ii.	Snow is falling on the city.	Inst	(Carlson 1980:§7, ex.91)

Following the parallels between (1) and (2), this section lays the foundations to the analysis in §7.3 of subkind-denoting demonstratives by analyzing the dual-usage of bare NPs in (2). Two pieces of motivation for starting with the latter are that bare NPs are morpho-syntactically simpler than demonstratives, plus the two constructions are given a uniform analysis by Wilkinson (1991). However, contra the uniformity suggested by (1) and (2), this section and §7.3 argue for a fundamental difference between the two constructions, exemplified in (3).

(3) God created the cow species, but it's not the case that

a. God created <u>cows</u>.
(It was the devil who created specimens.) *has non-contradictory reading*

b. God created <u>that kind of animal</u>. *contradiction*

This section interprets (3a) as indicating that episodicity of bare NPs is independent of kind-reference, and §7.3 interprets (3b) as indicating otherwise for subkind-denoting demonstratives.

In addition to laying the foundations to §7.3, this section contributes to answering research question (4). Stated in relation to (2a), the question is: What is the relation between the kind-reference of *dogs* in (2a.i) and the episodic reference to dog specimens in (2a.ii)?

(4) What is the relation between kind-reference and episodic reference to instances by bare NPs?

The contribution of this section to (4) is giving a new argument against the neo-Carlsonian answer, where episodic reference to instances by bare NPs is mediated by kind-reference via a last-resort type-shift (Chierchia 1998b, Dayal 1999, 2004). This answer entails that episodicity is possible only if kind-reference is impossible. Thus, to the extent that (5) is ambiguous in a manner not licensed by lexical ambiguity of *create*, the neo-Carlsonian answer to (4) incorrectly predicts this ambiguity not to exist. The more specific prediction is that if (5b) is a reading, then (5a) should not be available alongside it.

(5) On June 28th, God created cows. (Carlson 1980:§7.4, ex.48)
   a. 'God created a number of cow specimens.' Inst
   b. 'God created the cow species.' K

§6.1 argues that (5) is ambiguous in a manner not licensed by lexical ambiguity of *create*, and §6.2 spells out the implications for (4). In the larger scheme of the thesis, this section and §7.3 entail a non-uniform analysis of bare NPs and subkind-denoting demonstratives, contra Wilkinson (1991).

6.1 Sentential ambiguity without lexical ambiguity

This subsection reviews cases of the K-Inst ambiguity in addition to (5), which is reported by Carlson (1980:§7.4) as a potential challenge to his own analysis of bare NPs. (5) has a third reading where *cows* is built on [$_{\text{subk}}$ cow] (Husband 2019), as is expected from the conclusion of §2.3 that [$_{\text{subk}}$ N] can occur in any count morphosyntax, but I set [$_{\text{subk}}$ N] aside.

The reported ambiguity in (5) has far-reaching implications, so it should be corroborated. (6) does so with negation and affirmation, where the non-contradictory readings of (6a) and (6b) indicate respectively that negation can target the Inst and K readings of (5), i.e. (5) is ambiguous.

(6) a. God created the cow species, but
it is not the case that <u>God created cows</u>.
(It was the devil who created specimens.)
has non-contradictory reading; negation can target (5a)
b. God created a number of cow specimens, but
it is not the case that <u>God created cows</u>.
(It was the devil who created the species.)
has non-contradictory reading; negation can target (5b)

Carlson writes that the ambiguity in (5) can be handled by positing lexical ambiguity of *create*, as discussed in §6.2. In anticipation of evaluating this postulation, this subsection reviews expressions which potentially license the K-Inst ambiguity, beginning with verbs.

First, in (7) are three reported cases of the K-Inst ambiguity, which are discussed individually in subsequent literature (Krifka 2003:ex.80, Carlson 2003:ex.2, Delfitto 2006:ex.7c, Husband 2019).

(7) a. Musk-rats were imported into Europe in 1906.		(Heyer 1985:ex.4)
i. 'A number of musk-rat specimens were imported…'	Inst	
ii. 'Musk-rats as a kind were imported…'	K	
b. John studied dinosaurs.		(Brugger 1993:ex.2a)
i. 'John studied a number of dinosaur specimens.'	Inst	
ii. 'John studied dinosaurs as a kind.'	K	
c. I only excluded old ladies.		(Longobardi 1994:ex.41a)
i. 'The only people I excluded were a number of old ladies.'	Inst	
ii. 'The only group I excluded was that of old ladies.'	K	

In anticipation of objection that the proposed readings of (7a) are indistinct, it is indeed the case that Inst ⇐ K; for a species to be imported somewhere, a number of its specimens must be imported there. However, it is also the case that Inst ⇏ K; two male musk-rats being imported into Europe does not verify K, because two males cannot sustain a population (Heyer 1985:fn.9). At any rate, I refrain from scrutinizing the reported cases of ambiguity in (7) because the corroboration of (5) in (6) is enough for present purposes.

Next, Krifka et al. (1995) report that some speakers can interpret *invent* as 'constructed' and *exterminated* as 'killed'. If these interpretations are generally available (not only to prevent degradation of *invented transistors* and *exterminated dodos*, cf. §9.3), then the ambiguity in (8) is predicted.

(8) a. Transistors were invented by Shockley. (Krifka et al. 1995:71)
    i. 'A number of transistor units were constructed…' Inst
    ii. 'Transistors as a kind were invented…' K
  b. Dodos were exterminated. (Krifka et al. 1995:71)
    i. 'A number of dodo specimens were killed.' Inst
    ii. 'The dodo kind was exterminated.' K

Alongside *invent* in (8a), (9) suggests that *Hobbits were invented by Tolkien* is ambiguous (Landman & Rothstein 2010:ex.5).

(9) a. Tolkien invented hobbits for two hours.
    'Tolkien invented hobbit specimens for two hours.' Inst
  b. Tolkien invented hobbits in two hours.
    'Tolkien invented the hobbit kind in two hours.' K

In anticipation of presenting two more cases of the K-Inst ambiguity, consider the attested sentences in (10).

(10) a. i. Lang Ping was so famous, stadiums were named after her. Inst [γ]
     ii. Stadiums were named after the stadion [unit of distance]. K [γ]
  b. i. Titanium was discovered in the ink of the Vinland Map
     before it was found in the two other Bibles. Inst [γ]
     ii. Titanium was discovered in 1791 by William Gregor. K [γ]

The hypothesized ambiguity in (11) is based on (10).

(11) a. Orcs were named by Tolkien.
     i. 'A number of orc specimens were named by Tolkien.' Inst
     ii. 'The orc monster was named *orc* by Tolkien.' K
  b. Titanium was discovered in Cornwall.
     i. 'An amount of titanium was discovered in Cornwall.' Inst
     ii. 'A discovery of titanium as a kind occurred in Cornwall.' K

(11b.ii) includes *a* rather than *the discovery*. I argue that the so-called avant-garde interpretation (Krifka et al. 1995:§1.3.4) is a cancellable implicature, indicated by my judgement that (12) is non-contradictory.

(12) Titanium was discovered in 1791, but it was also discovered independently beforehand. *non-contradictory*

To complete the discussion of verbs which might license the K-Inst ambiguity, in (13) are three more potential cases.

(13) a. Novels were developed by revolutionaries.
   i. 'A number of novel titles were developed by revolutionaries.' Inst
   ii. 'Novels as a kind were developed by revolutionaries.' K
  b. Foxes were domesticated in Russia.
   i. 'A number of fox specimens were domesticated in Russia.' Inst
   ii. 'The fox genus was domesticated in Russia.' K
  c. Skyscrapers were decimated.
   i. 'A number of skyscrapers were decreased in height.' Inst
   ii. 'The number of skyscrapers was decreased.' K

Next, Carlson's (1980:§5.2.5) discussion of *popular*, *well-known* and *nuisance* suggests that they too might license the K-Inst ambiguity. Based on his discussion, I hypothesize the ambiguity in (14).

(14) Dogs are popular now.
  a. 'A number of dog specimens are popular now.' Inst
  b. 'The dog subspecies is popular now.' K

The hypothesized ambiguity in (14) is supported by (15), showing that negation can target either hypothesized reading.

(15) a. The dog species is popular now, but
   it is not the case that <u>dogs are popular now</u>.
   (There is no popular dog specimen now.)
   has non-contradictory reading; negation can target (14a)
  b. A number of dog specimens are popular now, but
   it is not the case that <u>dogs are popular now</u>.
   (The species is not popular now.)
   has non-contradictory reading; negation can target (14b)

As an interim summary, in (16) are expressions which at least suspectedly license the K-Inst ambiguity of bare NPs.

(16) a. Verb direct object: Bring into being, create, decimate, develop, discover, discuss, domesticate, exclude, import, invent, kill off, make disappear, name, study

b. Verb subject: Reach (Australia)

c. Adjective: Famous, popular, protected by law, well-known

d. Noun: Nuisance

With (16) in mind, one can ask whether the sentential K-Inst ambiguity is necessarily licensed by lexical ambiguity. One test of whether *reach* is ambiguous between ranging over kinds or instances has yielded mixed results; Wilkinson (1991:§3, ex.52) rejects (17), but she reports Kratzer as accepting it.

(17) The rat and my grandfather reached Australia in 1890.
Wilkinson (1991:§3, ex.52) rejects, Kratzer accepts

Setting (17) aside, I accept (18), from which I conclude that *create* is not ambiguous between ranging over kinds or instances.

(18) God created Adam and Eve and the cow.

Combining (18) with negation and affirmation in (6), *God created cows* is ambiguous in a manner not licensed by lexical ambiguity of *create*. Thus, the sentential K-Inst ambiguity does not rely on lexical ambiguity. The next subsection explains the implications of this to research question (4), plus why Carlson (1980) brought up the option of lexical ambiguity in the first place.

6.2 Kind-reference and episodicity of bare NPs

Under Carlson (1980), the ambiguity of *God created cows* would be accounted for by the lexical ambiguity of *create* in (19); x^i ranges over Carlsonian individuals, which consist of kinds and objects (non-spatio-temporal instances of kinds), and x^s ranges over stages (spatio-temporal instances of kinds).

(19) a. $[\![\text{create}_1]\!] = \lambda y^i \lambda x^i.\text{CREATE}^i(x,y)$ *Carlsonian individuals*
b. $[\![\text{create}_2]\!] = \lambda y^s \lambda x^s.\text{CREATE}^s(x,y)$ *Carlsonian stages*

Carlson's translation schemas for (19) yield (20a) and (20b), which respectively represent the K and Inst readings of *God created cows*.

(20) a. $\mathrm{CREATE}^i(g,c)$ (cf. Carlson 1980:§4, ex.100)
'CREATE^i, a relation between Carlsonian individuals, holds between God (g) and the cow kind (c)).'

b. $\exists x^s \exists y^s[\mathrm{CREATE}^s(x,y) \wedge R(x,g) \wedge R(y,c)]$ (cf. Carlson 1980:§4, ex.94)
'CREATE^s, a relation between Carlsonian stages, holds between a stage of God x (x realizes g) and a stage of the cow kind y (y realizes c).'

Following the conclusion from (18) that *create* is not ambiguous as in (19), an alternative to lexical ambiguity is that (19a) is the only denotation of *create*, and the Inst reading of *God created cows* is represented via one of the formulas in (21) (x^o ranges over Carlsonian objects).

(21) a. $\exists x^o[\mathrm{COW}(x) \wedge \mathrm{CREATE}^i(g,x)]$
'There is a (plural) cow object which God created.'

b. $\exists x^o[R(x,c) \wedge \mathrm{CREATE}^i(g,x)]$
'There is a (plural) object realization of the cow kind which God created.'

(21a) does not include the cow kind (represented as c), so it deviates from the aspect of Carlson's analysis where bare NPs are always kind-denoting. (21b) is in line with that, but for it to be derived from (20a) there should be an optional operation which introduces existential quantification over object realizations of the kind denoted by the bare NP. To explicate, let us assume that the two main components in *God created cows* are raised *cows*$_i$ and [God created t_i], which have the (Carlsonian) denotations in (22).

(22) a. ⟦cows⟧ $= c$ e^k 'the cow kind'

b. ⟦God created t_i⟧ $= \lambda y^i.\mathrm{CREATE}(g,y)$ $<e^i,t>$
'the function from Carlsonian individuals to the truth-value of the proposition that God created the individual'

Function application in (22) yields the K reading of *God created cows* in (20a). For Inst, one could assume that before the denotations in (22) combine, (22a) can optionally undergo the type-shift in (23a) to yield the generalized quantifier in (23b), leading to the Inst reading in (23d).

(23) a. $\lambda y^i \lambda Z.\exists x^o[R(x,y) \wedge Z(x)]$ (c) $(\lambda y^i.CREATE(g,y))$

b. $\lambda Z.\exists x^o[R(x,c) \wedge Z(x)]$ $(\lambda y^i.CREATE(g,y))$ λy^i

c. $\exists x^o[R(x,c) \wedge \lambda y^i.CREATE(g,y)(x)]$ λZ

d. $\exists x^o[R(x,c) \wedge CREATE(g,x)]$ λy^i

'There is a (plural) object realization of the cow kind which God created.'

Under the preceding analysis, episodicity of bare NPs is mediated by kind-reference via an optional type-shift, (24a). This differs from Chierchia (1998b) and Dayal (1999, 2004), where this mediation is via a last-resort type-shift, (24b). Another feature of the latter analysis is that kinds are derived from properties, i.e. there are two steps to episodicity. Krifka (2003) criticizes this analysis on the grounds that the shift from properties to kinds is not locally-triggered; it is covert (in English), and it does not lead to an interpretable structure in cases like *God saw cows*. Thus, under Krifka (2003) and Cohen (2007, 2020), episodicity is derived directly from the property via a last-resort shift, (24c). Thus, in (24) are three competing answers to research question (4) below.

(4) What is the relation between kind-reference and episodic reference to instances by bare NPs?

(24) a. kind (optional →) episodicity

b. property → kind (last-resort →) episodicity
(Chierchia 1998b, Dayal 1999, 2004)

c. property (last-resort →) kind
(last-resort →) episodicity
(Krifka 2003, Cohen 2007, 2020)

(24a) and (24c) are compatible with the K-Inst sentential ambiguity not being licensed by lexical ambiguity, but (24b) contradicts that due to entailing that episodic reference to instances by bare NPs should be possible only if kind-reference is impossible. To the extent that *God created cows* is ambiguous in a manner not licensed by lexical ambiguity of *create*, (24b) incorrectly predicts this ambiguity not to exist. The more specific prediction is that if *God created cows* has a kind-level reading, then it should lack an instance-level reading. §6.1 argues that this prediction is not borne out, meaning that the answer to research question (4) is not (24b). In the interest of focusing on reference to subkinds, I leave a fuller answer to (4) to a different venue.[22]

Crucially to reference to subkinds, Carlson (1980:§7, ex.50) reports that *God created this kind of animal* has the same ambiguity as *God created cows*. However, (3) below indicates a difference.

(3) God created the cow species, but it's not the case that

a. God created <u>cows</u>.
(It was the devil who created specimens.) *has non-contradictory reading*

b. God created <u>this kind of animal</u>. *contradiction*

I return to (3) in §7.3. Beforehand, the next subsection accounts for the ambiguity of *God created cows*, setting the groundwork for §7.3 accounting for *God created this kind of animal* lacking parallel ambiguity.

6.3 Account

In the present account of the ambiguity of *God created cows*, *create* is unambiguous and its theme argument is a kind or an instance, (25).

(25) $[\![\text{create}]\!]_w = \lambda y^{k\cup inst}\lambda x^{inst}.\text{CRT}(x,y)$

'The function from a kind or instance y and an instance x to
the truth-value of the proposition that x created y in w.'

