Counting Aggregates, Groups and Kinds: Countability from the Perspective of a Morphologically Complex Language

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1 Introduction: The Components of Countability and Their Interrelation

Theories of countability face the task of explaining how various nouns’ different participation in grammatical number constructions corresponds to meaning contrasts among those nouns.12 What, if anything, in a noun’s meaning impinges on its ability to appear in different morphosyntactic contexts related to counting and/or measuring? Or in the other direction, how do morphosyntactic contexts impinge on the possible interpretations of a noun? An explanation of countability must show how and why countability distinctions arise, from morphosyntax or lexical meaning or from a combination thereof, and be predictive of grammatical number systems both generally and in particular languages.

Different proposals have staked out different positions along the spectrum of possible ways morphosyntax, lexical meaning and countability are related—from arguing that lexical meaning simply does not influence countability patterns (see Borer 2005 i.a.) to arguing that lexical meaning fully determines countability patterns (Wierzbicka, 1988; Wisniewski et al., 2003). The evidence for which analysis is best comes from natural language data, of

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2 Our use of the term Countability subsumes various phenomena broadly related to grammatical number, including the count/non-count contrast, collectives, duals, pluralia tantum and so forth, following the usage in Payne and Huddleston (2002), Joosten (2003), and Grimm (2012).
course, and consequently the choice of which languages to discuss will pre-
determine the range of tenable conclusions about the nature of countability.

This paper adds to this discussion data from Czech and, as a conse-
quence, directs the focus towards languages that have a morphologically
rich nominal system. Importantly, more expressive nominal morphology
may specifically target entity types which in less rich nominal systems re-
main morphologically undifferentiated. In the case of Czech, several complex
cardinal expressions along with derivational morphology specifically target
entity types beyond the object-level, namely aggregates, groups and (tax-
onomic) kinds, none of which, for instance, in English are morphologically
distinguished in such a clear fashion.

The greater complexity of the system of cardinal expressions has impli-
cations even at the level of the very diagnostics of countability. One of the
clearest diagnostics of countability is the combination of nouns with car-
dinal expressions, e.g. as in two cats (the impossibility of which is named
the “signature property” of non-countable nouns by Chierchia 2010). In
Czech, certain nouns may combine with some cardinal expressions yet not
others, and accordingly be “countable” in different ways.

In this paper, we relate Czech’s nominal system to three questions that
are central to theories of countability. First, what must theories of countabil-
ity assume as primitive? There are two sub-questions here. What elements
serve as the ontological foundations of countability? And is one countability
category, e.g. non-countable, more basic than another? Second, as Czech
provides morphology for explicitly counting aggregates, what can be deter-
mined about the nature of aggregates? Finally, to what extent is countability
lexically-specified as opposed to dependent on pragmatic context? Put in
other terms, how intrinsic is nominal flexibility to countability? We now
provide initial discussion of each question in turn.

Primitives of Countability  The early theory of Link (1983) took the
count-mass distinction to be a lexical contrast grounded in a basic ontologi-
cal distinction between atomic and non-atomic entities, from which the syn-
tactic patterns of countability followed. From this starting point, researchers
have taken more and less parsimonious positions. Chierchia (1998, 2010), for
instance, takes a more parsimonious position wherein all nouns derive from a
common ontological sort: All nouns have an atomic domain, but mass nouns,
due to their inherent vagueness in Chierchia (2010), impede the ability to
refer to the atomic parts. Alternately, many researchers account for three
(grammatical) types of nouns — substances, individuals and nouns such as furniture that are non-countable yet refer to individuals — while retaining two ontological sorts, namely atomic entities and non-atomic entities, where nouns like furniture are comprised of atomic entities but are non-countable for some reason, e.g. a lexical feature is stipulated as in Barner and Snedeker (2005) or Bale and Barner (2009). On the other hand, Grimm (2012) accepts an ontological contrast between atomic and non-atomic entities, and further argues that even more ontological contrasts are needed than just the one between atomic and non-atomic (substance) reference, namely reference to aggregates, for example, for nouns such as ‘hair’ or ‘foliage’, while Grimm and Levin (2017) argue for recognizing yet other ontological types in the artifactual domain, distinguishing between individual artifact nouns (hammer, chair) and artifactual aggregates (furniture, laundry).

Czech provides more evidence that nominal roots may be ontologically richer than the individual/substance contrast which has garnered the most attention in the literature. This is in part due to the complex cardinals mentioned, which directly target several ontological sorts (aggregates, groups and kinds), but also due to derivational morphology which observably derives aggregates, which form a sub-class of non-countable nouns in Czech with particular properties.

A related, yet slightly different question facing theories of countability is what to take as basic and what to derive. Countable and non-countable nouns could have equal status, or one class could be derived from the other. For Borer (2005), again an example of a parsimonious theory, all nouns begin as mass or “stuff”, then are given further structure in syntax through the application of functional heads. To anticipate, the Czech system provides a complicated, and perhaps fatal, data point for theories where one class of nouns is derived from the other.

The Nature of Aggregates The discussion of aggregates as a separate ontological sort leads to the more specific question of what, if anything, can be determined about the nature of aggregates, or the various different sorts of things which have been labeled “aggregates”. While the recent literature has often proposed a three-way contrast in nominal semantic types, substance (non-countable), aggregate (non-countable) and individuals (countable), where aggregate nouns are complete atomic join semi-lattices, that is, including atoms and sums (Bale and Barner, 2009; Deal, 2017), many questions remain, most critically, why these particular nouns rather than others have aggregate denotations. Other questions include what the na-
ture of any specific lexical semantics in play is and the cross-linguistically commensurability of different classes of aggregates. Czech’s morphology isolates a reasonably coherent lexical class of aggregate nouns, prototypically based on spatial proximity of elements, which in turn sheds light on some of the preconditions that associate with aggregate nouns.

Nominal Flexibility  In English, famous shifts in meaning have been attributed to operations knowing as ‘grinding’, ‘packaging’, and ‘sorting’ (see Pelletier 1979; Bunt 1985, i.a.), demonstrated with examples (1), (2) and (3) from Bach (1986). For these cases in English, erstwhile countable nouns appear as non-countable, as in (1), and vice versa, as in (2) and (3), given suitable context. The core question is how does the meaning of a word impinge on its ability to appear in different contexts, if at all?

(1)  a. There was dog splattered all over the road.
    b. Much missionary was eaten at the festival
(2)  ice-creams = ‘portions of ice-cream’
(3)  muds = ‘kinds of mud’

While the existence of contextual shifts is uncontroversial, their importance for theories of countability is a matter of ongoing debate. Some researchers have taken nominal flexibility to be a foundational property of countability (Bale and Barner, 2009; Borer, 2005; Chierchia, 2010; Pelletier and Schubert, 2004), which is compatible with the data in English. On the other hand, there are serious questions as to how well the flexibility data in English carries over to other languages.