Next, I assume that the two main components in *God created cows* are raised *cows*$_i$ and [God created t_i], which have the denotations in (26); (26a) follows the references in (24b–c) in that bare NPs basically denote properties.

[22] A challenge to (24a) is Cohen's (2020) postulation that optional operations are scopally-flexible, which contradicts the generalization that the existential quantification contributed by bare NPs is not scopally flexible. Conversely, a challenge to (24c) is that it predicts bare NPs in languages without articles to have indefinite readings, which is contrary to Dayal's (1992, 1999, 2004) description of Hindi, Russian and Chinese.

(26) a. $[\![\text{cows}]\!]$ $=$ COWS $\langle s,\langle e^{inst},t\rangle\rangle$

‘The function from worlds to
the set of pluralities of cow specimens in that world.’

b. $[\![\text{God created } t_i]\!]_w$ $= \lambda y^{k\cup inst}.\text{CRT(God},y)$ $\langle e^{k\cup inst},t\rangle$

’The function from a kind or instance y to
the truth-value of the proposition that God created y in w.’

Next, I follow the references in (24c) in assuming that the covert type-shifts in (27) are respectively responsible for kind-reference and episodicity of bare NPs; NOM stands for *nominalization* and EX for *existence*.

(27) a. $[\![\text{NOM}]\!] = \lambda P.{}^{\cap}P$ $\langle\langle s,\langle e,t\rangle\rangle,e\rangle$

($^{\cap}P$ is defined only if every extension of P has a maximal element)

‘The function from property P to its kind-correlate.’

b. $[\![\text{EX}]\!]_w = \lambda P\lambda Q.\exists x.[P_w(x) \wedge Q_w(x)]$ $\langle\langle s,\langle e,t\rangle\rangle,\langle\langle s,\langle e,t\rangle\rangle,t\rangle\rangle$

’The function from two properties to the truth-value of the proposition
that some x has both properties in w.’

Lastly, I assume that the covert type-shifts in (27) are unranked, i.e. both are equally applicable to resolve type-mismatch. This deviates from the references in (24b), which assume that EX is applicable only if NOM is not (in Dayal’s 2004 notation, $\cap > \exists$). Thus, NOM resolving the mismatch in (26) leads to the K reading in (29), and EX resolving the mismatch leads to the Inst reading in (30).

(28) a. $[\![\text{God created } t_i]\!]_w$ $([\![\text{NOM}]\!]\ ([\![\text{cows}_i]\!]))$

b. $\lambda y^{k\cup inst}.\text{CRT}(g,y)$ $({}^{\cap}\ \text{COWS})$

c. $\text{CRT}(g,{}^{\cap}\text{COWS})$ ‘God created cows as a kind in w.’

(29) a. $[\![\text{EX}]\!]_w$ $([\![\text{cows}_i]\!])$ $([\![\text{God created } t_i]\!])$

b. $\lambda P\lambda Q.\exists x[P_w(x) \wedge Q_w(x)]\ (\text{COWS})\ (\lambda w\lambda y^{k\cup inst}.\text{CRT}_w(g,y))$

c. $\exists x[\text{COWS}_w(x) \wedge \text{CRT}_w(g,x)]$

‘Some plurality of cow specimens in w is s.t. God created it in w.’

§7.3 accounts for *God created this kind of animal* lacking parallel ambiguity to *God created cows* by assuming that the two subject NPs differ in that EX in (27b) is only applicable to the former. This is part of the topic of the instance-level use of subkind-denoting NPs, the topic of the next section.

7 The instance-level use of subkind-denoting NPs

To reiterate the beginning of §6, a key fact about subkind-denoting NPs is that they can be used to express propositions about instances of the subkind(s). This use (Inst) is shown in (1a) alongside the kind-level use (K) in (1b).

(1) a. This kind of animal is sitting on my lawn. Inst (Carlson 1980:§2, ex.82b)
b. This kind of animal is widespread. K (Carlson 1980:§3, ex.58)

This section addresses the final research question of the thesis: What is the nature of the Inst use of subkind-denoting NPs? §4 gives an answer for *a kind of N* in predication and existential sentences as in (2).

(2) a. This sapling (🌱) is a kind of tree. *predication*
b. There's a kind of tree in the garden. *existential sentence*

Under §4, the Inst use in (2) involves rigid properties. First, (2a) asserts that the rigid property-correlate of the type-e denotation of *this sapling* is in the set-denotation of *kind of tree*. Second, (2b) asserts that the set-denotation of *kind of tree* includes a rigid property whose extensions are located in the garden. This section addresses the Inst use of additional sorts of subkind-denoting NPs, namely (i) demonstratives as in (1a) and (ii) quantified NPs in predication and existential sentences as in (3).

(3) a. Fred is every kind of doctor. (McNally 1997:ex.122)
b. There was every kind of local wine. (McNally 1997:ex.199b)

Under §7.1–7.2, the Inst use in (3) comes from a certain resolution of type-mismatch involving the property-level variable denoted by the trace of the raised quantificational NP. Under §7.3, demonstratives as in (1b) denote rigid properties which satisfy ⟦kind of N⟧. §7.4 is the conclusion, and §7.5 is an appendix about alternative analyses.

To lay the foundations to this section, I explicate my assumptions regarding the questions in (4).

(4) a. What is the smallest semantic constituent with binominal *kind*?
b. What does the noun denote in *kind of N*?
c. Is *of* in *kind of N* meaningful?

For (4a), two broad options are that binominal *kind* forms a constituent with the noun or the determiner. §7.5.3 argues against Zamparelli's version of the latter (1998:§4, 2000:§3.4), so I assume the former. For (2b), recall from §5.1.2 that two broad options are that *kind of N* includes [$_{\text{inst}}$ N] (Carlson 1980:§6.2) or [$_{\text{subk}}$ N] (Zamparelli 1998:ex.83, Sutton & Filip 2018:ex.20–21). I opt for the former, although I have no argument against the latter. For (2c), recall that §5.1.1 rejects the aspect of Zamparelli's (1998) analysis where *of* in *kind of N* has the meaning of the partitive preposition. In the absence of other proposals, I follow Carlson (1980:§6.2) and Wilkinson (1991:§2) in treating the preposition as inert. Thus, I assume that the denotation of *kind of N* is ⟦kind⟧(⟦$_{\text{inst}}$ N⟧). With that, the next subsection is about predicative NPs built on *kind of N*.

7.1 Predication

This subsection is about the Inst use of *kind of N* in predication, shown in (5b) alongside the K use in (5a).

(5) a. Oaks are a kind of tree. K
b. This sapling (🌱) is a kind of tree. Inst

Recall that under §4, both sentences in (5) express propositions about membership in the set ⟦kind of tree⟧; (5a) is about the (unrestricted) oak property, and (5b) is about the (rigid) property-correlate of the type-e denotation of *this sapling*. This analysis is limited to unquantified predicative NPs, so the present subsection complements §4 by addressing quantified ones. As background, such NPs can be built on the nominals in (6) which range over subkinds, attributes (Partee 1987:§4) or roles (Landman 2004:§3), (7).

(6)	a. [$_{\text{subk}}$ N], kind of N	*subkind*	(Krifka et al. 1995:§1.3.3)
	b. color, size, length, price, shape, age	*attribute*	(Partee 1987:§4)
	c. Shakespearean king, minister	*role*	(Landman 2004:§3.4)

(7)	a. Fred has been every kind of doctor.	(McNally 1997:ex.122)
	b. My house has been every color.	(Williams 1983:ex.28)
	c. Olivier has been every Shakespearean king.	(Partee 1987:ex.22)

Focusing on *kind of N*, (8a–b) is a contrast between *every doctor* and *every kind of doctor* following McNally (1997:ex.122), and (8c) shows that the latter's felicity is licensed by the subject denoting an instance rather than a kind (Landman 2004:§3, ex.33).

(8) a. #Fred is every doctor in this room.
× 'Fred is the only doctor in this room.'
b. Fred is every kind of doctor.
c. The physician is every kind of doctor.
× 'The physician is the only kind of doctor.'

The significance of (8a) and (8c) is that they cannot express the propositions in (9), where the consequent is an identity clause with a universally-bound variable (x or Q respectively).

(9) a. ⟦Fred is every doctor in this room.⟧ ≠
$\forall x[(\mathrm{DOCTOR}(x) \wedge \mathrm{IN\_THIS\_ROOM}(x)) \rightarrow x = \mathrm{Fred}]$
'Fred is the only doctor in this room.'
b. ⟦The physician is every kind of doctor.⟧ ≠
$\forall Q[[\![\text{kind of doctor}]\!](Q) \rightarrow Q = \mathrm{PHYSICIAN}]$
'The physician is the only kind of doctor.'

The preceding discussion raises two questions: What blocks the propositions in (9), and what is expressed by (8b)? These are addressed in the remainder of this subsection, beginning with the latter.

As background for (8b), in (10) are adapted analyses of predicative *every color* (Partee 1987:ex.21) and *every Shakespearean king* (Landman 2004:§3, ex.37a). Unlike the consequent in (9b) having a universally-bound variable over properties, those in (10) have extensions of universally-bound variables over intensions (property and individual concept respectively).

(10) a. $[\![\text{This house is every color.}]\!]_w =$
$\forall Q_{<s,<e,t>>}[\mathcal{COLOR}(Q) \rightarrow Q_w(h)]$
'Every color is such that this house (h) is of that color.'
b. $[\![\text{Derek Jacobi is every Shakespearean king.}]\!]_w =$
$\forall \mathbf{r}_{<s,e>} [\mathbf{SK}(\mathbf{r}) \rightarrow \mathbf{r}_w = d]$
'Every role of Shakespearean king is such that Derek (d) instantiates it.'

In anticipation of an analysis of predicative *every kind of N* which parallels (10), (11) is the denotation of binominal *kind* from §4.2.4. This section does not use $[\![\text{kind}_7]\!]$ in §5.2.1 because its added components are irrelevant to the present data (except vagueness plays a role in §7.2).

(11) $[\![\text{kind}_5]\!] = \lambda P \lambda Q. \exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee P_v](x)]]$
'There is a way to be normal in a respect s.t. every possible instance of the subkind Q which is normal in that way is a sum of parts of instances of the superkind P in its own world or an intended one.'

With (11) at hand, the example in (12) is *kind of tree* rather than *kind of doctor* as in (9b) so as to accommodate non-inclusion in the subkind relation, exemplified by *Oaks are a kind of tree* being true despite oak bushes. Being a kind of tree is something that shapeshifters can do (mythic beings who can change their physical shape), so imagine that a shapeshifter can be multiple tree specimens simultaneously for (12) to be contingent.

(12) $[\![\text{This shapeshifter is every kind}_5 \text{ of tree.}]\!]_{u,\, [[\![\text{this shapeshifter}]\!] \rightarrow s]}$
a. $\forall Q[[\![\text{kind}_5 \text{ of tree}]\!](Q) \rightarrow Q_u(s)]$
b. $\forall Q[\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee \text{TREE}_v](x)]] \rightarrow Q_u(s)]$
'For every property, if it has a way of being normal such that every instance which is normal in that way is an actual or intended sum of parts of trees, then this shapeshifter instantiates it.'

As is familiar from §4.2.4, (12) is too weak. To reiterate, the truth of *Oaks are a kind of tree and a kind of bush* indicates that $[\![\text{kind}_5 \text{ of tree}]\!]$ can include the unrestricted oak genus, which is instantiated by oak bushes. Thus, (12) incorrectly predicts that being an oak bush verifies being the oak genus as-a-kind-of-tree. Put differently, (12) incorrectly predicts compatibility in (13).

(13) The only oak that this shapeshifter is is an oak bush.
⊥ This shapeshifter is every kind of tree (including the oak).

The previous paragraph suggests a distinction between the oak genus simpliciter (which is instantiated by oak bushes) and the oak genus as-a-kind of tree (which is not). The next paragraphs argue that language makes this distinction, after which the contradiction in (13) is accounted for by appealing to the notion of kinds as-subkinds.

I assume that the kind representation of non-particulars (e.g. the oak genus) is revealed by data pertaining to demonstratives consisting of *kind* and a pronoun, e.g. *this kind*. To illustrate, say you are reading a book about plants and want to learn more about oaks; *this kind* being in a display does not entail that the display has oak organisms, and it is verified by the display in Figure 15 consisting of oak leaves and acorns, (14).

(14) You're interested in oaks? This kind is in the display (in Figure 15). *true*

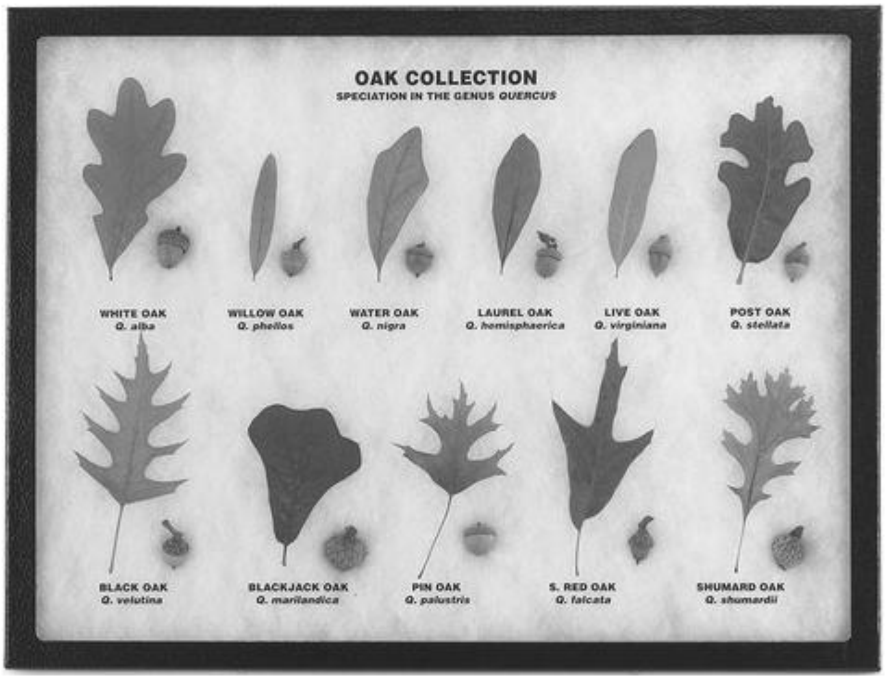


Figure 15: Oak leaves and acorns.

I assume that the kind representation of the oak genus is denoted by *this kind* in (14). Thus, I surmise from (14) that kinds can be instantiated by parts of specimens which are not specimens themselves, e.g. oak leaves which are not themselves oaks. It makes sense conceptually that kinds are considered to be instantiated by such parts, given that kinds which have gone extinct in prehistory have been reconstructed purely via such parts (i.e. without specimens).

Another characteristic of the kind representation of non-particulars is revealed by (15), where saying of gems that *that kind* is in mine 1 is verified by the mine having merely intended gems.

(15) [The rough diamonds in mine 1 are intended to be polished into gems.
Those in mine 2 are intended for diamond tools.]
You're looking for gems? That kind is in mine 1. *true*

As before, I assume that the kind representation of the gem non-particular is denoted by *that kind* in (15). Thus, I surmise from (15) that kinds can be instantiated by intended instances of the corresponding property.

The data in (14–15) motivates the two representations in (16) of non-particulars; the property in (16a) is instantiated by all specimens and only them, while the kind in (16b) is instantiated by all actual or intended sums of parts of specimens and only them. Parthood is relevant to the oak kind instantiating parts of oaks which are not oaks themselves, and intentions are relevant to the gem kind instantiating merely intended gems.

(16) Q is the intension of a noun under the instance reading.

a. $\lambda w \lambda x.Q_w(x)$ *property*

b. $\lambda w \lambda x.\exists v[INT^+_w(v) \wedge (\vee Q_v](x)]$ *kind*

Next, I assume that the subkind representation of a non-particular (e.g. the oak genus) is revealed by data pertaining to demonstratives like *this kind of tree*. I assume that in (17b) it denotes the oak as a kind of tree, and the resulting proposition is stronger than that which results from *this kind* in (17a) in that only the former entails that the leaves and acorns in Figure 15 come from specimens whose adult stage is a tree (as opposed to a bush).

(17) You're interested in oaks?

a. This kind is in the display in Figure 15. $\nRightarrow$
The leaves and acorns are parts of actual or intended tree specimens.

b. This kind of tree is in the display in Figure 15. ⇗

The preceding data suggests the three representations in (18) of the oak non-particular (OAK ranges over specimens, i.e. it is not the intension of the 'wood' reading of *oak*). The simplifications in (18b–c) are explained next.

(18) a. $\lambda w \lambda x.OAK_w(x)$

b. $\lambda w \lambda x.\exists v[INT^+_w(v) \wedge (\vee OAK_v](x)]$
$\lambda w \lambda x.(\vee OAK_v](x)$

c. $\lambda w \lambda x.\exists v[INT^+_w(v) \wedge (\vee OAK_v](x)] \wedge \exists v[INT^+_w(v) \wedge (\vee TREE_v](x)$
$\lambda w \lambda x.(\vee OAK_v](x) \wedge \exists v[INT^+_w(v) \wedge (\vee TREE_v](x)$

To reiterate, the property in (18a) is instantiated by all oak specimens and only them, the kind in (18b) is also instantiated by (actual or intended) sums of parts of oaks which are not oaks themselves, and (18c) (the oak as a kind of tree) is restricted to actual or intended sums of parts of tree specimens. Intentions are relevant to transitory properties like GEM and TREE but not to permanent ones like OAK, so the following discussion uses to the simpler versions of (18b–c).

Next is a compositional analysis of (18b–c) under which they are derived via $[\![\text{kind}_{2\text{op}}]\!]$ in (19) (*two-place operator*), which is distinct from $[\![\text{kind}_5]\!]$ in (11); it takes two properties P and Q and returns the property which is P as a kind of Q, e.g. the oak genus as a kind of tree.

(19) $[\![\text{kind}_{2\text{op}}]\!] = \lambda P\lambda Q\lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee P_v](x) \wedge$
$\qquad\qquad\qquad\qquad\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee Q_v](x)$

‘The function from P and Q to the property whose every instance is
an actual or intended sum of parts of P, and
an actual or intended sum of parts of Q.’

I assume that *this* in (17) denotes the oak property, and that in *this kind* in (20a) the Q argument of $[\![\text{kind}_{2\text{op}}]\!]$ is saturated by the self-identity property, notated as ID ($\lambda w\lambda x.x = x$). Thus, the two demonstratives in (17) have the denotations in (20b–c) in the manner shown in (20), where the simplification from (20a.iv) to (20a.v) is licenced by every x satisfying the omitted conjunct.

$$
\begin{array}{lll}
\text{(20) a. i.} & [\![\text{kind}_{2\text{op}}]\!] & ([\![\text{this}]\!]\,)\ (\text{ID}) \\
\text{ii.} & \lambda P\lambda Q\lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee P_v](x) \wedge & \\
 & \qquad\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee Q_v](x) & (\text{OAK}\ \ )\ (\text{ID}) \\
\text{iii.} & \quad \lambda Q\lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{OAK}_v](x) \wedge & \\
 & \qquad\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee Q_v](x) & (\text{ID}) \\
\text{iv.} & \qquad \lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{OAK}_v](x) \wedge \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{ID}_v](x) & \\
\text{v.} & \qquad \lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{OAK}_v](x) & \\
\text{b. i.} & [\![\text{kind}_{2\text{op}}]\!] & ([\![\text{this}]\!]\,)\ ([\![\text{tree}]\!]) \\
\text{ii.} & \lambda P\lambda Q\lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee P_v](x) \wedge & \\
 & \qquad\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee Q_v](x) & (\text{OAK}\ \ )\ (\text{TREE}\ ) \\
\text{iii.} & \quad \lambda Q\lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{OAK}_v](x) \wedge & \\
 & \qquad\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee Q_v](x) & (\text{TREE}\ ) \\
\text{iv.} & \qquad \lambda w\lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{OAK}_v](x) \wedge \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee \text{TREE}_v](x) &
\end{array}
$$

Notably, $[\![\text{kind}_{2\text{op}}]\!]$ in (19) is akin to $[\![\text{kind}_5]\!]$ in (11) below, so the question arises of whether and how they are related.

(11) $[\![\text{kind}_5]\!] = \lambda P\lambda Q.\exists N\forall w\forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_{w}{}^{+}(v) \wedge (\vee P_v](x)]]$

I propose that $[\![\text{kind}_{2op}]\!]$ in (19) is derived from $[\![\text{kind}_5]\!]$ in (11) via $[\![\text{Rt2OP}]\!]$ in (21) (*relation to 2-place operator*); it takes a relation between properties $\boldsymbol{\mathcal{R}}$ and returns the function from two properties P and Q to the property you have if your property-correlate stands in the relation with the rigid properties whose extensions are those of P and Q. Although (21) might seem ad-hoc, I hypothesize that an operation akin to it relates the propositional use of relational nouns (e.g. *brother*) to their modificational use, exemplified respectively in *Cain is the brother of Abel* and *Cain as the brother of Abel*.

(21) $[\![\text{Rt2OP}]\!] = \lambda\boldsymbol{\mathcal{R}}\lambda P\lambda Q\lambda w\lambda x.\boldsymbol{\mathcal{R}}(\lambda v.P_w)(\lambda u\lambda y.y = x) \land \boldsymbol{\mathcal{R}}(\lambda v.Q_w)(\lambda u\lambda y.y = x)$

The application of $[\![\text{Rt2OP}]\!]$ to $[\![\text{kind}_5]\!]$ in (11) is simplified in (22); (22b) reduces to (22c) via λ-conversion, (22d) is licensed by ∃N being satisfiable by N_{triv}, and (19) is licensed by $P(z) \Leftrightarrow \forall x[x = z \rightarrow P(x)]$ (cf. §4.2.4).

(22) a. $[\![\text{Rt2OP}]\!]\ ([\![\text{kind}_5]\!])$

b. $\lambda\boldsymbol{\mathcal{R}}\lambda P\lambda Q\lambda w\lambda x.\boldsymbol{\mathcal{R}}(\lambda v.P_w)(\lambda u\lambda y.y = x) \land \boldsymbol{\mathcal{R}}(\lambda v.Q_w)(\lambda u\lambda y.y = x)$
$(\lambda R\lambda S.\exists N\forall w'\forall z[(S_{w'}(z) \land N_{w'}(z)) \rightarrow \exists v'[INT_{w'}{}^{+}(v') \land ({\vee}R_{v'}](z)]])$

c. $\lambda P\lambda Q\lambda w\lambda x.\exists N\forall w'\forall z[(z = x \land N_{w'}(z)) \rightarrow \exists v'[INT_{w'}{}^{+}(v') \land ({\vee}P_w](z)]] \land$
$\exists N\forall w'\forall z[(z = x \land N_{w'}(z)) \rightarrow \exists v'[INT_{w'}{}^{+}(v') \land ({\vee}Q_w](z)]]$

d. $\lambda P\lambda Q\lambda w\lambda x.\forall w'\forall z[z = x \rightarrow \exists v'[INT_{w'}{}^{+}(v') \land ({\vee}P_w](z)]] \land$
$\forall w'\forall z[z = x \rightarrow \exists v'[INT_{w'}{}^{+}(v') \land ({\vee}Q_w](z)]]$

(19) $\lambda P\lambda Q\lambda w\lambda x.\forall w'\exists v'[INT_{w'}{}^{+}(v') \land ({\vee}P_w](x)]] \land$
$\forall w'\exists v'[INT_{w'}{}^{+}(v') \land ({\vee}Q_w](x)]]$

Next, I appeal to *kind*$_{2op}$ to account for the contradiction in (13) (repeated shortly). First, consider the non-entailment in (23).

(23) This shapeshifter is an oak bush and a willow bush. ⇏
As for the oak and the willow, this shapeshifter is both kinds of trees.

The non-entailment in (23) is accounted for by *both kinds of trees* including *kind*$_{2op}$. To illustrate, (24a) quantifies over the unrestricted oak and willow properties and thus incorrectly predicts entailment due to them instantiating oak and willow bushes respectively. By contrast, (23) is accounted for by (24b) quantifying over these properties as-kinds-of-trees.

(24) The oak and the willow…

$[\![$This shapeshifter is both kinds of trees.$]\!]_{u,\ [[\![\text{this shapeshifter}]\!] \rightarrow s]}$

a. $\forall Q[(Q = \text{OAK} \vee Q = \text{WILLOW}) \rightarrow Q_u(s)]$

b. $\forall Q[(Q = \lambda w \lambda x.(\vee\text{OAK}_v](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee\text{TREE}_v](x) \vee$
$Q = \lambda w \lambda x.(\vee\text{WILLOW}_v](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee\text{TREE}_v](x))$
$\rightarrow Q_u(s)]$

For completeness, note that the preceding analysis of *both kinds of N* can extend to anaphoric *each kind of N* as in (25).

(25) Advisors who are not Fee-Only can still act as a Fiduciary […].
A Fee-Only advisor can't accept commissions or referral fees […].
Special Note: I have been **each type of advisor** at some point. [γ]

As an interim summary, I assume that *this kind of N*, *both kinds of N* and *each kind of N* can include *kind$_{2op}$*. I assume the same for *every kind of N*, although it requires a more complex analysis. Recall that in *this kind of tree* in (20b), $[\![$that$]\!]$ is the discourse referent OAK. Such an analysis extended to (24) would say that $[\![$both$]\!]$ is the plurality of OAK and WILLOW, which is reasonable given that it is denoted by *both* in (26). However, the infelicity of *every* in (26) shows that this analysis does not extend to predicative *every kind of tree*.

(26) As for the oak and the willow, this shapeshifter has been {both, #every}.

Despite (26), appealing to *kind$_{2op}$* remedies the weakness of (12) below via (27), paraphrasable as 'Every property as a kind of tree is such that the shapeshifter instantiates it.' The next paragraphs offer a compositional analysis of (27), and the generation of (12) discussed afterwards.

(12) $[\![$This shapeshifter is every kind$_5$ of tree.$]\!]_{u,\ [[\![\text{this shapeshifter}]\!] \rightarrow s]}$

a. $\forall Q[[\![\text{kind}_5 \text{ of tree}]\!](Q) \rightarrow Q_u(s)]$

b. $\forall Q[\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\text{TREE}_v](x)]] \rightarrow Q_u(s)]$

'For every property, if it has a way of being normal such that every instance which is normal in that way is an actual or intended sum of parts of trees, then this shapeshifter instantiates it.'

(27) $[\![$This shapeshifter is every kind$_{2op}$ of tree.$]\!]_{u, [[\![\text{this shapeshifter}]\!] \to s]}$

a. $\forall Q[[\exists R[Q = [\![\text{kind}_{2op} \text{ of tree}]\!](R) \qquad\qquad] \to Q_u(s)]$

b. $\forall Q[[\exists R[Q = \lambda w\lambda x.(\vee R_v](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x)]] \to Q_u(s)]$

'For every property, if it equals a property that is only instantiated by actual or intended sums of parts of trees, then s instantiates it.'

The analysis of (27) appeals to $[\![$kind$_{2op}$ of tree$]\!]$ in (28), where TREE saturates the Q-argument of $[\![$kind$_{2op}]\!]$. I also assume that *every* is polymorphic and denotes (29) when the argument is a set of properties.

(28) $[\![\text{kind}_{2op} \text{ of tree}]\!] = \lambda P\lambda w\lambda x.(\vee P_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x)$

(29) $[\![\text{every}]\!]_{(\mathcal{P})} \qquad = \lambda\mathcal{P}\lambda\mathcal{Q}.\forall R[\mathcal{P}(R) \to \mathcal{Q}(R)]$

The argument of polymorphic $[\![$every$]\!]$ is a set, but $[\![$kind$_{2op}$ of tree$]\!]$ in (28) is an operation on properties. I therefore assume that (28) can shift to a set of properties via $[\![$OtS$]\!]$ (*operation to set*) in (30), which takes an operation on properties **P** and returns the set of properties which equal an output of the operation.

(30) $[\![\text{OtS}]\!] = \lambda\mathbf{P}\lambda Q.\exists R[Q = \mathbf{P}(R)]$

The simplification of $[\![$OtS$]\!]([\![$kind$_{2op}$ of tree$]\!])$ in (31) shows that it is a set of properties which are only instantiated by actual or intended sums of parts of tree specimens, as desired.

(31) a. $[\![\text{OtS}]\!] \qquad\qquad ([\![\text{kind}_{2op} \text{ of tree}]\!])$

b. $\lambda\mathbf{p}\lambda Q.\exists R[Q = \mathbf{p}(R)] \; (\lambda Q\lambda w\lambda x.(\vee Q_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x))$

c. $\lambda Q.\exists R[Q = \lambda Q\lambda w\lambda x.(\vee Q_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x) \; (R)] \qquad \lambda\mathbf{p}$

d. $\lambda Q.\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x)] \qquad \lambda Q$

Next, (32) is the denotation of *every kind of tree* built on *kind$_{2op}$* (which exists alongside that built on binominal *kind*).

(32) a. $[\![\text{every}]\!]_{(\mathcal{P})} \qquad\qquad ([\![\text{OtS}]\!]([\![\text{kind}_{2op} \text{ of tree}]\!]))$

b. $\lambda\mathcal{R}\lambda\mathcal{P}.\forall Q[\mathcal{R}(Q) \qquad \to \mathcal{P}(Q)] \; ([\![\text{OtS}]\!]([\![\text{kind}_{2op} \text{ of tree}]\!]))$

c. $\lambda\mathcal{P}.\forall Q[[\![_{\text{OtS}} \text{ kind}_{2op} \text{ of tree}]\!](Q) \quad \to \mathcal{P}(Q)]$

d. $\lambda\mathcal{P}.\forall Q[\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee \text{TREE}_v](x)] \to \mathcal{P}(Q)]$

We come to *This shapeshifter is every kind of tree*. I assume with Partee (1987:ex.21) that one of its two main components is raised *every kind of tree*, and the second consists of the subject and the trace of raised *every kind of tree*. The subject denotes an entity, the trace denotes a λ-bound variable over properties, and their type-mismatch is resolved by extensionalizing the property (cf. Landman 2004:§3.4) as in (33).

(33)	a. ⟦λt ⟦this shapeshifter⟧	⟦t_i⟧⟧	
	b. λP. s	P	*mismatch*
	c. λP. s	P_w	*extensionalization*
	d. λP. P_w(s)		*application*

Lastly, (27) is derived by applying (32) to (33), thus deriving a reading of *be every kind of tree* which accounts for the contradiction in (13) below.

(13) The only oak that this shapeshifter is is an oak bush.
⊥ This shapeshifter is every kind of tree (including the oak).

Crucially, the preceding assumptions over-generate in two respects. First, they do not prevent the infelicitous (34a) from expressing (34b), the background to which is that homo sapiens is the only extant species of the homo genus. (34a) improves (in my judgement) with a plural copula verb, as is discussed in relation to (36), and it does not matter here whether ⟦kind of human⟧ is derived via ⟦kind_5⟧ or ⟦$\text{kind}_{2\text{op}}$⟧.

(34) a. #Homo sapiens is every extant kind of human.
b. ∀Q[(⟦kind of human⟧(Q) ∧ $\mathcal{EXTANT}$(Q)) → Q = HOMO_SAPIENS]
‘Homo sapiens is the only extant kind of human.’