A valuable set of recent studies, including Dalrymple and Mofu (2012) on Indonesian, Lima (2014) on Yudja and Deal (2017) on Nez Perce, have reported on languages with restricted morphological means to grammatically code number distinctions and which simultaneously permit a large degree of nominal flexibility. In these languages, canonical mass nouns, like mud or blood, may be counted when appearing in contexts which license such interpretations. Although the authors have not settled whether in these languages there is a lexically encoded distinction between countable and non-countable nouns or not (see discussion in Deal 2017), these studies have greatly added to our knowledge about how such languages function.

Examining Czech, which uses rich inflectional and derivational morphology to code countability, provides a counterpoint study. As will become clear, Czech presents the opposite behavior than theories that emphasize
flexibility would predict: While Czech possesses rich number morphology, it manifests very limited nominal flexibility. More generally, we seek to provide evidence bearing on a larger question: As the syntax and morphology varies from language to language, how does this affect the distribution of labor between pragmatically available senses and morpho-syntactically specified senses?

This paper is organized as follows. In section 2, we introduce the core countability data from Czech, including the basic diagnostics as well as derivational morphology and complex cardinals. To the best of our knowledge, even this basic data has not received any substantial attention in the countability literature. Further, as we have indicated, the data itself already provide directions towards answering some of the questions brought up here, which we return to in section 3. Sections 4 and 5 develop a formal analysis of Czech’s nominal system, providing an extended investigation of how the different semantic distinctions are parceled out to different parts of the morphosyntax. Altogether, this exploration of countability in a morphologically rich language advances the understanding of the interplay between morphosyntax, lexical meaning and countability.

2 Countability in Czech: The Core Data

As with the majority of Slavic languages, Czech is an SVO language possessing rich inflectional and derivational morphology. Czech nominals lack overt articles and those that appear bare can be interpreted in various ways, including definite, indefinite or generic interpretations.3

Czech manifests the familiar distributional contrasts for notionally countable and non-countable nouns. For instance, pes ‘dog’, a prototypical count noun, intuitively denotes individual dogs. Such nouns can be pluralized, as shown in (4-b), and also may combine both with cardinal numerals, as shown in (4-c) and (4-d). Cardinal numerals fall into two syntactic categories: adjectives for cardinal numbers 1, 2, 3 and 4, as in (4-c), and nouns for cardinal numerals 5 and greater, as in (4-d). Countable nouns also combine with determiners such as mnozí ‘many’, a vague adjectival determiner agreeing with the noun it modifies in both case and number.

(4) a. pes-∅
dog-SG

3See Dayal (2004), Filip (1999), and Krifka (1992), among others, for discussions of the interpretation of bare nouns in Czech in connection with lexical and grammatical aspect.
We take *bláto* ‘mud’ as an instance of a prototypical non-countable noun, denoting a substance. As shown in (5), these nouns cannot be pluralized, nor do they combine with cardinal numerals or with determiners such as ‘many’. However, these nouns do combine with certain determiners, such as *všechno*, roughly equivalent to English ‘all’, which requires singular agreement on the noun, shown in (6).

(5) a. bláť-o
   mud-SG
   ‘mud’
b. *bláť-a
   mud-PL
   ‘muds’
c. *dvě/tři bláť-a
   two/three mud-PL
   ‘two/three mud’
d. *mnoh-á bláť-a
   DET-NOM.PL mud-NOM.PL
   ‘many mud’

(6) a. všechn-o bláť-o
   DET-SG mud-SG
   ‘all mud’
b. všechn-a vod-a
   DET-SG water-SG
   ‘all water’

Another diagnostic from English, that only non-countable nouns may
appear as bare singulars, does not succeed in Czech, as countable nouns may also appear as bare singulars. We also note that Czech bare singulars are able to refer to objects (7-a) as well as to kinds (7-b) (at least when the bare singulars are arguments of kind-level predicates like in (7-b)).

(7)  

a. Blesk způsobil požár a zabil mamut-a. 
    thunderbolt caused wildfire and killed mammoth-ACC.SG 
    ‘A thunderbolt caused a wildfire and killed a mammoth.’ 

b. Mamut-∅ vymřel i v oblastech, kde bylo 
    mammoth-NOM.SG died-out even in areas where was 
    málo lidí. 
    few people 
    ‘Mammoths died out even in areas where there were only few people.’

For certain prototypical non-countable nouns, such as voda ‘water’, Czech also manifests an additional interpretation, that is, a “packaging” use, as witnessed in (8-a). Yet, the ability for non-countable nouns to be used with a packaging interpretation is highly constrained, typically only found in conventionally licensed instances, similar to what has been observed for English. Attempting to establish a parallel packaging interpretation with písky ‘sand’ in (8-b) fails: Even when speakers are given a background scenario in which a quarry sells different packages of sand to builders, Czech native speakers reject (8-b) and deem it unnatural.

(8)  

a. mnoh-é vod-y už byl-y 
    many-NOM.PL waters-NOM.PL already were-PL 
    vyprod-ané 
    sold-PST.PART 
    ‘many bottles of water were already sold out’

b. #mnoh-é písk-y už byl-y 
    many-NOM.PL sands-NOM.PL already were-PL 
    vyprod-ané 
    sold-PST.PART 
    Intended: ‘many packages of sand were already sold out’

So far, the nominal classes that can be isolated through distributional tests match up with expectations derived from English and other Western European languages. Yet, the data in Czech is far more involved. The remainder of this section explores the various types and interpretations of nouns, made visible through complex morphology on both nouns and car-
dinal numerals, and then turns to consider the issue of nominal flexibility. Through its derivational morphology, Czech identifies entity types critical to understanding countability, but which have garnered less discussion in the literature than the individual/substance distinction, namely derived non-countable aggregates (list-ı ‘foliage’), and complex numerals which count groups (dvoj-ice ‘a group of two’), connected clusters (dvoje hranolky ‘two collections of French fries’) and taxonomic kinds (dvojí metr ‘two kinds of measure’). We discuss each in turn.

2.1 Derived Aggregates

In addition to nouns which we consider to be lexically non-countable, Czech possesses derivational morphology, the suffix -ı°, which derives non-countable nouns. Table 1 presents the nouns known to be derived by -ı. While these nouns are restricted to be inanimate, they arise in several semantic domains. Schematically, -ı applies to a countable noun root \(N\) and results in an interpretation ‘a collection of \(N\)’, although some of the examples illustrate that an even more specific (lexical) semantics may be necessary.¹

Nouns derived with -ı are strongly non-countable. Unlike the root nouns from which they are formed, nouns derived by -ı do not pluralize nor combine with simple cardinal numerals or vague quantifiers, as shown in (10)-(12), nor do they manifest packaging or otherwise countable interpretations, as shown in (13), unlike lexically non-countable nouns such as vody ‘water’.

There are several variant forms of -ı, such as -ovı́, which as far as we can discern, do not differ semantically.

The items presented in the table comprise the majority of Czech nouns derived by -ı. A few other lexical items exist but they are archaic or at the periphery of contemporary Czech.