Following Landman (2004:§3), I account for (34a) being unable to express (34b) by adopting the Variable Constraint, under which a variable of type a cannot shift to an expression of type <a,t>. To illustrate, I assume that one of the two main components of (34a) consists of the subject and the trace of the raised *every kind of human*. Consider (35), where P (the denotation of the trace) shifts via IDENT to a (singleton) set of properties.

(35)	a. ⟦λt ⟦homo sapiens⟧	⟦t_i⟧⟧	
	b. λP. HOMO_SAPIENS	P	*mismatch*
	c. λP. HOMO_SAPIENS	λQ.Q = P	*IDENT*
	d. λP. HOMO_SAPIENS = P		*application*

Regardless of whether ⟦kind of human⟧ is derived via ⟦$kind_5$⟧ or ⟦$kind_{2op}$⟧, applying it to (35) over-generates (34b). This is remedied by assuming the Variable Constraint, which prevents P in (35) from shifting via IDENT.

As alluded to previously, I judge that (34a) is improved with a plural copula verb, as shown in (36a) alongside the attested (36b). I leave this to future research, which could perhaps draw a connection to the collective use of *every* in (36c) (Landman 2004:§2, ex.20a).

(36) a. Homo sapiens {#is, are} every extant kind of human.
b. Electrolytes are every type of electrically conductive fluids. [γ]
c. The press is every person who writes about the news.

Next, although the preceding assumptions derive a reading which reflects the contradiction in (13) below, they also derive a reading which predicts compatibility, namely (12) below.

(12) ⟦This shapeshifter is every $kind_5$ of tree.⟧$_{u,\ [⟦\text{this shapeshifter}⟧ \to s}$
a. $\forall Q[⟦kind_5 \text{ of tree}⟧(Q) \quad\quad \to Q_u(s)]$
b. $\forall Q[\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \to \exists v[INT_{w^+}(v) \wedge (\vee TREE_v](x)]] \quad \to Q_u(s)]$
'For every property, if it has a way of being normal such that every instance which is normal in that way is an actual or intended sum of parts of trees, then this shapeshifter instantiates it.'

(13) The only oak that this shapeshifter is is an oak bush.
⊥ This shapeshifter is every kind of tree (including the oak).

The proposition in (12) is derived under the present assumptions because nothing prevents *every kind of N* from including *kind₅*. Whether this is desirable is discoverable with kind-level expressions which derive entailments about all instances, as in (37). For example, a kind being extinct entails that it has no living instances.

(37) a. die out, discontinue, eradicate, exterminate, extinct, legalize, outlaw, stamp out (§2.6.1)
b. exclude, kill off, disappear (§6.1)

If *every kind of N* can include *kind₅*, then the premises in (38) should have a reading which entail the conclusion. The predicted reasoning of (38a) is as follows: Every kind of pet has been eradicated, and dogs are a kind of pet, therefore all dogs have been eradicated, therefore there are no stray dogs.

(38) a. Premise: Every kind of pet has been eradicated.
Conclusion(?): There are no stray dogs.
b. Premise: Every kind of stray animal has been eradicated.
Conclusion(?): There are no pet dogs.

In a survey, 20 self-reported native monolingual English speakers were asked whether the conclusions follow from the premises in (38), and the vast majority answered negatively: 90% for (38a) and 100% for (38b). These results support the present analysis where *every kind of N* can include *kind*$_{2op}$. At the same time, these results are compatible with *every kind of N* being able to include *kind*$_5$, because this reading (where the conclusions follow) might be less accessible. I am able to access it in (38), so I maintain that *every kind of N* (and *kind of N* in general) can include *kind*$_5$ or *kind*$_{2op}$. This admittedly has the negative consequence of predicting (13) above to have a non-contradictory reading, and I hypothesize that it is judged as unambiguously contradictory because the reading with *kind*$_5$ is, for some reason, very inaccessible, as it was to my consultants.

Following the assumption that predicative *every kind of N* can include *kind*$_5$ or *kind*$_{2op}$, the null hypothesis would be to extend this assumption to predicative *a kind of N*. The next paragraphs argue that this maintains the analysis in §4.2.4, repeated in (39).

(39) $[\![\text{This is a kind}_5 \text{ of N.}]\!]_{[[\![\text{this}]\!] \rightarrow b]} =$
$[\![\text{kind}_5 \text{ of N}]\!]([\![\text{IDENT}]\!]([\![\text{this}]\!]_{[[\![\text{this}]\!] \rightarrow b]})) = \forall w \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee[\![\text{N}]\!]_{v}](b)]$
'In every world, b is a sum of parts of N or is intended as such.'

Under the present assumptions, *This is a kind*$_{2op}$ *of N* expresses (40), which the next paragraph explains is equivalent to (39).

(40) a. $[\![\text{This is a OtS kind}_{2op}\text{ of N.}]\!]_{[[\![\text{this}]\!] \rightarrow \text{b}]}$

b. $[\![\text{OtS}]\!]([\![\text{kind}_{2op}\text{ of N}]\!])$ $\qquad$ $([\![\text{IDENT}]\!]\ ([\![\text{this}]\!]_{[[\![\text{this}]\!] \rightarrow \text{b}]}))$

c. $\lambda Q.\exists R[Q \quad = \lambda w \lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee R_{v}] \quad (x)] \wedge$

d. $\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee[\![N]\!]_{v}](x)] \quad (\lambda v \lambda y.y = b)$

e. $\exists R[(\lambda v \lambda y.y = b) = \lambda w \lambda x.\exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee R_{v}] \quad (x)] \wedge$

$\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee[\![N]\!]_{v}](x)] \qquad \lambda Q$

'For some property R, in every world,

b is an actual or intended sum of parts of R, and

b is an actual or intended sum of parts of N.'

That (39) and (40) are equivalent is explained as follows. First, if (39) is true then $\exists R$ in (39e) is verified by $R = \lambda v \lambda y.y = b$, therefore (39) $\Rightarrow$ (40). Second, if (40) is true then (39) is verified by b being an actual or intended sum of parts of N in every world, therefore (39) $\Leftarrow$ (40). Thus, assuming that predicative *a kind of tree* can include *kind$_{2op}$* maintains the analysis in §4.2.4.

In conclusion, next is a summary of the analysis of predicative *every kind of N*. First, it is assumed to be able to include *kind$_5$* or *kind$_{2op}$*, and thus it can denote (41a) or (41b), which quantify respectively over kinds simpliciter and kinds as subkinds.

(41) a. $[\![\text{every}]\!]_{\langle\mathcal{P}\rangle}([\![\text{kind}_5\text{ of N}]\!]) =$

$\lambda\mathcal{P}.\forall Q[\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_{w}{}^{+}(v) \wedge (\vee[\![N]\!]_{v}](x)]] \rightarrow \mathcal{P}(Q)]$

'The function from $\mathcal{P}$ to the proposition that for every property Q, if it has a way of being normal such that every instance which is normal in that way is an actual or intended sum of parts of $[\![N]\!]$, then $\mathcal{P}$ is true of Q.'

b. $[\![\text{every}]\!]_{\langle\mathcal{P}\rangle}([\![\text{OtS}]\!]([\![\text{kind}_{2op}\text{ of N}]\!])) =$

$\lambda\mathcal{P}.\forall Q[\exists R[Q = \lambda w \lambda x.(\ \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee R_{v}](x)] \wedge$

$\qquad \exists v[\text{INT}^{+}{}_{w}(v) \wedge (\vee[\![N]\!]_{v}](x)]) \rightarrow \mathcal{P}(Q)]$

'The function from $\mathcal{P}$ to the proposition that for every property Q, if it has a property R such that every instance P is an actual or intended sum of parts of R and $[\![N]\!]$, then $\mathcal{P}$ is true of Q.'

Next, I assume that one of the two main components of a sentence with predicative *every kind of N* consists of the subject and the trace of raised *every kind of N*, where the latter denotes a λ-bound variable over properties. This variable cannot shift via IDENT under the Variable Constraint, thus preventing (34a) below from expressing (34b). However, the variable can be extensionalized to resolve mismatch with an expression of type e, thus accounting for the felicity of (7a) below where the extension of the subject is of type e.

(34a) #The homo sapiens is every extant kind of human.

(34b) $\forall Q[([\![\text{kind of human}]\!](Q) \wedge \mathcal{EXTANT}(Q)) \rightarrow Q = \text{HOMO\_SAPIENS}]$

'The homo sapiens is the only extant kind of human.'

(7a) Fred has been every kind of doctor. (McNally 1997:ex.122)

Next, the denotations in (41) lead to different propositions when the superordinate kind does not include its subkinds, exemplified in (12) and (28) respectively with *kind of tree*.

(12) $[\![\text{This shapeshifter is every kind}_5 \text{ of tree.}]\!]_{u,\ [[\![\text{this shapeshifter}]\!] \rightarrow s]}$

a. $\forall Q[[\![\text{kind}_5 \text{ of tree}]\!](Q) \rightarrow Q_u(s)]$

b. $\forall Q[\exists N \forall w \forall x[(Q_w(x) \wedge N_w(x)) \rightarrow \exists v[\text{INT}_w{}^+(v) \wedge (\vee\text{TREE}_v](x)]] \rightarrow Q_u(s)]$

'For every property, if it has a way of being normal such that every instance which is normal in that way is an actual or intended sum of parts of trees, then this shapeshifter instantiates it.'

(28) $[\![\text{This shapeshifter is every kind}_{2op} \text{ of tree.}]\!]_{u,\ [[\![\text{this shapeshifter}]\!] \rightarrow s]}$

a. $\forall Q[[\exists R[Q = [\![\text{kind}_{2op} \text{ of tree}]\!](R)] \rightarrow Q_u(s)]$

b. $\forall Q[[\exists R[Q = \lambda w \lambda x.(\vee R_w](x) \wedge \exists v[\text{INT}^+{}_w(v) \wedge (\vee\text{TREE}_v](x)] \rightarrow Q_u(s)]$

'For every property, if it equals a property modified as a kind of tree, then this shapeshifter instantiates it.'

The proposition in (28) reflects the contradiction in (13) below, because being an oak bush does not count as instantiating the oak as a kind of tree. (12) predicts compatibility in (13), and I hypothesize that this proposition is less accessible for reasons which I leave to future research.

(13) The only oak that this shapeshifter is is an oak bush.

$\perp$ This shapeshifter is every kind of tree.

In conclusion, (42) is my answer to the research question pertaining to predication.

(42) What is the nature of the Inst use of subkind-denoting NPs in predication?

a. Non-quantificational: The property-correlate of the type-e denotation of the subject is claimed to satisfy $[\![\text{kind of N}]\!]$.

b. Quantificational: Resolution of type-mismatch involving the property-level variable denoted by the trace of the raised quantificational NP.

This concludes my analysis of subkind-denoting NPs in predication. The next subsection is about existential sentences.

7.2 Existential sentences

Recall that §4.2.4 offers an analysis of the instance-level use of *a kind of N* in existential sentences which accounts for the data in (43).

(43) a. There's a tree sapling in the garden.
⇒ There's a kind of tree in the garden.
(⇏ There's a tree specimen in the garden.)
b. There's a blade of grass in the lawnmower bag.
⇒ There's a kind of plant in the lawn mower bag.
(⇏ There's a plant specimen in the lawn mower bag.)

This subsection builds on §4.2.4 by offering a compositional analysis of *There's a kind of N* and *There's every kind of N*.

The *in* prepositionals in (43) bias towards the instance-level use, because kinds cannot literally be located in gardens and bags. But what if there were no bias, e.g. via *dislike*? McNally (1997) reports (44) as ambiguous; she does not specify what Chris dislikes under (44a) (the instance, the kind, or both), but this is irrelevant to the following discussion.

(44) There was a kind of wine that Chris disliked. (McNally 1997:ex.199a)
a. 'There was an instance of a kind.' Inst
b. 'There was a kind (no commitment to existence of its instances).' K

As reviewed in §7.5.1, McNally analyzes *There's a kind of N* as ambiguous, where each reading uses a different denotation of the indefinite article. I take it for granted that (44) can assert the existence of a kind, but I argue that it lacks a separate reading which entails the existence of instances. By that I mean that a proposition which does entail the existence of instances comes from a certain resolution of vagueness of a single reading (see §7.5.1). The hypothesis that an instance-entailing reading is separate predicts that the negation of (44) should have a reading compatible with Chris disliking a non-extant kind of wine. Shifting the verb to *like* to avoid double negation, the prediction is that (45) will have a non-contradictory reading stemming from negating the proposition that Chris liked a kind of wine with instances. This prediction is not borne out by the judgement that (45) is unambiguously contradictory.

(45) Although Chris liked a non-extant kind of wine,
it's not the case that there was a kind of wine that Chris liked.
contradiction

Following (45), this subsection does not treat (44a) and (44b) as separate readings.

Equally as important as the reported ambiguity in (44) is the contrast between *a kind of N* and *every kind of N*. McNally judges that (46) unambiguously entails the existence of instances, and I concur.

(46) There was every kind of local wine.
entails the existence of instances (McNally 1997:ex.199b)

This subsection maintains McNally's contrast between *a kind of N* and *every kind of N* in that only the latter unambiguously entails the existence of instances. Thus, the remainder of the subsection builds on the analysis of *There's a kind of N* in §4.2.4 and offers an analysis of *There's every kind of N*.

The analysis of *There's a kind of N* in §4.2.4 is repeated in (47). It accounts for the (non-)entailment in (43), but not for the kind-level use, as is remedied next.

(47) $[\![\text{There's a kind}_5 \text{ of N.}]\!] = \exists x \forall w \exists v[\text{INT}^+_w(v) \wedge (^{\vee}[\![\text{N}]\!]_v](x)]$
'Something is in every world a sum of parts of N or intended as such.'

The improvement upon (47) is in (48). The construction is ambiguous following §7.1, where *kind of N* can include *kind$_5$* or *kind$_{2op}$*, and the proposition of $\text{EXIST}_w(Q)$ depends on Q in the manner detailed next.

(48) a. $[\![\text{There's a kind}_5 \text{ of N.}]\!]_w = \exists Q[[\![\text{kind}_5 \text{ of N}]\!](Q) \wedge \text{EXIST}_w(Q)]$
b. $[\![\text{There's a OtS kind}_{2op} \text{ of N}]\!]_w = \exists Q[[\![\text{OtS kind}_{2op} \text{ of N}]\!](Q) \wedge \text{EXIST}_w(Q)]$

The proposition $\text{EXIST}_w(Q)$ in (48) depends on whether Q is rigid or corresponds to a kind. For the latter, EXIST_w claims that the kind is recognized in w (unlike how the mammal class was unrecognized before it was invented by Linnaeus). Conversely, EXIST_w claims of rigid properties that every member of Q_w takes up time (and space if relevant) in w, (49).

(49) a. If Q corresponds to a kind, $\text{EXIST}_w(Q)$ is true iff Q is recognized in w.

b. If Q is rigid, $\text{EXIST}_w(Q)$ is true iff every $x \in Q_w$ takes up time (and space if relevant) in w.

In (39) and (40) are the simplifications of applying ⟦kind_5 of N⟧ and ⟦OtS kind_{2op} of N⟧ to the rigid $\lambda v \lambda y.y = b$; recall from §7.1 that the propositions are equivalent. Thus, (48) preserves the account of (43); a rigid property which is only instantiated by tree saplings verifies ⟦kind of tree⟧ regardless of whether it is derived via ⟦kind_5⟧ or ⟦kind_{2op}⟧, and a rigid property which is only instantiated by non-plant parts of plants similarly verifies ⟦kind of plant⟧ (cf. §4.2.4).

(39) $[\![\text{kind}_5 \text{ of N}]\!] \quad (\lambda v \lambda y.y = b)) = \forall w \exists v[\text{INT}^+_w(v) \wedge ([\![\text{N}]\!]_v](b)]$

‘In every world, b is a sum of parts of N or is intended as such.’