For 21 of the 22 nouns given, -ı clearly applies to purely countable nouns, as we verified through applying the standard tests for distinguishing countable and non-countable nouns. These nouns are often naturally found in counting contexts as shown in the following example for krajka ‘lace’:

\[
\text{(9) přidá-la ještě další dv-ě kraj-k-y a vyda-la nový měš se čt-y-mi kraja-mi small notebook with four-INS.PL lace-INS.PL}
\]

She added two laces and published a new small notebook with four laces

The only exceptional noun is dřevı́, derived from dřevo ‘wood’, which is ambiguous between countable and non-countable interpretations. We assume that -ı applies to the countable form.

Since case syncretism often obscure the morphological patterns in Czech, we often present nouns in the instrumental case which is morphologically more transparent.
<table>
<thead>
<tr>
<th>Noun</th>
<th>Gloss</th>
<th>Derivational Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stromoví</td>
<td>‘clump of trees’</td>
<td>strom ‘tree’</td>
</tr>
<tr>
<td>boroví</td>
<td>‘clump of pine trees’</td>
<td>borovice ‘pine tree’</td>
</tr>
<tr>
<td>habroví</td>
<td>‘clump of hornbeam trees’</td>
<td>habr ‘hornbeam tree’</td>
</tr>
<tr>
<td>olšoví</td>
<td>‘clump of alder trees’</td>
<td>olše ‘alder tree’</td>
</tr>
<tr>
<td>vrboví</td>
<td>‘clump of willow trees’</td>
<td>urba ‘willow tree’</td>
</tr>
<tr>
<td>Plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>listí</td>
<td>‘foliage’</td>
<td>list ‘leaf’</td>
</tr>
<tr>
<td>rákosí</td>
<td>‘rushes’</td>
<td>rákos ‘reed’</td>
</tr>
<tr>
<td>trní</td>
<td>‘thorns, brambles’</td>
<td>trn ‘thorn’</td>
</tr>
<tr>
<td>jahodí</td>
<td>‘clump of strawberry plants’</td>
<td>jahoda ‘strawberry’</td>
</tr>
<tr>
<td>lískoví</td>
<td>‘clump of hazel bushes’</td>
<td>liska ‘hazel tree’</td>
</tr>
<tr>
<td>maliní</td>
<td>‘clump of raspberry plants’</td>
<td>malina ‘raspberry’</td>
</tr>
<tr>
<td>ostružiní</td>
<td>‘clump of blackberry plants’</td>
<td>ostružina ‘blackberry’</td>
</tr>
<tr>
<td>Complex Objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cihloví</td>
<td>‘brickwork’</td>
<td>cihla ‘brick’</td>
</tr>
<tr>
<td>krajkoví</td>
<td>‘lacework’</td>
<td>krajka ‘lace’</td>
</tr>
<tr>
<td>laťkoví</td>
<td>‘fence (made from laths)’</td>
<td>laška ‘lath/slat’</td>
</tr>
<tr>
<td>nádobí</td>
<td>‘dishes’</td>
<td>nádoba ‘container’</td>
</tr>
<tr>
<td>síloví</td>
<td>‘netting/nets’</td>
<td>síl ‘net’</td>
</tr>
<tr>
<td>Nautical Terms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lanoví</td>
<td>‘rigging/ropes’</td>
<td>lano ‘rope’</td>
</tr>
<tr>
<td>plachtoví</td>
<td>‘sails’</td>
<td>plachta ‘sail’</td>
</tr>
<tr>
<td>ráhmoví</td>
<td>‘spars’</td>
<td>ráhno ‘spar’</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dříví</td>
<td>‘firewood’</td>
<td>dřevo ‘wood’</td>
</tr>
<tr>
<td>kamení</td>
<td>‘rocks’</td>
<td>kámen ‘rock’</td>
</tr>
</tbody>
</table>
As the examples in table 1 indicate, the derived nouns implicate multiple elements designated by the root noun, that is, a clump of pine trees implicates multiple pine trees. Further, nouns derived by -í pattern in their semantic properties with plural nouns: They are cumulative (list-í + list-í = list-í) and non-divisive, since there are atomic parts for which divisiveness does not hold — parts of list-í are list-í but the atomic parts (list ‘leaf’) are not list-í.

Despite these similarities, the meanings of nouns derived by -í contrast strongly with ordinary plural meanings. As the glosses given in table 1 express, the resultant meaning of nouns derived by -í is not simply a set of, for example, pine trees, but a set in which the members are coherently related. This is most often in terms of spatial proximity, as in the case of clumps of trees or plants, but also may be in terms of functional interdependence, as in the case of lanovié where it is not the individual ropes at issue, but

\[\text{Cumulative}(P) = [P(x) \land P(y) \rightarrow P(x \cup y)]\]
\[\text{Divisive}(P) = \forall x[P(x) \rightarrow \forall y[y < x \rightarrow P(y)]]\]
\[\text{Atomic}(x,P) \leftrightarrow P(x) \land \neg\exists y[y < x \land P(y)]\]
their coherent organization as part of a ship’s rigging. Similarly, cihlovi, 
derived from cihla ‘brick’, does not signify a random collection of bricks, 
rather they must be related in some manner, for instance, used together in 
an architectural motif.9

Additionally, -i is not nearly as productive as one would expect if it 
were only to signal plurality. As the examples in (15) demonstrate, the 
ability to derive new nouns with -i is limited. Such limited productivity is, 
however, consistent the lexically restrictions typically found with collective 
morphology (see Acquaviva 2008 for discussion of various systems).

(15) a. *stol-i 
    table-i 
    ‘collection of tables’
b. *kabat-i 
    jacket-i 
    ‘collection of jackets’
c. *planet-i 
    planet-i 
    ‘collection of planets’

Given these observations, the non-countability, at least at the object-
level, of derived aggregates is expected, since these nouns do not simply 
designate entities, but coherently related groupings of entities. As will be 
seen in detail in section 2.2.2, Czech provides morphological mechanisms for 
counting precisely these more complex composite entities.

2.2 Complex Numerals

Czech, like other Slavic languages, possesses simple cardinal numerals, such 
as those shown in (16) as well as morphologically derived complex numerals.

(16) a. ttri ps-i 
    three dog-NOM.PL 
    ‘3 dogs’
b. ttri hrunk-y 
    three cup-NOM.PL

9We confirmed these intuitions by examining uses of -i nouns along with their related 
images on the internet. For instance, in one illustrative example, the noun cihlovi designates 
various clusters of bricks used in an architectural pattern, differentiated by colors. 
(https://www.novinky.cz/bydleni/tipy-a-trendy/240130-karnevalove-vile-rekonstrukce-
vratila-puvodni-rozverny-styl.html)
This section lays out the basic data from complex numerals in Czech, through which speakers make reference to groups, aggregates, and taxonomic kinds.

### 2.2.1 Derived group numerals

We first examine the complex numeral derived with the suffix *-ice*, which we term *group numerals*. These numerals produce an interpretation of “group of *n* Xs”, such as “group of three sailors” given in (17-b). The distribution of the *-ice* suffix is restricted, both in the numerals it combines with, limited to basic numerals from 2 to 8, and in the nouns it combines with, restricted to animate nouns.

\[(17)\]
\[
\begin{align*}
\text{a. } & \text{tři námořníc-i} \\
& \text{three sailor-NOM.PL} \\
& \text{‘3 sailors’} \\
\text{b. } & \text{troj-ice námořník-ů} \\
& \text{three-ICE sailor-GEN.PL} \\
& \text{‘a group of 3 sailors’}
\end{align*}
\]

We first make some remarks on the basic syntactic configuration of these numeral phrases.\(^{10}\) The derivational suffix *-ice* applies to a non-cardinal numeral stem and takes a nominal complement in the genitive case (*námořníků* ‘sailors’ in the example in (17-b)). The derived complex numeral, rather than the noun, behaves as the head of the construction. First, *-ice* numerals assign genitive case to their nominal complement and there is no further agreement between the derived numeral and the nominal complement. Additionally, if such a numeral is the subject of a sentence, the verb agrees with the numeral, not with the nominal complement. In these respects, the *-ice* complex numerals parallel syntactically the cardinal numerals for numbers 5 and above, since both cardinal and complex numerals are syntactically not modifiers, but rather behave like heads of the extended NP projection. But the two classes differ semantically: The cardinal numerals $\geq 5$ permit collective and distributive interpretations, whereas the *-ice* complex numerals only permit a collective interpretation.\(^{11}\)

\(^{10}\)We present here only properties which will be critical to our analysis of these constructions, while acknowledging that the literature on Slavic numerals and their syntactic properties is intricate. See Veselovská (2001), Ionin and Matushansky (2006), among others, for discussion.

\(^{11}\)Some properties of the Czech group numeral are shared by a similar type of complex cardinal number in Russian, the collective numeral, discussed in Khrizman (2015). First,
The complex numeral formed with -ice may occur in both singular and plural, as shown in (20).

(20) a. s troj-ic-í námořník-ů
    with three-ICE-INST.SG sailor-GEN.PL
    ‘with group of three sailors’

b. s troj-ice-mi námořník-ů
    with three-ICE-INST.PL sailors-GEN.PL
    ‘with groups of three sailors’

Complex numeral phrases formed through the application of -ice can be both types of numerals favor a “collective” interpretation, and second, Russian collective numerals are also restricted to combine with animate nouns (more specifically, the nouns must denote humans or young animals). Yet, there are many important differences between the Russian collective and Czech group numerals. Most critically, Russian collective numerals allow distributive readings (when they act as antecedents of dependent indefinites) and cumulative readings, while such readings are simply unacceptable for Czech group numerals. The Czech examples in (18-a) and (18-b) witness this fact. In (18-a), the obligatory distributive marker po heading the dependent indefinite phrase clashes with the collectivity of the -ice numeral construction, resulting in the sentence being unacceptable. In (18-b), the sentence has only collective-distributive interpretation: the group of three sailors has been lost twice (in different harbors). The cumulative interpretation, for example where Sailor A has been lost in a harbor 1 and Sailors B and C have been lost in a harbor 2, is unacceptable. Consequently, Czech group numerals seem to be a clear case of group interpretation unlike Russian collective numerals. In terms of the classification of collective predicates introduced by Winter (2001), Czech group numerals act like collective set predicates as indicated by the differing acceptability of Czech group numerals with quantifiers all and every, shown in (19), similarly to other collective set predicates like meet, gather, be brothers, or be similar. This is formalized in section 5.2 accordingly. More data concerning Czech group numerals can be found in Dočekal (2012).

    three-ICE sailors-GEN.PL won-SG.F DIS liter rum-GEN.SG
    ‘A group of three sailors won a liter of rum.’

b. Troj-ice námořníků se ztratil-a ve dvou přístavech
    three-ICE sailors REFLECTED lost-SG.F in two harbors
    ‘A group of three sailors has been lost in two harbors.’

(19) a. ?Všichni podezřelí byl-a troj-ice námořníků.
    all suspects AUX-3.SG three-ICE sailor-GEN.PL
    ‘All suspects were a group of three sailors.’

b. *Každý podezřelý byl troj-ice námořníků.
    every suspect was three-ICE sailor-GEN.PL
    ‘Every suspect was a group of three sailors.’

On the other hand, Polish collective numerals like dwójka ‘group of two’ appear to behave exactly like Czech -ice numerals, as reported in Wagiel (2015).
further quantified over with cardinal numerals, as shown in (21). Further, they are compatible with the vague adjectival determiners *mnozí* ‘many’, as shown in (22). At the same time, unlike simple cardinal numerals, the use of *-ice* derived numerals is incompatible with the singular universal quantifier *všechno* ‘all’, as shown in (23).

(21) dvě troj-ice námořník-ů
    two three-ICE sailor-GEN.PL
    ‘two groups of three sailors’

(22) mnohé troj-ice námořník-ů
    many three-ICE sailor-GEN.PL
    ‘many groups of three sailors’

(23) *všechna troj-ice námořník-ů
    all three-ICE sailor-GEN.PL
    ‘all group of three sailors’

Accordingly, counting groups through complex numerals provides only a partial match for the diagnostics of countability present for simple cardinal numeral, or countable nouns for that matter. The other complex cardinals, to which we now turn, also show only partial matching, but in different fashions than the group numerals.

### 2.2.2 Complex Numerals for Aggregates

A second complex numeral, which we call AGGREGATE NUMERALS, is formed through combining the suffix *-oje* with cardinal numeral roots and designates a number of collections of an entity. For instance, applied to the cardinal numeral root *dv*- ‘two’ yields *dv-oje*, which roughly translates to ‘two collections’, as shown in (24). While this complex numeral has a similar surface morphological formation to what was seen for complex numerals formed from *-ice*, namely the derivational suffix combining with a cardinal stem and then with a noun, there are a number of differences. First, *-oje* is much more productive than the derived group numeral suffix *-ice* and appears to be derivable for any cardinal numeral. Second, the noun is the head of the numeral phrase. The numeral must agree with its head noun in case and gender, as shown in (24-a), in contrast to the group numerals. (This is often difficult to see since the agreement may be morphologically syncretic — for example, the phonologically zero NOM.PL morpheme on the numeral in (24-a) is syncretic with ACC.PL.) When the numeral is part of a subject of a clause, the verb agrees with its head noun, as in (24-a).
On the other hand, this complex numeral is quite restricted in the sorts of nouns it may combine with, primarily nouns derived by -í, pluralia tantum, and entities that typically come together in multiples. Examples of each type are shown in (25)-(27), respectively. There is clearly a lexical semantic theme concerning which nouns may combine with -oje numerals: The nouns must designate entities which are sets of individuals that typically come together or are “connected” to one another in some manner.

(25) NOUNS DERIVED BY -í: nádobí ‘dishes’, dříví ‘firewood’, kamení ‘rocks’

(26) PLURALIA TANTUM: dveře ‘doors’, housle ‘violins’, brýle ‘glasses’

(27) ENTITIES THAT TYPICALLY COME TOGETHER IN MULTIPLES: sirky ‘matches’, hranolky ‘french fries’, schody ‘stairs’

In the case of nouns derived by -í, native speakers always prefer the use of the complex numeral over the simple cardinal numeral, despite a slight oddity for some combinations. A naturally-occurring example is given in (28-a) where the sequence of counting with cardinal numerals is changed from simple cardinals to an -oje numeral for a noun derived by -í. The use of a simple cardinal numeral would be unacceptable for native speakers. This is further illustrated in (28-b), a constructed example representing in a typical fast-food ordering scenario with the unacceptable use of a simple cardinal and for which -oje numerals are the only grammatical option. Out of the blue, this is unacceptable. If an interpretations is forced, it would be interpreted as two coffees and two individual French fries.