(40) $[\![\text{OtS kind}_{2op} \text{ of N}]\!](\lambda v \lambda y.y = b)) = \lambda w \lambda x.\exists v[\text{INT}^+_w(v) \wedge (\vee R_v] \quad (x)] \wedge$
$\exists v[\text{INT}^+_w(v) \wedge (\vee [\![\text{N}]\!]_v](x)]$

‘For some property R, in every world,

b is an actual or intended sum of parts of R, and

b is an actual or intended sum of parts of N.’

The propositions in (48) are non-equivalent when Q corresponds to a kind, in which case (48a) is about a kind simpliciter while (48b) is about a kind as a subkind. Thus, the first reading of *There’s a kind of pet that was eradicated* contradicts the existence of non-pet instances of the kind in question, while the second is compatible with that.

For compositionality, I propose that the propositions in (48) are derived via (50) applying to one of the two denotations of *kind of N*, where (50) is the version of polymorphic ⟦there⟧ whose argument as is a set of properties.

(50) $[\![\text{there}]\!]_{(\mathcal{P}),w} = \lambda \mathcal{P}.\exists Q[\mathcal{P}(Q) \wedge \text{EXIST}_w(Q)]$

Under the present analysis, *There’s a kind of N* is ambiguous in whether it is about a kind simpliciter or a kind as a subkind, but there is no ambiguity which affects whether the existence of instances is entailed. However, this is affected by resolution of vagueness. Recall from §5.1.1 that *kind of N* is vague, which is cashed out in §5.2.1 by ⟦kind_7⟧ including the free variable $\mathcal{C}$. Thus, $\mathcal{C}$ being valued as a set of properties corresponding to kinds does not entail the existence of instances, while valuation as a set of rigid properties does. This accounts for the contradiction in (45) below with the assumption that tokens of $\mathcal{C}$ co-vary, meaning that no matter the value of $\mathcal{C}$, (45) asserts of the same set of properties that it includes and does not include a member which Chris liked (a contradiction).

(45) Although Chris liked a non-extant kind of wine,
it's not the case that there was a kind of wine that Chris liked.
contradiction

The present assumptions over-generate a non-contradictory reading of (45) if *a kind of N* has a quantificational denotation. I block this in §7.5.1.

Continuing to *There's every kind of N*, the present analysis makes it so that EXIST in (50) applies to instances in this case, so (51) augments (49) by specifying that if x is an instance, then $\text{EXIST}_w(x)$ is true iff x takes up time (and space if relevant) in w.

(51) If x is an instance, $\text{EXIST}_w(x)$ is true iff
x takes up time (and space if relevant) in w.

As in §7.1, I assume that one of the two main components of *There's every kind of N* is *every kind of N*, and the second consists of *there* and the trace of raised *every kind of N*. The trace denotes a λ-bound variable over properties whose mismatch with ⟦there⟧ is resolved by extensionalizing the property in the manner shown in (52). In (52c), τ (a variable over types) is typed as e due to ⟦there⟧ taking an argument of type <e,t>.

(52) a. $[\![\lambda t\ [\![\text{there}]\!]_w \quad [\![t_i]\!]]\!]$
b. $\lambda P\ \lambda X_{<\tau,t>}.\exists y_\tau[X\ (y) \wedge \text{EXIST}_w(y)]\ (P\ )$ *mismatch*
c. $\lambda P\ \lambda X_{<\tau,t>}.\exists y_\tau[X\ (y) \wedge \text{EXIST}_w(y)]\ (P_w)$ *extensionalization*
d. $\lambda P\ \lambda X_{<e,t>}.\exists y_e[X\ (y) \wedge \text{EXIST}_w(y)]\ (P_w)$ *typing*
e. $\lambda P\ .\exists y\ [P_w(y) \wedge \text{EXIST}_w(y)]$ *application*

Recall from §7.1 that getting the right results for *There's every kind of tree* relies on the NP including *kind*$_{2op}$ rather than *kind*$_5$. The denotation of the former is in (32) below, and its combination with (52) is in (53).

(32) a. $[\![\text{every}]\!]_{(\mathcal{P})} \quad ([\![\text{OtS}]\!]([\![\text{kind}_{2op}\text{ of tree}]\!]))$
b. $\lambda R\lambda\mathcal{P}.\forall Q[R(Q) \quad \rightarrow \mathcal{P}(Q)]\ ([\![\text{OtS}]\!]([\![\text{kind}_{2op}\text{ of tree}]\!]))$
c. $\lambda\mathcal{P}.\forall Q[[\![_{\text{OtS}}\text{ kind}_{2op}\text{ of tree}]\!](Q) \quad \rightarrow \mathcal{P}(Q)]$
d. $\lambda\mathcal{P}.\forall Q[\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge \exists v[\text{INT}^+_w(v) \wedge (\vee\text{TREE}_v](x)] \rightarrow \mathcal{P}(Q)]$

(53) a. (32) (52)

b. $\lambda\mathcal{P}.\forall Q[\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge$
$\exists v[INT^+_w(v) \wedge (\vee TREE_v](x)] \rightarrow \mathcal{P}(Q)]$ $(\lambda P.\exists y[P_w(y) \wedge EXIST_w(y)])$

c. $\forall Q[\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge \exists v[INT^+_w(v) \wedge (\vee TREE_v](x)]$
$\rightarrow \lambda P.\exists y[P_w(y) \wedge EXIST_w(y)]\ (Q)]$

d. $\forall Q[\exists R[Q = \lambda w\lambda x.(\vee R_w](x) \wedge \exists v[INT^+_w(v) \wedge (\vee TREE_v](x)]$
$\rightarrow \exists y[Q_w(y) \wedge EXIST_w(y)]$

'For every property, if it equals a property modified as a kind of tree, then it has an instance which exists in w.'

The preceding assumptions reflect that *There's every kind of N* entails the existence of instances. Merely entailing the existence of kinds would be derived by P in (52) shifting via IDENT, but this is blocked by the Variable Constraint in the manner explained in relation to (36).

In conclusion, the present analysis of *kind of N* in existential sentences diverges from McNally (1997) in that *There's a kind of N* is not ambiguous in a way which affects whether the existence of instances is entailed. Also, the present analysis maintains that *There's every kind of N* entails the existence of instances. Thus, (54) is my answer to the research question pertaining to existential sentences ((54b) is also my answer for quantificational NPs in predication).

(54) What is the Inst use of subkind-denoting NPs in existential sentences?
a. Non-quantificational: ⟦kind of N⟧ consists of rigid properties. One of their extensions is claimed to take up time (and space if relevant) in w.
b. Quantificational: Resolution of type-mismatch involving the property-level variable denoted by the trace of the raised quantificational NP.

This concludes my analysis of subkind-denoting NPs in existential sentences. The next subsection is about demonstratives built on *kind of N*.

7.3 Demonstratives

This subsection is about the (episodic) Inst use of demonstratives built on *kind of N*, repeated in (1a) below alongside the K use in (1b).

(1) a. This kind of animal is sitting on my lawn.	Inst	(Carlson 1980:§2, ex.82b)
b. This kind of animal is widespread.	K	(Carlson 1980:§3, ex.58)

(1) shows that subkind-denoting demonstratives are like bare NPs in having the Inst and K uses, so one might ask whether they too license sentential ambiguity (cf. §6). Carlson (1980:§7.4) gives a positive answer in reporting that (55) has parallel ambiguity to (56).

(55) On June 28th, God created this kind of animal. (Carlson 1980:§7.4, ex.50)
a. 'God created specimens of this kind.' Inst
b. 'God created this kind (does not entail creating specimens).' K

(56) On June 28th, God created cows. (Carlson 1980:§7.4, ex.48)
a. 'God created a number of cow specimens.' Inst
b. 'God created the cow species.' K

Recall from §6.1 that (57a) having a non-contradictory reading shows that (56) can indeed express K. Likewise, the non-contradictory reading of (57b) shows that (56) can express Inst, i.e. (56) is ambiguous.

(57) a. God created a number of cow specimens, but
it's not the case that he created cows.
(It was the devil who created specimens.)
has non-contradictory reading; negation can target K
b. Got created the cow species, but
it's not the case that he created cows.
(It was the devil who created the species.)
has non-contradictory reading; negation can target Inst

If (55) and (56) have parallel ambiguity, then the former's negation should behave as in (57). However, (58) indicates that (55) can express K but not Inst, contra the reported ambiguity in (55).

(58) a. God created a number of cow specimens, but
it's not the case that he created that kind of animal. *non-contradictory*
b. Got created the cow species, but
it's not the case that he created that kind of animal. *contradictory*

The contrast between (57b) and (58b) indicates a fundamental difference between bare NPs and subkind-denoting demonstratives, where only the former can be used to express propositions which are merely about instances. This subsection complements §6 by accounting for subkind-denoting demonstratives not licensing the sentential K-Inst ambiguity, but first I explicate the consequences of assuming that *this kind of N* can include *kind$_5$* or *kind$_{2op}$*.

Recall from §7.1 that the vast majority of participants in a survey judged that the conclusions in (38) below do not follow from the premises. I however can access an interpretation from which the conclusions follow, so §7.1 analyzes *every kind of N* as ambiguous: *Every kind$_5$ of pet* quantifies over kinds simpliciter and the conclusions follows, while *every kind$_{2op}$ of pet* quantifies over kinds as-subkinds and the conclusions do not follow.

(38) a. Premise: Every kind of pet has been eradicated.
Conclusion(?): There are no stray dogs.
b. Premise: Every kind of stray animal has been eradicated.
Conclusion(?): There are no pet dogs.

Parallel to §7.1 treating *every kind of N* as ambiguous, this section treats *this kind of N* as ambiguous in a way which affects whether the conclusion follows from the premise in (59).

(59) Premise: This kind of pet (the dog) has been eradicated.
Conclusion(?): There are no stray dogs.

The reading of (59) where the conclusion does not follow comes from *kind$_{2op}$* and *this* denoting DOG, as in (60); the latter is notated as *this$_{dr}$* (*discourse referent*). (60) shows that these elements result in a property which is only instantiated by (sums of parts of actual or intended) pets, whose eradication does not license the conclusion in (59).

(60) a.	$[\![\text{kind}_{2op}]\!]$	$([\![\text{this}_{dr}]\!])$	$([\![\text{pet}]\!])$
b.	$\lambda P\lambda Q\lambda w\lambda x.(\vee P_w](x) \wedge \exists v[\text{INT}^+{}_w(v) \wedge (\vee Q_v](x)$	(DOG)	(PET)
c.	$\lambda Q\lambda w\lambda x.(\vee \text{DOG}_w](x) \wedge \exists v[\text{INT}^+{}_w(v) \wedge (\vee Q_v](x)$		(PET)
d.	$\lambda w\lambda x.(\vee \text{DOG}_w](x) \wedge \exists v[\text{INT}^+{}_w(v) \wedge (\vee \text{PET}_v](x)$		

Next, the reading of (59) where the conclusion follows comes from *kind$_5$* and *this$_{set}$*, where the latter takes a set and returns the value of a free variable only if it is in the set, undefined otherwise. (61a) is the version of polymorphic $[\![\text{this}_{set}]\!]$ whose argument is a set of properties, and (61b) is the denotation when the free variable is assigned the value of the dog property.

(61) a. $[\![\text{this}_{\text{set}}]\!]_{(\mathcal{P})} \quad = \lambda\mathcal{P}.\begin{cases} \text{Q} & \text{if } \mathcal{P}(\text{Q}) \\ \text{undefined} & \text{otherwise} \end{cases}$

b. $[\![\text{this}_{\text{set}}]\!]_{(\mathcal{P}),\,[\text{Q} \to \text{DOG}]} = \lambda\mathcal{P}.\begin{cases} \text{DOG} & \text{if } \mathcal{P}(\text{DOG}) \\ \text{undefined} & \text{otherwise} \end{cases}$

Next, the truth of the following conjunctive subkind statement shows that the unrestricted dog property can be in ⟦kind_5 of pet⟧: *Dogs are a kind of pet and a kind of stray* (cf. §4.2.1). Thus, (61b) applied to ⟦kind_5 of pet⟧ returns the unrestricted dog property, whose eradication licenses the conclusion in (59).

As an aside, note that the semantic constituency is different in the two readings of *this kind of N*, namely [this_{set} [kind_5 N]] versus [[$\text{kind}_{2\text{op}}$ this_{dr}] N]. This however has no bearing on my assumed syntactic structure, and §7.5.3 argues that *kind* is always the syntactic head in binominals.

We come to the lack of the sentential K-Inst ambiguity. No matter which version of *kind* or *this* is used, ⟦this kind of pet⟧ is a property. Recall that in §6.3, the Inst reading of *God created cows* is derived from covert ⟦EX⟧ applying to the instance-level property ⟦cows⟧. Thus, a straightforward way to account for the lack of this reading in *God created this kind of animal* is to assume that ⟦EX⟧ is inapplicable to ⟦this kind of animal⟧. One way to achieve this is to assume that ⟦EX⟧ is applicable only in the absence of determiners, and thus it is inapplicable to due to *this*; cf. Longobardi's (1994:ex.65) principle where a DP with an empty D receives a (narrow scope) existential interpretation.

Next, recall that in §6.3 the K reading of *God created cows* is derived from ⟦NOM⟧ applying to ⟦cows⟧. To account for this reading being available with the demonstrative, I assume that ⟦NOM⟧ differs from ⟦EX⟧ in being applicable to ⟦this kind of animal⟧. This assumption can be dispensed with if the two versions of *kind* are modified so that ⟦this kind of animal⟧ is an ontological primitive rather than a property, but I continue to regard it as a property for ease of comparison with the analysis of bare NPs in §6.3. Thus, bare NPs license the K-Inst ambiguity because both ⟦NOM⟧ and ⟦EX⟧ are applicable, but subkind-denoting demonstratives do not because only ⟦NOM⟧ is applicable.

The preceding analysis accounts for subkind-denoting demonstratives not licensing the K-Inst ambiguity, and we come to their Inst use in (62).

(62) a. This kind of tree is available. (cf. Carlson 1980:§4, ex.85)
b. This kind of pet is running. (cf. ibid. ex.92)
c. This kind of pet is chasing Bill. (cf. ibid. ex.94)
d. This kind of plant is in Israel. (cf. ibid. ex.103)

As is familiar from the previous subsections, I assume that ⟦kind of N⟧ can include (or consist of) rigid properties, meaning that ⟦this kind of N⟧ can equal a rigid property. With this in mind, recall (63), the definition of ⟦NOM⟧ in §6.3 (Chierchia 1998b:ex.16).

(63) ⟦NOM⟧ = $\lambda P.{}^{\cap}P$ $<_{<s,<e,t>>,}{}^{e}>$
 (${}^{\cap}P$ defined only if every extension of P has a maximal element)
 'The function from property P to its kind-correlate.'

To account for (62), I assume that ⟦NOM⟧ is not only the function from properties to kind-correlates as in (63), but more generally the function from properties to ontological primitive correlates (Chierchia & Turner 1998, McNally 1997). Thus, ⟦NOM⟧ applied to a rigid property returns the (plural) individual in every extension of the property. Thus, my analysis of (62) is that ⟦this kind of N⟧ is a rigid property, e.g. $\lambda v \lambda y.y = b$, and ⟦NOM⟧ returns b which is the argument of the predicate. Crucially, recall from §7.1 that regardless of whether *kind₅* or *kind₂ₒₚ* is used, ⟦kind of N⟧ is true of rigid properties whose every extension is an actual or intended sum of parts of N. Thus, (64) is my analysis of (62), which predicts (correctly in my judgement) (62a) to be verified by saplings which should grow into trees, (62b–c) to be verified by merely intended pets, and (62d) to be verified by parts of plants which are not plant organisms themselves.