(28) a. Dvě kuchyně, dva nákupy, dvě lednice, dv-oje nádobí
   two kitchens two purchases two refrigerators two-oje dishes
‘two kitchens, two purchases, two refrigerators, two sets of dishes’ … Czech National Corpus (2018)

b. dvě kávy, ??dvě/dv-uje hranolky
two coffees two/two-uje French.fries
‘two coffees, two (individual) French fries’

Attempts to apply -uje to nouns outside of these restricted class typically result in infelicities, as shown in (29).12

12 Under very special conditions, to be discussed in footnote 24, -uje can be used with other nouns.

(29) a. ??dv-uje stol-y
two-OJE table-PL
‘two sets of tables’
b. ??dv-uje kabát-y
two-OJE jacket-PL
‘two sets of jackets’

Unacceptability further results from combining -uje numerals with všechny ‘all’ as in (30) or with simple cardinals as in (31).

(30) a. ??všechny dv-uje housl-e
DET two-OJE violin-PL
‘all two sets of violins’
b. ??všechny dv-uje kléč-e
DET two-OJE key-PL
‘all two sets of keys’

(31) a. *trí dv-uje kléč-e
three two-OJE key-PL
‘three two sets of keys’
b. *trí dv-uje dveř-e
three two-OJE key-PL
‘three two sets of doors’

Thus, the sort of object delivered by combination with an aggregate numeral is not one that can be further counted, at least not in a standard manner.
2.2.3 Taxonomic numerals

The final type of complex numeral, derived with the suffix -oji, yields taxonomic plurals, namely, a “different kinds” reading, which we call the TAXONOMIC NUMERAL. This complex numeral is syntactically parallel to -oje: The derivational suffix combines with a cardinal numeral root and then with a noun. The noun is the head of the numeral phrase and the numeral must agree with its head noun in case and gender. **Like -oje, -oji appears to be derivable for any cardinal numeral.** Applying -oji to the cardinal numeral root dv- ‘two’ yields dv-oji, roughly translated as ‘two kinds’. Examples are given in (32). Note that syry ‘cheese’ in example (32-b) does not combine with ordinary cardinals, and by that diagnostic is uncountable.

(32)  
 a. dv-oji život  
   two-OJI life
   ‘two kinds of life’ (as in a Jekyll and Hyde scenario)
 b. dv-oji syry  
   two-OJI cheese
   ‘two kinds of cheese’
 c. dv-oji tvár  
   two-OJI face
   ‘two faces’ (as in a Janus face)

Unlike the previous two complex numerals, the nouns with which -oji combines are not as restricted. Still, there are some noun types for which usage is more usual than for others, namely liquid and substance nouns, pluralia tantum and abstract nouns. Examples of each type are shown in (33)-(35), respectively.

(33) LIQUID AND SUBSTANCE NOUNS: krev ‘blood’, víno ‘wine’, sýr ‘cheese’
(34) PLURALIA TANTUM: housle ‘violin’, šaty ‘dress’
(35) ABSTRACT NOUNS: život ‘life’, metr ‘measure’, občanství ‘citizenship’

Similarly to what was found with complex aggregate numerals derived by -oje, further combination with všechny ‘all’ or simple cardinals is disallowed, as shown in (36) and (37), respectively.

(36)  
 a. *všechny dv-oji syry  
    DET two-OJI cheese
Having set out the data for complex numerals in Czech, we now turn to examining the ability of nouns in Czech to shift their interpretation as a function of the context.

2.3 Restricted Nominal Flexibility

In comparison with a language such as English, the grammatical elements impacting countability and nominal interpretation in Czech are far more elaborate. At the same time, and, as we will argue, relatedly, the interpretative possibilities of nouns appears to be more impoverished than in English. At issue is the reduced number of interpretations a noun licenses.

As discussed at the beginning of this section, packaging is permitted in Czech, if there is sufficient conventional use associated with the entity at issue. Yet, two other operations frequently claimed to be “universal”, namely the Universal Grinder (Pelletier, 1979) and the Universal Sorter (Bunt, 1985), are even more restricted.

“Grinding” appears to be broadly rejected by Czech native speakers. The examples in (38) and (39) provide standard grinding contexts in Czech, the first providing a “splattered animal” context and the second providing an “animal-as-food-product” context. Both are anomalous in Czech.\(^\text{13}\)

(38) #Po celé silnici byla kráva.
  on whole road was cow
  ‘There was cow all over the road.’

(39) #V salátu bylo prase.
  in salad was pig

\(^{13}\text{We tested these sentences with 32 native speakers of Czech recruited from Masaryk University. The first sentence was only accepted as a mass interpretation by 2 of the 32 and only 8 out 32 consented to a mass interpretation for the second sentence.}\)
'There was (a) pig in the salad.'

***ALL NEW BELOW****

Turning to taxonomic interpretations, Czech’s grammatical means to reference taxonomic sub-kinds are more elaborate, and this corresponds to greater intricacy in both distribution and interpretation. First, in Czech, interpreting plural nouns as referring to “different kinds” of the relevant noun is often not possible to the extent it is in English. While the sentence in (40-a) is unremarkable in English, its Czech counterpart distinctly odd.

(40) a. I used two oils in this salad.
   b. #CZECH.

GLOSS
Intended: ‘I used two oils in this salad.’

While taxonomic sub-kind readings may occur for typically non-countable nouns both as bare plurals and with simple cardinals, their distribution is restricted, both in terms of their syntactic context and in terms of their interpretation.

Acceptable examples of taxonomic sub-kind uses with a bare plural noun phrases and with a simple cardinal phrase are given in (41-a) and (42-a)\textsuperscript{14}, respectively.

(41) a. Prodáváme vína lahová i stáčená
   sell-1PL wine.PL in-bottles and wine-on-tap
   ‘We sell wines in bottles and on tap.’
   b. Prodáváme oleje pro osobní, nákladní a užitková
   sell-1PL oil.PL for personal cargo and utility
   vozidla
   car.PL
   ‘We sell oils for personal cargo and utility cars.’

(42) a. V Brně mají na čepu další tři piva
   in Brno have.3PL on tap next three beer.PL
   ‘They have three beers on tap in Brno.’

Countable nouns appear also to receive a taxonomic sub-kind interpretations, although usually manifest post-nominal modification which ensures a taxonomic interpretation, as in (43).

\textsuperscript{14}We thank an anonymous reviewer for providing example (42-a) and several other examples of simple cardinal phrases with taxonomic readings.
A common trait of all the examples of taxonomic uses of non-countable nouns was they were found in generic, existential or otherwise non-episodic contexts. This contrasts with clearly episodic uses of nouns in their taxonomic interpretation in English, as in (40-a). This further contrasts with the use of the taxonomic numeral, which is licensed both in episodic and non-episodic contexts. This is shown in (44), where simple cardinal phrases used in generic and episodic descriptions produce a contrast in acceptability, shown in (44-a) and (44-b), while of using the taxonomic numeral in the same sentences provides is acceptable in both contexts, as shown in (44-c) and (44-d).

(44)  a. Naše benzínka prodává tři paliva.  
     our gas-station sells.IMPERF-HAB three fuel.PL 
     ‘Our gas station sells three fuels.’
  b. ??Naše benzínka včera prodala tři paliva  
     our gas-station yesterday sold.PERF three fuel.PL 
     ‘Yesterday our gas station sold three fuels.’
  c. Naše benzínka prodává trojí palivo.  
     our gas-station sells.IMPERF-HAB three-kind fuel.SG 
     ‘Our gas station sells three fuels.’
  d. Naše benzínka včera prodala trojí palivo  
     our gas-station yesterday sold.PERF three-kind fuel.SG 
     ‘Yesterday our gas station sold three fuels.’

A second difference between the use of simple cardinals or bare plurals to indicate taxonomic sub-kinds and the use of taxonomic numerals is in the type of sub-kind that is identified. With the use of simple cardinals or bare plurals, specific, named, and well-established “sub-specimens” appear to be the most salient and possible the only type of taxonomic entities reference. For instance, in the example (44-a), the use of the simple cardinal with a taxonomic interpretation would be interpreted as contrasting, for example, specific types of gasoline, such as with different octane levels (e.g., 85, 95, or 98). The use of the taxonomic numeral, however, typically brings about upper-level taxonomic contrasts, such as between diesel, gasoline and natural gas, although the more specific types are also a possible interpretation.
We now take stock of the implications of Czech’s nominal system for theories of countability.

3 Interim Discussion

All theories of countability have at their core a claim of what countability is about. By measuring the claims of different theories against the Czech data, we can work towards narrowing down the space of theoretical possibilities. We return to the three issues introduced in section 1: (i) whether nouns are ontologically uniform or multi-sorted, (ii) the nature of aggregates, and (iii) the trade-off between a language’s potential for nominal flexibility and its capacity for expression through morphology.

To gain insight into the first issue, we consider what it means within different theories to be non-countable and then compare those conjectures with Czech data from the non-countable nouns derived by -í. In brief, we will show that the Czech data poses challenges for theories in which there is one over-arching explanation of how (non-)countability arises. In particular, these explanations falter when extended to account for the second form of non-countable nouns in Czech derived by -í.

First we consider the theory of Borer (2005) for which all nouns begin as non-countable, and then through combination with a functional head, e.g. Div⁰, may become countable. Two facets of the Czech system in conjunction undermine this claim: the lack of grinding and the nouns in Czech derived by -í. Instead, the opposite trajectory is observed. Non-countable aggregate nouns such as listí ‘foliage’ begin as nominal roots for which there is only evidence that they are fully countable nouns, that is, list ‘leaf’ only has a countable interpretation and no effects from ‘grinding’ may be observed. Through combination with morphology, these nouns become then non-countable with respect to combination with simple cardinal numerals, which is exactly opposite of the prediction in Borer (2005). This is not to say that the system in Borer (2005) could not altered to account for the immediate data under consideration, in the way that others have expanded her system to account for different countability phenomena (De Belder, 2013; Mathieu, 2012). Rather, the phenomenon of -í nouns in Czech stands in contradistinction to the conceptual predictions of Borer (2005).

Similar unmet expectations are found when considering how the data aligns with the theory of Chierchia (2010), for which non-countable nouns differ from countable ones in that non-countable nouns designate entities for which the atomic parts are vague. Applying this line of reasoning to
-í nouns would also be counterintuitive, since the parts, designated by the derivational source, e.g. list- ‘leaves’, are non-vaguely atomic and fully countable. One would have to argue either that the semantic contribution of -í brings about vagueness into the derived forms, or that there is a secondary cause for non-countability.\(^{15}\) In either case, this subclass of non-countable nouns would go against the grain of the explanation of non-countability in Chierchia (2010).

More generally, the subclass of non-countable nouns derived by -í provides a strong argument that non-countability may arise from more than one source. Accordingly, theories for which there is a single path of explanation that gives rise to (non-)countable interpretations are simply not expressive enough. In other words, the domain of nominal meaning is not of a single ontological sort, but many-sorted, containing at least substances and what we have termed aggregate nouns, those derived by -í, the nature of which we turn to now.

Granting the existence of aggregates nouns as separate from substance nouns, many questions remain about their nature. Again, measuring the theoretical possibilities by the Czech data proves illuminating.

The grammatical number system of Czech forces the recognition of (i) aggregate nouns as a distinct class, both through devoted derivational morphology (-í) and through a devoted complex numeral, and (ii) a stronger notion of aggregate than is often employed in theories of countability. The first point dovetails with increasing acceptance in the literature of at least three types of nouns, substance (non-countable), aggregate (non-countable) and individuals (countable). For instance, Bale and Barner (2009) and Deal (2017) both explicitly set out to model those three noun types. Despite increasing recognition of two sorts of non-countable nouns, the data from Czech implicates a more specific semantics than is usually given in the analysis of nouns such as furniture or footwear in English. First, in those models, aggregate nouns are essentially treated as akin to plural nouns but for the inclusion of atoms, technically speaking as atomic join semi-lattices. Second, even though theories such as Barner and Snedeker (2005) or Bale and Barner

\(^{15}\) An anonymous reviewer suggests that noun meanings derived with -í may be analyzed akin to furniture-nouns in Chierchia (2010), that is, as singular properties; however, it is difficult to see a path forward for using a denotation which is simply all the instantiations of, say, leaves, as it does not speak to the particular conditions of relatedness, discussed in 2.1, nor explain the restricted distribution. Chierchia (2010, fn. 11) carefully distinguishes furniture-nouns from “collectives”, noting that single entities may qualify as furniture, as in “That chair is furniture”, but this is at odds with -í nouns which may not felicitously reference atomic parts, but only coherent collections.
(2009) do recognize aggregate nouns as a distinct class, they analyze them through lexical fiat, i.e. the non-countable status of such nouns is idiosyncratic. For these accounts, extending such a treatment to -í nouns leaves their regularity and lexical semantic cohesion unexplained. Why should these particular nouns, and not others, receive such distinguished morphological treatment?

As shown in 2.2.2, Aggregate Numerals, complex numerals derived with -oje, apply to nouns derived by -í, pluralia tantum nouns, and also certain morphologically regular plural nouns which designate entities that typically come together in multiples. Assuming that there is some form of semantic selection, then there should be a common denominator among these noun types. Analyzing aggregates as akin to plurals however does not provide enough discriminatory power to bring this to the fore. Since morphologically regular plurals and aggregates are selected for by Aggregate Numerals, the common denominator would be individuated lattices, yet, this would over-generate as any plural noun should be able to combine with Aggregate Numerals, contrary to fact. Instead, our semantics must distinguish entity types for whom its members canonically co-occur, as is the case for these nouns in Czech.