(64) a. ⟦This kind of tree (the oak) is available.⟧ = AVAILABLE(b)
 (b is a sum of parts of actual or intended oak trees.)
 b. ⟦This kind of pet (the dog) is running.⟧ = RUNNING(b)
 (b is a sum of parts of actual or intended pet dogs.)
 c. ⟦This kind of pet (the dog) is chasing Bill.⟧ = RUNNING(b, Bill)
 (b is a sum of parts of actual or intended pet dogs.)
 d. ⟦This kind of plant (grass) is in Israel.⟧ = IN(b, Israel)
 (b is a sum of parts of actual or intended grass organisms.)

(64) is as an alternative to Zamparelli (1998:fn.2), who regards the Inst use of subkind-denoting demonstratives as a non-grammatical inference from the K use. To paraphrase Zamparelli in relation to *This kind of animal is sitting on my lawn*, a kind cannot literally sit on a lawn, but the sentence can be uttered if the event acquires a particular significance, e.g. no animals of that kind have been on that lawn before. Under the present analysis, ⟦NOM⟧(⟦this kind of animal⟧) can literally sit on a lawn when the demonstrative denotes a rigid property which verifies ⟦kind of animal⟧. The sentences in (62) might have a felicity-condition per-

taining to event significance, but I leave this to future research. Thus, (65) is my answer to the research question for demonstratives.

(65) What is the nature of the Inst use of subkind-denoting demonstratives?
The demonstrative denotes a rigid property which satisfies ⟦kind of N⟧.

This concludes the analysis of the Inst use of subkind-denoting demonstratives. The next subsection is the conclusion.

7.4 Conclusion

Recall from §1 that the second research question of this thesis is: What is the nature of the instance-level use of subkind-denoting NPs? §4.2.4 gives the following answer for *a kind of N* in predication and existential sentences: (i) *This sapling is a kind of tree* asserts that the (rigid) property-correlate of the type-e denotation of *this sapling* is in the set-denotation of *kind of tree*, and (ii) *There's a kind of tree in the garden* asserts that the set-denotation of *kind of tree* includes a rigid property whose extensions are located in the garden. The previous subsections expand the answer by addressing *every kind of N* in predication (§7.1) and existential sentences (§7.2), as well as demonstratives like *this kind of N* (§7.3). For the latter, the assumption of §4.2.4 that ⟦kind of N⟧ can include (or consist of) rigid properties entails that ⟦this kind of N⟧ can be a rigid property, which is my analysis of the Inst use of such demonstratives.

For *every kind of N*, I assume that it must raise and leave a trace denoting a variable over properties, which causes type-mismatch in predication and existential sentences. This variable cannot shift to type <<s,<e,t>>,t> due to the Variable Constraint (Landman 2004:§3), so *There's every kind of N* cannot merely asserts the existence of kinds, and *This is every kind of N* cannot assert that the kind denoted by *this* is the only kind of N. The only way to resolve the mismatch is by extensionalizing the variable to type <e,t>, so the subject of predication can have a type-e denotation as in *Fred is every kind of doctor*, and *There's every kind of N* entails the existence of instances.

The present analysis of the Inst use of subkind-denoting NPs is an alternative to those reviewed in the appendix.

7.5 Appendix: Comments on alternative analyses

This subsection reviews aspects of existing analyses which are contrary to the present one of the Inst use of subkind-denoting NPs. §7.5.1 reviews the aspect of McNally (1997) where *There's a kind of N* has a reading which entails the existence of instances, §7.5.2 reviews the aspect of Wilkinson (1991) where *this kind of N* is ambiguous between kind- and instance-denoting, and §7.5.3 reviews the aspect of Zamparelli (1998, 2000) where the word orders in (66) are derived from the same underlying structure.

	kind-initial	*kind-final*	
(66)	a. this kind of doctor	a doctor of this kind	(2000:ex.253)
	b. every kind of doctor	a doctor of every kind	(2000:ex.255)
	c. a kind of doctor	?a doctor of a kind	(cf. 1998:ex.91)
	d. three kinds of cars	cars of three kinds	(2000:ex.209)

7.5.1 McNally (1997): Existential sentences

This subsection reviews the aspect of McNally (1997) where *There's a kind of N* has a reading which entails the existence of instances.

(44) below is ambiguous under McNally, and each reading uses a different denotation of the indefinite article.

(44) There was a kind of wine that Chris disliked. (McNally 1997:ex.199a)
a. 'There was an instance of a kind.' Inst
b. 'There was a kind (no commitment to existence of its instances).' K

First, (44a) is assumed to use a quantificational denotation of *a(n)*, which under the present formalism is (67), the version of polymorphic ⟦a(n)⟧ whose argument is a set of properties.

(67) $[\![\text{a(n)}]\!]_{(\mathcal{P})} = \lambda\mathcal{P}\lambda\mathcal{Q}.\exists R[\mathcal{P}(R) \wedge \mathcal{Q}(R)]$

Using (67) gives (68) for *There's a kind of wine* (setting aside the two possible denotations of *kind of wine*; cf. §7.1).

(68) a. $[\![\text{a(n)}]\!]_{(\mathcal{P})}$ ($[\![\text{kind of wine}]\!]$) $[\![\lambda t\ [\![\text{there}]\!]_w\ [\![t_i]\!]]\!]$
b. $\lambda\mathcal{Q}.\exists R[[\![\text{kind of wine}]\!](R) \wedge \mathcal{Q}(R)]$ $(\lambda P.\exists y[P_w(y) \wedge \text{EXIST}_w(y)])$
c. $\exists R[[\![\text{kind of wine}]\!](R) \wedge \exists y[R_w(y) \wedge \text{EXIST}_w(y)]$
'Some kind of wine has an instance in w which exists in w.'

To reiterate §7.2, the hypothesis that (68) is a reading incorrectly predicts (45) below to have a non-contradictory reading.

(45) Although Chris liked a non-extant kind of wine,
it's not the case that there was a kind of wine that Chris liked.
contradiction

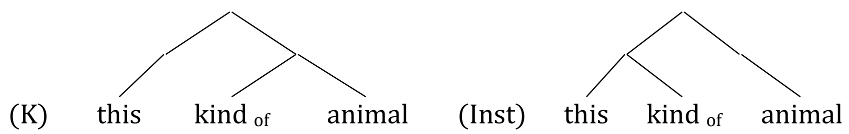
I conclude from (45) that (44) lacks reading (68), and I block it with four assumptions; the first three are from Coppock & Beaver (2015), and the fourth follows from the affinity between between predicative NPs and pivots of existential sentences (Landman 2004:§3.2.2): (i) the indefinite article *a(n)* is inert, (ii) the quantificational denotation of a nominal with *a(n)* comes from a covert type-shift (EX in §6.3), (iii) it is inapplicable in predicative positions, and (iv) the pivot of existential sentences is a predicative position.

There are two ways to accommodate McNally's judgement that *There's a kind of N* can assert the existence of instances. First, as discussed in §7.2, the existence of instances is entailed if the free variable C in ⟦kind_7⟧ is valued as a set of rigid properties. Second, even if C is not valued as such a set, one can assert the existence of instances by relying on the addressee to derive the implicature that the kind in question has instances.

Next, McNally derives the kind-level reading of *There's a kind of N* with the indefinite article denoting property-theoretic *ent* (*entity*), a typographical variant of ∩, which maps functions to their ontological primitive correlates, aka nominalized functions (Chierchia & Turner 1988). Thus, ⟦a_{ent} kind of wine⟧ denotes the nominalized function corresponding to the property of being a kind of wine. For McNally, the existential predicate asserts that a nominalized function is instantiated. Thus, *There's* a_{ent} *kind of wine* asserts the existence of a kind without entailing existence instances. An additional reading is not needed to accommodate the judgement that the sentence can assert the existence of instances, because this can be achieved via conversational implicature or resolution of vagueness.

7.5.2 Wilkinson (1991): Demonstratives

This subsection reviews the aspect of Wilkinson (1991, 1995) where *this kind of N* is ambiguous between kind- and instance-denotation, which is proposed to correspond to the syntactic ambiguity in Figure 16.



'this kind, which is a kind of animal' 'specimens of this kind of animal'
Figure 16: Wilkinson's (1991:§2.4) syntax

As seen in Figure 16, Wilkinson proposes that the noun is the head in the Inst use of *this kind of animal*. This is meant to parallel how *dresses* is the head in *what size dresses*, as indicated by the plural agreement in (69a) (§2, ex.53a). However, the Inst use of *this kind of glasses* can have the verb agree with *kind*, as in (69b). Thus, Wilkinson's evidence for the syntactic structure of *what size dresses* does not extend to that of the Inst use of *this kind of animal*, so I do not adopt this aspect of her analysis.

(69) a. What size dresses {*is, are} left in stock? (Wilkinson 1991:§2, ex.53a)
b. This kind of glasses is left in stock.

Wilkinson's semantic analysis relies on *this* having the two denotations in (70), which differ in whether the output is of type <<e,t>,t> or e.[23]

(70) a. $[\![\text{this}_1]\!] = \lambda X \lambda Y.X(z) \wedge Y(z)$ <<e,t>,<<e,t>,t>> (ibid. ex.25)
b. $[\![\text{this}_2]\!] = \lambda X.\iota\lambda y[X(z) \wedge z = y]$ <<e,t>,e> (ibid. ex.29)

Wilkinson's analysis of kind-denoting *this kind of animal* is in Figure 17, where superscript *o* and *k* stand for *object* and *kind* respectively. The demonstrative denotes the function from kind-level predicates to the proposition that the predicate is true of z^k, which is a kind of animal.

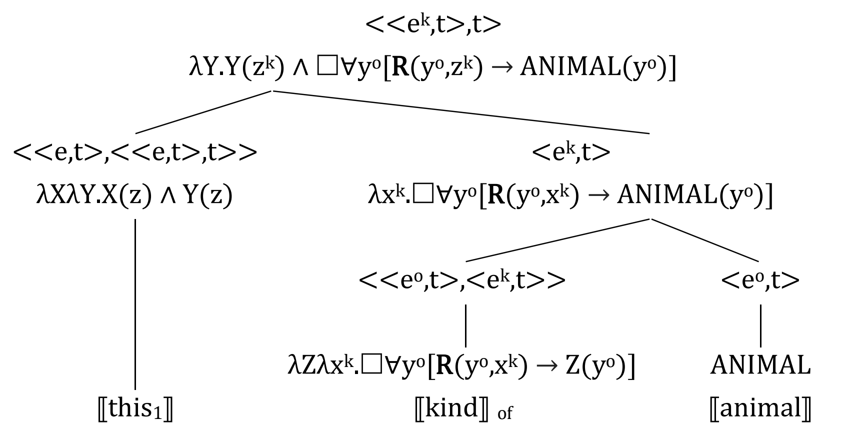


Figure 17: Wilkinson's (1991:§2) K use of *this kind of animal*.

[23] Wilkinson's notation (below) gives the impression that she intends the inputs to be of type <s,<e,t>>, but in ex.57 it is apparent that they are intended as type <e,t>, otherwise the function composition in Figure 18 would fail.
a. $[\![\text{that}_1]\!] = \lambda P \lambda Q.{}^{\vee}P(z) \wedge {}^{\vee}Q(z)$ (ex.25)
b. $[\![\text{that}_2]\!] = \lambda Q.\iota\lambda y[{}^{\vee}Q(x) \wedge y = x]$ (ex.29)

Next, Wilkinson's analysis of instance-denoting *this kind of animal* appeals to the covert predication operator in (71), where π(x) is the type <e,t> correlate of x (p.94).

(71) $[\![\text{PRED}]\!] = \lambda x \lambda y.\pi(x)(y)$ $<e,<e,t>>$

Wilkinson offers two analyses of instance-denoting *this kind of animal*, which differ in whether *kind* has an intransitive denotation. Here I present the one where it does not, summarized in Figure 18 and explained afterwards (*fc* stands for *function composition*).

$<e^o,t>$
$\lambda d.\pi(\iota\lambda y^k[z^k = y^k \wedge \Box\forall u^o[\mathbf{R}(u^o,z^k) \rightarrow \text{ANIMAL}(u^o)]])(d)$

$<<e^o,t>,<e^o,t>>$
$\lambda X\lambda d.\pi(\iota\lambda y^k[z^k = y^k \wedge \Box\forall u^o[\mathbf{R}(u^o,z^k) \rightarrow X(u^o)]])(d)$

$<e^o,t>$
ANIMAL

fc

$<<e^o,t>,e^k>$
$\lambda Z.\iota\lambda y^k[z^k = y^k \wedge \Box\forall u^o[\mathbf{R}(u^o,z^k) \rightarrow Z(u^o)]]$

$<e^k,<e^o,t>>$
$\lambda x\lambda d.\pi(x)(d)$

fc

$<<e,t>,e>$ $\quad$ $<<e^o,t>,<e^k,t>>$

$\lambda X.\iota\lambda y[z = y \wedge X(z)]$ $\quad$ $\lambda Y\lambda x^k.\Box\forall u^o[\mathbf{R}(u^o,x^k) \rightarrow Y(u^o)]$

$[\![\text{this}_2]\!]$ $\quad$ $[\![\text{kind}]\!]_{\text{of}}$ $\quad$ $[\![\text{PRED}]\!]$ $\quad$ $[\![\text{animal}]\!]$

Figure 18: Wilkinson's (1991:§2) Inst use of *this kind of animal*.

In Figure 18, *this kind of animal* denotes the predicate of being an instance of z^k, whose every realization is an animal specimen. Thus, if z^k is valued as the cow kind, the denotation is equivalent to COW.

In conclusion, Wilkinson regards *this kind of N* as ambiguous between kind- and instance-denoting. I also regard it as ambiguous, but between whether it denotes a kind simpliciter or a kind as a subkind, and both denotations have the K and Inst uses. My main reason for rejecting Wilkinson's ambiguity is that it incorrectly predicts (57b) below to have a non-contradictory reading, under which *that kind of animal* denotes COWS and the second clause asserts that God did not create cow specimens.

(57b) Got created the cow species, but
it's not the case that he created that kind of animal. *contradictory*

7.5.3 Zamparelli (1998, 2000): Word order

This subsection discusses the aspect of Zamparelli (1998, 2000) where the word orders in (66) below are derived from the same underlying structure.

	kind-initial	*kind-final*	
(66)	a. this kind of doctor	a doctor of this kind	(2000:ex.253)
	b. every kind of doctor	a doctor of every kind	(2000:ex.255)
	c. a kind of doctor	?a doctor of a kind	(cf. 1998:ex.91)
	d. three kinds of cars	cars of three kinds	(2000:ex.209)

Focusing on (66b), Figure 19 is based on Zamparelli (2000:ex.304) (cf. Moro 2000:§3.2.2): *Of* complements a constituent made of [book] and [every kind], and each word order in (66b) results from a different raising (KI = kind, SD = strong determiner; I set aside the landing sites).

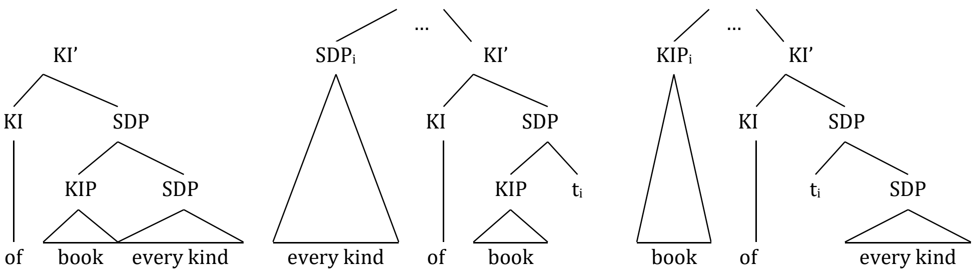


Figure 19: Zamparelli (2000:ex.304).