Finally, we turn to considering the nature of nominal flexibility, which we argue requires a more nuanced view. The countability literature has often put forth that the possible interpretation of nouns is unrestrained, in that every countable noun can find a non-countable use, and vice versa, as is most clearly articulated in Pelletier and Schubert (2004) or Borer (2005). What then should be made of Czech’s limited flexibility? Under such a view, an interpretation as a taxonomic plural should be licensed when conceptually possible, yet, the taxonomic plural is systematically absent as an interpretation of ordinary plural nouns in episodic contexts, even though parallel examples in English demonstrate such uses are conceptually possible. The cause for this discrepancy is obvious: Czech has morphology devoted to expressing taxonomic interpretations which can be employed freely. Accordingly, regular plural noun phrases only receive taxonomic interpretations in grammatical contexts that already foster kind interpretations. Similarly, grinding with bare singular nouns is absent in Czech. Again, there is a plausible reason for this: Unlike in English, Czech does not have articles, so bare singular nouns already serve a role in Czech (see also Cheng et al. 2008; Rothstein 2017).

The broader implication is that the potential for nominal flexibility in a given language is influenced and constrained by distinctions already expressed within the morphosyntax of nominals in that language. That is, the
lexical semantics of nouns manifests structure that is coordinated with what is expressed in the grammatical structure.

4 A Formal Treatment of Czech’s Grammatical Number System

We now turn to examining how to integrate Czech’s nominal system within a formal analysis of countability. We develop an analysis by extending a version of the theory of Krifka (1995). The system in Krifka (1995) provides a useful starting point: It develops explicit representations of several ingredients to the semantics of countability, such as taxonomic reference and a notion of “natural units” (in contrast to several other theories, discussed in sections 1 and 3, committed to parsimonious views of the semantics underpinning countability). As such, it provides a suitably expressive framework to model many of the distinctions present in Czech. Even so, after presenting the basic components of the theory of Krifka (1995), we still must further develop a variety of extensions to the system in section 5 in order to fully account for the data.

4.1 Nominal Semantics in Krifka (1995)

Krifka (1995) integrates two lines of research on nominal semantics. On the one hand, building on Link (1983) and Krifka (1989), among others, the domain of objects is structured according to the basic principles of mereology, and as such models nominal meaning as complete semilattice structures lacking the null element. On the other hand, it builds on the work on generics, in which nominal meaning includes both reference to objects and reference to kinds (Carlson, 1980; Krifka et al., 1995; Zamparelli, 1999; Müller-Reichau, 2006). Krifka (1995) proposes a revision to kind-based nominal semantics: instead of kinds, the broader category of concepts is used, of which kinds are special subset. We will adopt this distinction for a general framework of nominal meaning, yet as it will not be critical for the purposes of present discussion, we will often use the terms kind and concept interchangeably. The two levels of nominal meaning are related by a realization relation R between concepts and the instances of the concept at the level of objects. That is, the referential use of dog is tied to the realizations of the concept dog, that is, the instances of a concept. A second relation discussed in Krifka (1995) is a taxonomic relation T holding between kinds/concepts and their subkinds or subconcepts, where the subkind reading of dogs would corre-
respond to “different types of dogs”, such as beagle or chihuahua. The basic meaning of a noun in this system is given in (45), where variables ranging over object-level and kind-level entities are subscripted with $o$ and $k$, respectively. In prose, (45) describes “the property of being a specimen or subspecies, or an individual sum of specimens or subspecies” (Krifka 1995, p. 399).

\[ \lambda y_k \lambda i \lambda x [R_i(x, y_k) \lor T(x, y_k)] \]

Given (45), an entity may satisfy the predicate dog in two ways. First, if it is an individual dog, or a plural individual composed of dogs, which are objects related to the kind dog by the realization relation $R$. Second, the predicate may be satisfied on the taxonomic reading, where the entity must be an individual subkind of dog (chihuahua) or sum of subkinds, which are related to the kind dog by the taxonomic relation $T$. The remainder of this section focuses on object-level interpretations, leaving the discussion of taxonomic-level interpretations for section 4.2.

Krifka’s account further includes measure functions to model expressions such as two liters or five ounces, and more pertinently for us, a measure function relevant for countable nouns that counts “natural units” — relative to the kind that the noun names — named the “object unit” operator (OU). The OU operator provides a measure, $n$, of the number of elements which qualify as instances of the kind. Thus, there are two criteria of applicability at work in the semantics of nominals: one which is “qualitative” and represented by the nominal predicate, for example, gold or dog, and a second which is “quantitative”, represented by a “natural unit” measure function.

Countable nouns under this account are two-place relations between numbers and entities ($\langle n, (e, t) \rangle$), while non-countable nouns are one-place entities ($\langle e, t \rangle$), as shown the contrasting lexical entries for dog and gold in (46-a) and (46-b), respectively.

\[ \begin{align*}
\text{a. } [\text{dog}] & := \lambda n \lambda x [R(x, \text{Dog}) \land \text{OU(Dog, } x) = n] \\
\text{b. } [\text{gold}] & := \lambda x [R(x, \text{Gold})]
\end{align*} \]

Krifka, partly inspired by classifier languages such as Mandarin, discusses where the natural unit measure function is located in the extended nominal phrase in English. One option is that the OU operator is endemic to the noun, as is the case in (46-a), and cardinal numerals are simply an argument of type $n$ as in (47-a). Alternately, the OU operator may be supplanted by

---

16In (45), $i$ is a variable of type $s$ ranging over possible worlds—in what follows, we will simplify by extensionalizing the representations.
(cardinal) numerals, that is, they include a built-in classifier as in (47-b).

\[
\begin{align*}
(47) & \quad a. \quad \left[\text{three}\right]_{\text{Num}} = 3 \\
& \quad b. \quad \left[\text{three}\right]_{\text{Num}} = \lambda y \lambda x [R(x, y) \land \text{OU}(y, x) = 3]
\end{align*}
\]

While Krifka (1995) provides some arguments for numerals including a built-in classifier in English, these arguments do not transfer over to Czech. One main argument given by Krifka (1995) is that assuming the OU operator as part of nominal meaning does not dispose of the need for a syntactic distinction between countable and non-countable nouns, as there is a ban in English on using singular count nouns as noun phrases. Yet, Czech differs as bare singulars are permitted, as was shown in 2. Second, the very nature of the complex numerals in Czech discussed here indicate this possibility would conceptually difficult for number terms generally: If the semantics of the numeral stem troj- ‘three’ included a built-in classifier as specified in (47-b), then the morphemes -ice, -oji, and -oji would then necessarily have to eliminate or overwrite the built-in classifier material in order to count groups, collections, or kinds.\(^{17}\)

In sum, we will take kinds as the building block of nominal meaning, as argued for in Carlson (1980) or Krifka (1995) and assumed in much other work.\(^{18}\) In addition, we assume that for countable nouns the shift from kind-level to object-level reference is accompanied by the lexically specified OU operator. That is, countable common nouns are of type \langle n, \langle e, t \rangle \rangle. Cardinal numerals, in their primary function, simply supply a number value.