A challenge to the aspect of Figure 19 where [every kind] is a constituent is how to relate *every type of book* to *every book type*. By contrast, if *every* complements a constituent with [book] and [type], the presence of the preposition can be attributed to their order. At any rate, Zamparelli (1998:ex.88) does not treat [this kind] as a constituent in *this kind of tiger*.

I do not know of semantic analyses based on Figure 19, but the syntax of Zamparelli (1998) comes with semantics. However, §5.1.2 argues against the aspect of his analysis where *of* in *kind of N* is the partitive preposition. Another aspect is that *kind* denotes a maximality operator which must operate on a set of kinds (§4.1.2). This is far removed from the semantics of *kind* in §4–5, so I set it aside. Instead, I discuss the idea that the word orders in (66) are derived from the same underlying structure.

One argument for Zamparelli's (2000) analysis is his conclusion from (72) (ex.210) that both word orders in (66d) can refer to kinds or instances.

(72) a. Three kinds of dogs {used to be common, suddenly appeared on my lawn}.
b. Dogs of three kinds {used to be common, suddenly appeared on my lawn}.

Zamparelli concludes from the felicity of *common* in (72b) that *dogs of three kinds* can be kind-referring. However, *common* is not as restrictive as other kind-level expressions (Krifka et al. 1995:§1.4.1). The next paragraph discusses (73), with the more restrictive *widespread* and *come in several versions*.

(73) a. Three kinds of dogs {are widespread, come in several versions}.
b. Dogs of three kinds {are widespread, come in several versions}.

My initial judgement of (73b) is that it is odd due to claiming of dog specimens (which instantiate three kinds of dogs) that they are widespread or come in several versions. However, I concede that with some effort, I can interpret (73b) as intuitively equivalent in (73a). I hypothesize that this interpretation comes from [$_{\text{subk}}$ dog], which can occur in count but not mass morphosyntax (cf. §2.3). This predicts that kind-reference should be impossible with a mass noun in the *kind*-final word order, as is borne out by my rejection of (74b). The difference in number agreement is discussed in relation to (77).

(74) a. Many kinds of wine were invented in Italy.
b. #Wine of many kinds was invented in Italy.

Next is an additional argument that the *kind*-final order cannot be kind-referring. The background is that in a survey, I asked participants whether they could describe a state of affairs where (75) is true, and I received the two sorts of answers in (75a–b).

(75) Titanium was discovered in Cornwall, but at the time of discovery there was no titanium in Cornwall.
a. Data regarding titanium located outside of Cornwall was analyzed in Cornwall, leading to the discovery of the element.
b. The element titanium was discovered in Cornwall theoretically, e.g. by filling in a gap in the periodic table.

The hypothesis that *metal of that kind* can be kind-referring predicts that replacing it with the first occurrence of *titanium* in (75) should have a true reading relative to the states of affairs in (75). This is not borne out by the judgement that (76b) is contradictory, contra (76a) (with the *kind*-initial order) being true in the states of affairs in (75).

(76) Even though at the time of discovery there was no titanium in Cornwall,
  a. that kind of metal was discovered in Cornwall. *has contingent reading*
  b. metal of that kind was discovered in Cornwall. *contradiction*

Zamparelli (1998:§5) writes that a potentially serious drawback to his analysis is that in BNC (BNC Consortium 2007), the agreement pattern in *those kinds of tiger* is attested while that in *a tiger of those kinds* does not. A related drawback is that the grammatical number of the *kind*-initial order is determined by *kind*, whereas that of the *kind*-final order is determined by the noun, as shown in (74) and (77).

(77) a. {#this, these} different kinds of wine
  b. {this, #these} wine of different kinds

Related to (77) is the fact that *kind* binominals are countable, whereas the countability of the *kind*-final order is inherited from the noun. This is shown in (78) with the uncountable *shallows* 'shallow water' (#*two shallows*).

(78) a. two different kinds of shallows
  b. #two shallows of different kinds

An alternative to Zamparelli's analysis is that the *kind*-initial and -final orders have different underlying structures, as in Wilkinson (1991:§2). One of Zamparelli's (2000:§3.1) opposing arguments is that Wilkinson stipulates that *of* is inert in *kind*-initial but meaningful in *kind*-final. This stipulativity is reduced by the prepositions being non-homophonous in Hebrew, (79), which gives reason to posit that in English they are accidental homophones. Moreover, the preposition in (79b) is glossed as the non-inert *from*, which lends credence to the aspect of Wilkinson where *of* is meaningful in the *kind*-final order.

(79) a. sugím ʃoním ʃel yáin *kind-initial*
  kinds different of wine
  'different kinds of wine'
  b. yáin mi- sugím ʃoním *kind-final*
  wine of/from kinds different
  'wine of different kinds'

The three differences discussed in this subsection between the word orders are summarized in (80), where (80a) is the conclusion from relatively restrictive kind-level expressions (*widespread*, *come in several versions*).

		kind-initial	*kind-final*
(80)	a.	can be kind-referring	cannot be kind-referring
	b.	number depends on *kind*	number depends on noun
	c.	countable	countability depends on noun

I conclude from (80) that *kind*-binominals are syntactically headed by *kind*, whereas the *kind*-final order is syntactically headed by the noun. Thus, I reject the aspect of Zamparelli (1998, 2000) where the two constructions are derived from the same underlying structure.

Further doubt regarding a shared underlying structure of the word orders is cast by gender in Dutch. (81a) shows via relative pronouns that the *type*-initial order has the neuter gender of *type* 'type', even with a non-neuter noun like *auto* 'car'. By contrast, (81b) shows that the *type*-final order can have this non-neuter gender, alongside the neuter gender of *type* 'type'.

(81) a. dat type auto {#die, dat}
that$_{n}$ type$_{n}$ car$_{mf}$ that$_{\{mf, n\}}$
in 1990 op de markt kwam
in 1990 on the market came
'that type of car that came on the market in 1990'

b. de eerste auto van dat type {die, dat}
the$_{mf}$ first car$_{mf}$ of that$_{n}$ type$_{n}$ that$_{\{mf, n\}}$
in 1990 op de markt kwam
in 1990 on the market came
'the first car of that type that came on the market in 1990'

Recall that the research question of this section is: What is the nature of the instance-level use of subkind-denoting NPs? (80) indicates that cases like *N of different kinds* are basically instance-denoting, so the research question is less applicable to such NPs.

This concludes the section which has answered the second (and last) research question of the thesis. The next section concludes the thesis, and the one after that raises further research questions about [$_{subk}$ N].

8 Conclusion

This thesis addresses the research questions in (1), which I identify as central to the topic of reference to subkinds.

(1) a. What is the principle for the availability of the subkind reading of nouns?
    b. What is the nature of the instance-level use of subkind-denoting NPs?

My answer to (1b) in §4.2.4 and §7 is divided in two; the first half is for (2) (with *every*), and the second is for (3) (without *every*).

(2) a. Fred is every kind of doctor. *predication*
    b. There was every kind of local wine. *existential sentence*

(3) a. This blade of grass is a kind of plant. *predication*
    b. There's a kind of tree in the garden. *existential sentence*
    c. This kind of pet is sitting on my lawn. *demonstrative*

My answer to (1b) for (2) is that *every kind of N* must raise and leave a trace denoting a variable over properties, which causes type-mismatch in the constructions in (2) (predication and existential sentences). This variable cannot shift to type <<s,<e,t>>,t> due to the Variable Constraint (Landman 2004:§3), so *There's every kind of N* cannot merely asserts the existence of kinds, and *This is every kind of N* cannot assert that the kind denoted by *this* is the only kind of N. The only way to resolve the mismatch is by extensionalizing the variable to type <e,t>, so the subject of predication can have a type-e denotation as in (2a), and (2b) entails the existence of instances.

Next, my answer to (1b) for (3) appeals to the vagueness of *kind of N* illustrated in (4).

(4) There are exactly two kinds of animals in this room.
    [The set of animal specimens in this room is {🦅$_1$, 🦅$_2$, 🦉, 🐊}.]
    a. True with the continuation *namely birds and reptiles*.
    b. False with the continuation *namely eagles, owls and alligators*.

I propose that as part of the vagueness of *kind of N*, its set-denotation can include (or consist of) rigid properties which verify ⟦kind of N⟧ to the same extent as property-correlates of kinds. Thus, (3a) asserts of the rigid property whose every extension is the blade of grass that it verifies ⟦kind of plant⟧, (3b) asserts of a rigid property which verifies ⟦kind of tree⟧ that the members of its extension take up space in the garden, and (3c) asserts of a rigid property which verifies ⟦kind of pet⟧ that the members of its extension are sitting on the lawn.

As part of answering (1b), I answer (5).

(5) What are the truth-conditions of sentences of the form:
Oaks are a kind of tree. Grass is a kind of plant.

§4 focuses on the aspect of (5) where the superkind need not include the subkind, exemplified in (6).

(6) a. Oaks are a kind of tree.
true although not every oak specimen is a tree specimen
b. Grass is a kind of plant.
true although not every bit of grass is a plant organism
c. Dogs are a kind of pet.
true although not every dog specimen is a pet

(7) indicates that the non-inclusion in (6) is non-uniform. Specifically, the non-entailment in (7a.i) reveals that the truth of (6a) relies on restricting the oak kind to not be instantiated by bush specimens, and (7a.ii) reveals that the truth of (6c) relies on restricting the pet kind to not be instantiated by strays. By contrast, the entailments in (7b–c) indicate that the truth of (6b–c) does not rely on inclusion, e.g. the grass kind can be instantiated by parts of plants which are not plants themselves, and the pet kind can be instantiated by merely intended pets.

(7) a. i. There's an oak bush in the garden. ⇏ There's a kind of tree in the garden.
ii. There's a stray dog on the street. ⇏ There's a kind of pet on the street.
b. There's a blade of grass in this lawnmower bag.
⇒ There's a kind of plant in this lawn mower bag.
(⇏ There's a plant specimen in this lawn mower bag.)
c. There's a dog up for adoption in this shelter.
⇒ There's a kind of pet in this shelter.
(⇏ There's a pet specimen in this shelter.)

§4 gives a denotation of binominal *kind* which accounts for (7), which involves existential sentences. This denotation also accounts for facts regarding non-quantificational predication and demonstratives, e.g. (3a) is true despite blades of grass not being plant organisms, and (3c) is verified (under one reading) by merely intended pets sitting on the lawn.

To conclude (1b), it is my hope that this thesis constitutes a step forward in the study of the instance-level use of subkind-denoting NPs.

Backtracking to the first research question, my answer to (1a) is in (8). In words, $[_{\text{subk}}$ N$]$ is felicitous iff $[\![_{\text{inst}}$ N$]\!]$ has a classified sub-property which is spread over by a set of properties which are the intensions of lexical nominals in the language of N. Thus, $[_{\text{subk}}$ virtue$]$ is felicitous because the property of classified virtue (which precludes sums of virtue of multiple kinds) is spread over by a set of properties denoted by English nouns, e.g. *courage*. By contrast, $[_{\text{subk}}$ courage$]$ is infelicitous to the extent that there is no classified sub-property of $[\![_{\text{inst}}$ courage$]\!]$ which is spread over by a set of such properties.

(8) N is a noun in language L. Its intension under the instance reading is $[\![_{\text{inst}}$ N$]\!]$.
$\mathbb{C}_M$ is the model's set of ways of classification. $[_{\text{subk}}$ N$]$ is felicitous iff
a. For some $\mathbb{c} \in \mathbb{C}_M$
b. $[\![_{\text{inst}}$ N$]\!]_{\mathbb{c}}$ is spread over by a set of properties $\mathcal{R}$ s.t.
c. every $Q \in \mathcal{R}$ is denoted by a lexical nominal in L

Leading up (8), §2 is an introduction to $[_{\text{subk}}$ N$]$ which is continued in §5 by comparing $[_{\text{subk}}$ N$]$ to *kind of N*. This comparison reveals the differences in (9), which are not accounted for in this thesis.

(9) a. Dogs are a ?(kind of) pet.
b. Caged dogs are a widespread #(kind of) dog.

(9) raises the question: What underlies these differences between $[_{\text{subk}}$ N$]$ and *kind of N*? The next section concludes the thesis by raising additional questions about $[_{\text{subk}}$ N$]$.

9 Further issues on [$_{\text{subk}}$ N]

This section raises issues for future research on [$_{\text{subk}}$ N]. §9.1 is about grammatical animacy and gender, §9.2 is about lexical plurals, and §9.3 is about subkind-denoting bare plurals as direct objects.

9.1 The subkind reading of nouns, animacy and gender

§2.3 shows that grammatical animacy and gender behave differently with respect to [$_{\text{subk}}$ N] in Hebrew. First [$_{\text{subk}}$ N] is inanimate even if [$_{\text{inst}}$ N] is animate, as (1) shows for *kélev* ‘dog. Specifically, *ha-kélev haxí popolári* ‘the most popular dog’ built on [$_{\text{subk}}$ dog] cannot answer *mí* ‘who’ (animate), but it can answer *má* ‘what’ (unspecified for animacy).

(1) a. et mí máks xakár? et ha- kélev haxí popolári.
def.do who Max studied? def.do def dog most popular
‘Who did Max study? The most popular dog {×breed, √specimen}.’
b. et má máks xakár? et ha- kélev haxí popolári.
def.do what Max studied? def.do def dog most popular
‘What did Max study? The most popular dog {√breed, √specimen}.’

Although [$_{\text{inst}}$ N] and [$_{\text{subk}}$ N] can differ in animacy, they necessarily have the same gender. (2a–b) shows that [$_{\text{subk}}$ kélev] ‘dog’ is masculine, like [$_{\text{inst}}$ kélev], and (2c) shows that [$_{\text{subk}}$ ʦfardéa] ‘frog’ is feminine, like [$_{\text{inst}}$ ʦfardéa].

(2) a. ha- akíta hu kélev nafóʦ.
the Akita is$_{\text{msc}}$ dog$_{\text{msc}}$ common$_{\text{msc}}$
‘The Akita is a common dog.’
b. #ha- akíta hi kalbá nefoʦá.
the Akita is$_{\text{fem}}$ dog$_{\text{fem}}$ common$_{\text{fem}}$
c. ha- ilanít hi ʦfardéa nefoʦá.
the treefrog is$_{\text{fem}}$ frog$_{\text{fem}}$ common$_{\text{fem}}$
‘The treefrog is a common frog.’

The different effect of animacy and gender on [$_{\text{subk}}$ N] is summarized in (3); [$_{\text{subk}}$ N] can differ in animacy from [$_{\text{inst}}$ N], specifically when the latter is [+animate], but [$_{\text{subk}}$ N] cannot differ in gender from [$_{\text{inst}}$ N].

		animacy		gender	
		[$_{\text{inst}}$ N]	[$_{\text{subk}}$ N]	[$_{\text{inst}}$ N]	[$_{\text{subk}}$ N]
(3)	a. *kélev* 'dog'	[+animate]	[−animate]	masculine	masculine
	b. *tsfardéa* 'frog'	[+animate]	[−animate]	feminine	feminine

(3) raises the question: What is the relevant difference between grammatical animacy and gender which causes [$_{\text{subk}}$ N] to be uniform in animacy but non-uniform in gender? An answer could offer insight into [$_{\text{subk}}$ N] in addition to what is offered by this thesis.

9.2 The subkind reading of lexical plurals

The survey in §3.5.1 had fillers which constituted three experiments. One sought to check whether the contexts in (4) affect the preference between the pairs in (5), consisting of inflectional and lexical plurals (Acquaviva 2004, 2008:§2, Ojeda 2005, Gardelle 2016, Mackenzie 2019). The goal of this experiment was to serve as a filler to the that in §3.5.1, and I had no predictions for the results.

(4) a. I wonder what the most widespread ______ are.
    b. On the way back, we saw some interesting ______.

	inflectional	*lexical*	*inflectional*	*lexical*
(5)	a. assets	valuables	b. commodities	goods
	c. fixtures	furnishings	d. garments	clothes
	e. grocery items	groceries	f. side dishes	fixings
	g. vegetables	greens	h. weapons	munitions

The present filler experiment consisted of word preference tasks where participants chose which option among the pairs in (5) they prefer in the blank spaces in (4) by selecting between 1 and 7. See §3.5.1 for full details. The mean ratings of the 2 contexts in (4) are in Figure 20, and those of the 8 pairs in (5) are in Figure 21 (closeness to 1 is preference for inflectional, closeness to 7 is preference for lexical).

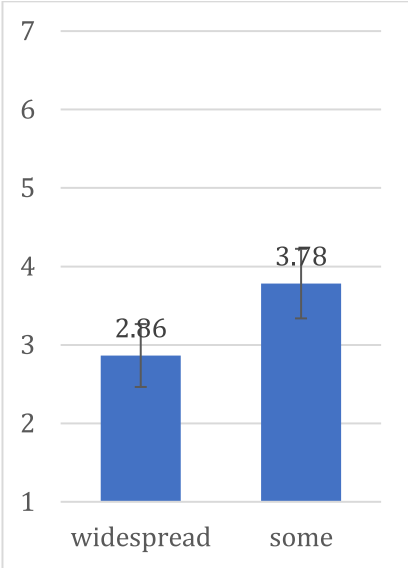


Figure 20: Mean ratings with 95%-confidence intervals.

	widespread	some
assets-valuables	2.75	5.42
commodities-goods	3.42	4.58
fixtures-furnishings	3.50	4.08
garments-clothes	2.92	4.08
grocery items-groceries	2.33	2.08
side dishes-fixings	2.17	2.08
vegetables-greens	2.25	2.67
weapons-munitions	3.58	5.25
	2.86	3.78

Figure 21: Mean ratings of pairs.

The statistical test in §3.5.1 finds a nearly-significant difference between the means (p=.0538), (6).

	Context 1	mean	*SD*	Context 2	mean	*SD*	t(6.74)	p
(6)	widespread	2.86	0.4	some	3.78	0.44	2.333	.0538

(7) summarizes (6) as a judgement regarding *valuables-assets*: There is no contrast in the instance-referring context (4b), but *assets* is a little better in the subkind-referring context (4a).

(7) a. I wonder what the most widespread {assets, ?valuables} are.
b. On the way back, we saw some interesting {assets, valuables}.

As mentioned at the outset, I had no predictions for the results of this experiment, so I had no plans for how to interpret (6). It is puzzling in light of the results of the main experiment, which did not find a contrast between the pairs in (8) in the same contexts in (4).

	countable	*uncountable*	*countable*	*uncountable*
(8)	a. wild animals	wildlife	b. sea animals	sealife
	c. farm animals	livestock	d. farm birds	poultry
	e. plants	vegetation	f. vegetables	produce
	g. machines	machinery	h. weapons	weaponry
	i. bullets	ammunition	j. suitcases	luggage
	k. shoes	footwear	l. hats	headgear

In conclusion, lexical plurals as in (5) are a class of nouns for which one might wonder whether they can have the subkind reading. The present (filler) experiment gauges this by comparing them to inflectional (near-)synonyms, and it was found that on average, the preference for the inflectional is greater when the NP is subkind-referring as opposed to instance-referring, (7). I do not know what to make of this finding, especially in light of the results of the main experiment, and I leave this to future research.

9.3 Kind- vs. subkind-reference of bare plurals as direct objects

A prediction of §2.3 is that if a noun has access to the subkind reading, then it should maintain that access in any case of count morphosyntax. Bare plurals in English occur in count morphosyntax, and those in (9) and (11) indeed reportedly have access to the subkind reading. Given that bare plurals in English can also be kind-denoting (cf. §6), one might expect sentential ambiguity in (9) and (11) between kind- and subkind-reference. This is borne out in (11) but not (9), which suggests that kind-reference is limited in a manner absent from subkind-reference.

Krifka et al. (1995) report that kind-referring bare plurals are not normally accepted in the object position of *invent* and *exterminate*, indicated by ? in (9.i). They also report that the bare plurals are interpretable as subkind-referring, indicated by √ in (9.ii).

(9) a. Shockley invented transistors. (Krifka et al. 1995:ex.112c)
  i. ? 'Shockley invented transistors as a kind.'
  ii. √ 'Shockley invented a number of kinds of transistors.'
 b. The French settlers in Mauritius exterminated dodos. (ibid. ex.112e)
  i. ? '…exterminated the dodo genus.'
  ii. √ '…exterminated a number of kinds of dodos.'

In Schoenfeld (to appear), I argue that the degradation of kind-reference in (9) is predicted by the Transitivity Hypothesis of Hopper & Thompson (1980), which predicts that in clauses describing actions with totally affected objects, a definite singular object should be better than a plural non-definite one. The notion of a totally affected object is relevant to (9) in that under kind-reference, the transistor kind is totally affected by the inventing action described in (9a), and the dodo genus is totally affected by the extermination action described in (9b). This analysis suggest that subkind-reference is more felicitous in (9) due to decreasing affectedness: Under subkind-reference, the transistor kind is only partially affected by the inventing action described in (9a), and the dodo genus is only partially affected by the extermination action described in (9b).

For Hopper & Thompson, the three following features (aka markers of high Transitivity) increase the likelihood of a clause receiving a sequential interpretation (Kalmár 1982), under which it is temporally ordered with surrounding clauses: (i) totally affected object, (ii) definite object and (iii) singular object. Under this analysis, the degradation of kind-reference in (9) stems from a clash between two tendencies: (i) clauses with plural non-definite objects tend to be non-sequential, and (ii) clauses with totally affected objects tend to be sequential. By contrast, these tendencies clash less with subkind-reference due to the decreased affectedness of the object.

Appealing to sequentiality predicts that kind-reference in (9) should be improved by precluding sequentiality, e.g. by using the present perfect instead of the simple past, whose difference in sequentiality is shown in (10) (cf. de Swart 2006:ex.3).

(10) a. John saw me and then he got frightened. *simple past*
 b. John has seen me # and then he got frightened. *present perfect*

Presently, I lack data on whether kind-reference in (9) is improved by the present perfect. However, the prediction from sequentiality is (partially) borne out by Husband (2019) reporting kind-reference as accessible (alongside subkind-reference) in (11), with the present perfect. I write *partially*, because

Husband also reports kind-reference as accessible in *The company patented androids*, with the simple past.

(11) The medical community has eradicated viruses. (Husband 2019:ex.7a)
  a. '…eradicated viruses as a kind.' *kind*
  b. '…eradicated a number of kinds of viruses.' *subkind*

(11) serves as a good reminder for how reference to subkinds (the topic of this thesis) differs from the closely-related topic of reference to kinds. The latter manifests in NPs denoting the kind corresponding to their descriptive content, e.g. *viruses* in (11a) denotes the virus kind, while the former manifests in NPs ranging over subkinds of that kind, e.g. *viruses* in (11b) existentially quantifying over kinds of viruses.

In conclusion, this thesis addresses two questions which I identify as central to the topic of reference to subkinds: What is the principle for the availability of the subkind reading of nouns? What is the nature of the instance-level use of subkind-denoting NPs? It is my hope that in answering these questions, I have provided clarity and insight into the topic of reference to subkinds.

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Web examples

§	ex.	retrieved / corpus	webpage
2	(10a)	16/6/2022	https://adlerastrojournalists.wordpress.com/2018/08/07/lions-and-baboons-and-birds-oh-my/
2	(10b)	16/6/2022	https://www.patheos.com/blogs/geneveith/2017/03/all-mammals-can-swim-except-for-two/
2	(40a)	22/6/2022	https://www.babycenter.com/family/hear-from-moms/the-5-worst-and-3-best-pets-for-kids-that-arent-cats-or-dogs_20001912
2	(40b)	22/6/2022	https://www.thedailystar.net/country/the-love-finches-1420834
2	(40c)	enTenTen15	http://mtv-play4climate.org/2014/12/08/birds-singing/
2	(40d)	22/6/2022	https://www.bbc.com/news/av/business-49774840
2	(42a)	23/6/2022	http://www.messaggiamo.com/music/41477-performance-and-gigs.html
2	(42b)	23/6/2022	http://artandperception.com/2007/09/two-kinds-of-artists.html
2	(61)	23/6/2022	https://www.holbrooktravel.com/blog/help-shelldon-tour-de-turtles
3	(6)	23/6/2022	https://www.sothebys.com/en/slideshows/the-top-20-diamonds-and-jewels-of-2017
3	(14)	23/6/2022	https://www.npr.org/2016/10/20/497840066/in-iq-a-sherlock-for-south-central
3	(20)	23/6/2022	https://ezinearticles.com/?The-History-Of-Knives---Learn-Where-It-All-Started&id=789979
3	(21)	18/7/2022	https://steamcdn-a.akamaihd.net/steam/apps/392330/manuals/TC2M_Game_Manual.pdf?t=1484674828
3	(37a)	22/6/2022	https://www.bbc.com/news/av/business-49774840
3	(37b)	enTenTen15	http://richieneal2012.org/category/desserts/page/2/
5	(7)	24/12/2022	https://scienceline.org/2014/06/migrating-to-the-city/
5	(11a)	23/6/2022	http://www.messaggiamo.com/music/41477-performance-and-gigs.html

5	(11b)	23/6/2022	http://artandperception.com/2007/09/two-kinds-of-artists.html
5	(14a)	22/6/2022	https://www.bbc.com/news/av/business-49774840
5	(14b)	enTenTen15	http://richieneal2012.org/category/desserts/page/2/
5	(28a.i)	24/6/2022	https://www.furman.edu/academics/biology/student-experiences/dragonflies/
5	(28a.ii)	24/6/2022	https://news.ycombinator.com/item?id=6707666
5	(28b.i)	24/6/2022	https://quizlet.com/80449756/sts-1500-final-flash-cards/
5	(28b.ii)	24/6/2022	https://newspaperarchive.com/altoona-mirror-jul-17-1954-p-20/
6	(10a.i)	24/6/2022	https://factsanddetails.com/china/cat12/sub78/item279.html
6	(10a.ii)	24/6/2022	https://www.worldhistory.org/Greek_Architecture/
6	(10b.i)	24/6/2022	https://www.manhattanprep.com/lsat/forums/q24-until-recently-it-was-thought-t1321.html
6	(10b.ii)	24/6/2022	https://www.manhattanprep.com/lsat/forums/q24-until-recently-it-was-thought-t1321.html
7	(25)	24/6/2022	https://provisionfinancialplanning.com/fiduciary-financial-advisor-may-not-mean-what-you-think/
7	(35b)	24/6/2022	https://www.fesi.eu/uploads/pdf/ttc-9_metal_corrosion.pdf

תקציר

התזה הזאת עוסקת בצירופים עם שם עצם שמשמשים לדיבור על תתי-סוגים של הסוג שמקביל לשם העצם. למשל, הצירוף *סוג הכלב הזה* כולל את שם העצם *כלב*, והוא יכול לשמש לדיבור על גזע מסוים של כלבים, למשל הבולדוג. התזה הזאת עונה על שתי שאלות מחקר בנוגע לצירופים כאלה.

הרקע לשאלה הראשונה הוא ששמות עצם מסוימים יכולים לשמש לדיבור על תתי-סוגים מבלי להתחבר ל-*סוג*, כמו *כלב* ב-*הכלב הכי נפוץ*. ל-*תלמיד* לעומת זאת אין את התכונה הזאת. להמחשה, *מעניין איזה תלמיד הכי פופולרי* לא יכול להתפרש בתור 'מעניין איזה סוג של תלמיד הוא הכי פופולרי.' שאלת המחקר הראשונה היא: מה קובע אילו שמות עצם יכולים לשמש לדיבור על תתי-סוגים ללא *סוג*? התשובה קשורה ל: (כמעט) כל פריט של ציפור שייך לסוג של ציפור ששמו הוא שם עצם, אבל לא כל תלמיד שייך לסוג של תלמיד ששמו הוא שם עצם. למשל, פריטים של עורבים שייכים לסוג של ציפור ששמו הוא שם העצם *עורב*, אבל תלמידי כיתה א' ותלמידי BA לא בהכרח שייכים לסוג של תלמיד ששמו הוא שם עצם (בהינתן ש-*תלמיד כיתה א'* ו-*תלמיד BA* הם לא שמות עצם כמו *עורב*).

הרקע לשאלת המחקר השנייה הוא שצירופים מסוימים יכולים לשמש לדיבור על סוגים או פריטים. למשל, *סוג של עץ* משמש לדיבור על סוג ב-*האלון הוא סוג של עץ*, אבל הוא משמש לדיבור על פריט ב-*השתיל הזה (🌱) הוא סוג של עץ*. בדומה לכך, *סוג הכלב הזה* משמש לדיבור על סוג ב-*סוג הכלב הזה הוא נפוץ*, אבל הוא משמש לדיבור על פריטים ב-*סוג הכלב הזה רדף אחריי*. שאלת המחקר השנייה היא: מהו הטבע של השימוש בצירופים כאלה לדיבור על פריטים? התשובה מחולקת לשניים; החצי הראשון עוסק ב-(1) (עם *כל*), והשני עוסק ב-(2) (בלי *כל*).

(1) א. פרד הוא כל סוגי הרופאים. *פרדיקציה*
ב. יש את כל סוגי היין במסעדה. *משפט ישי*

(2) א. השתיל הזה (🌱) הוא סוג של עץ. *פרדיקציה*
ב. יש סוג של עץ בגינה. *משפט ישי*
ג. סוג הכלב הזה רדף אחריי. *כינוי רמז*

התשובה לשאלת המחקר השנייה עבור (1) עוסקת באינטראקציה בין המשמעות של *כל* לשני המבנים ב-(1) (פרדיקציה ומשפטים ישיים).

התשובה לשאלת המחקר השנייה עבור (2) קשורה ל: בשימוש צירופים כמו *סוג של בעל חיים*, יכולה להיות אי-בהירות בנוגע לאילו סוגים מתייחסים. למשל, כשפריטי בעלי החיים בחדר הם 🦅$_1$, 🦅$_2$, 🦉, 🦖, שתי תשובות אפשריות ל-*כמה סוגי בעלי חיים יש בחדר* הם: *שתיים (ציפורים וזוחלים)*, ו-*שלוש (נשרים, ינשופים ותנינים)*. אני מציע שכחלק מאי-הבהירות הזאת, אפשר להשתמש ב-*סוג של בעל חיים* לדיבור על פריטים שחולקים תכונות מסוימות עם סוגים של בעלי חיים.

כחלק משאלת המחקר השנייה, אני עונה על השאלה: מהו יחס התת-סוג? במילים אחרות, מהי המשמעות של משפטים במבנה של *האלון הוא סוג של עץ* ו-*דיג הוא סוג של ספורט*? חלק מהתשובה היא שהמשפטים מביעים שקיים הסבר לכך שפריטים של התת-סוג שייכים לסוג-העל. למשל, המשפט הראשון מביע שקיים הסבר לכך שפריטים של עצי אלון הם עצים (ולא שיחים).

אוניברסיטת תל-אביב
הפקולטה למדעי הרוח ע"ש לסטר וסאלי אנטין
ביה"ס לפילוסופיה, בלשנות ולימודי מדע

הוראה על תתי-סוגים

חיבור זה הוגש לשם קבלת התואר" דוקטור לפילוסופיה"
באוניברסיטת תל אביב

על ידי
אביב שונפלד

העבודה הוכנה בהדרכת
פרופ' פרד לנדמן

ספטמבר 2022