We make standard assumptions for the nominal syntax. We assume the determiner phrase includes a \textsc{num} layer. The \textsc{num} head can be occupied by cardinals 2-4 and 5 and above, which contribute their cardinal value as the number argument and require plural agreement on the noun.\(^{19}\)

\(^{17}\) A third argument given by Krifka (1995) is that since many nouns can be used as countable or non-countable nouns in English, as in Czech, building the OU operator into the noun would, erroneously, disallow this flexibility. We are skeptical that the observed flexibility in English or Czech necessitates abandoning specifying countability as part of nominal meaning, since the facts could be accounted for, arguably more successfully, by analyzing flexibility as resulting from either (i) true ambiguity, as in the case of \textit{string} which designates pieces of string or the material, or (ii) pragmatic accommodation. See \textsc{Update Reference} Grimm (2018) for extended argumentation.

\(^{18}\) The analysis we articulate below is in principle compatible with taking properties as basic, as in Krifka (2003), with a slightly different architecture guiding the type shifts, although we do not elaborate here.

\(^{19}\) We note that there is tension in this analysis between the denotation of cardinal numerals as of type \langle n \rangle and the syntactic modifier status of Czech cardinals 1-4. Yet, we assume, following Geurts (2006) and Rothstein (2017), among others, that a type type-
Compositionally, an NP of type \( \langle n, (e, t) \rangle \) has its number argument saturated by a cardinal number of type \( n \), where the plural form is required for agreement. Alternately, \( \text{NUM} \) can be occupied by non-quantified singular or plural nouns, whereby singular or plural morphology is semantically valued as the number value 1 or \( \geq 2 \), respectively. In this case, an NP moves into \( \text{NUM} \) whereby its number argument is saturated by the noun’s morphological number value. This view accords with standard current formal syntactic analysis of Slavic numerals (see Miechowicz-Mathiasen 2012, Marušić and Nevins 2009, \textit{inter alia}).

The general theory of nominal reference outlined so far is able to account for the basics of nominal reference in Czech as well. The representations in (48) present the different types of nouns discussed in increasing complexity: kind-referring bare singular (48-a), non-countable noun (48-b), singular countable noun (48-c), plural countable noun (48-d), and a noun with a simple cardinal numeral (48-e).

\[
\begin{align*}
\text{(48)} & \quad \text{a. } [[N \text{ pes}]] = \text{DOG} \\
& \quad \text{b. } [[\text{NP prach}]] = \lambda x [R(x, \text{DUST})] \\
& \quad \text{c. } [[\text{NumP pes}]] = \lambda x [R(x, \text{DOG}) \land \text{OU(Dog, } x) = 1] \\
& \quad \text{d. } [[\text{NumP psi}]] = \lambda x [R(x, \text{DOG}) \land \text{OU(DOG, } x) \geq 2] \\
& \quad \text{e. } [[\text{NumP [Num' 2] [NP psi]]}] = \lambda x [R(x, \text{DOG}) \land \text{OU(DOG, } x) = 2]
\end{align*}
\]

Additionally, we will assume, following Krifka (1995) the availability of a shift from a kind to a number-neutral predicate of the kind whereby the OU operator is existentially bound, given in (49). This shift derives a predicate interpretation which, as we will show in section 5.2.2, can be passed along to the complex numerals for aggregates.

\[
\begin{align*}
\text{(49)} & \quad [[\text{NP psi}]] = \lambda x \exists n [R(x, \text{DOG}) \land \text{OU(DOG, } x) = n]
\end{align*}
\]

As we now show, this account, with minor modifications, also extends...
straightforwardly to the taxonomic interpretations of nominals in Czech as well.

### 4.2 Taxonomic Interpretations and Numerals

To incorporate the taxonomic interpretations found with bare plurals and simple cardinals, discussed in section 2.3, we generalize the nominal semantics to include taxonomic units form the system of Krifka (1995). Accordingly, the base template for nominal meaning in Czech is (50), disposing of the realization operator R and the taxonomic operator T, which can be generalized into a single operator, RT, given in (51).

\[
(50) \lambda y_k \lambda x [R_i(x, y_k) \lor T(x, y_k)]
\]

\[
(51) RT(x, y) \leftrightarrow R(x, y) \lor T(x, y)
\]

To this we add the analogue for the OU operator for kinds, the KU ('kind unit') operator which, for each possible world, when applied to a kind, delivers the number of subspecies of that kind. Both measure functions, OU and KU, can be joined into one operator, OKU ('object or kind unit'), defined in (52) (Krifka, 1995, 406).

\[
(52) OKU_i(x)(y) = n \leftrightarrow OU_i(x)(y) \lor KU_i(x)(y) = n
\]

The different types of nominal reference are given in their generalized form in (53).

\[
(53) \begin{align*}
\text{a. } & [\text{N pes}] = \text{DOG} \\
\text{b. } & [\text{NP prach}] = \lambda x [RT(x, \text{DUST})] \\
\text{c. } & [\text{NumP pes}] = \lambda x [RT(x, \text{DOG}) \land OKU(Dog, x) = 1] \\
\text{d. } & [\text{NumP psi}] = \lambda x [RT(x, \text{DOG}) \land OKU(DOG, x) \geq 2] \\
\text{e. } & [\text{NumP Num'} 2 [\text{NP psi}]] = \lambda x [RT(x, \text{DOG}) \land OKU(DOG, x) = 2]
\end{align*}
\]

These representation secure the desired taxonomic interpretations for countable nouns. For instance, psi ‘dogs’ may receive the interpretation, stated in simplified form, \(\lambda x [T(x, \text{DOG}) \land OKU(DOG, x) \geq 2]\), denoting the set of sums of sub-kinds of DOG greater than equal to 2. It is prudent to retain the representation in (53-b) for non-countable nouns, where no unit operator is specified, as non-countable nouns may be used to refer to assemblages of stuff which do not cohere to any units. At the same time, it is necessary to all non-countable nouns to shift to the representations...
in (53-d)-(53-e), requiring a rule which converts non-countable noun templates to countable ones, that is, from $\lambda y \lambda x [RT(x, y)]$ to $\lambda y \lambda x [RT(x, y)] \land OKU(y, x) = n$. This then licenses a reading for, e.g., *tři paliva* ‘three fuels’, namely $\lambda x [T(x, FUEL) \land KU(FUEL, x) = 3]$.

We now turn to the second method to derive taxonomic interpretations in Czech. We argue that the taxonomic operator $T$ is also found in the meaning of the complex taxonomic numerals derived by *-ojí*. The lexical entry for the derivational suffix *-ojí* is given in (54), designating “different kinds”. In prose, *-ojí* takes a numeral, a kind, and a subkind or individual sum of subkinds, checks that all the parts of the (sum of) subkind are a subkind of the kind specified by the nominal head and that their cardinality is equal to that specified by the numeral.

\[(54) \quad [-ojí] = \lambda n \lambda k \lambda x [\forall z (z < x \land T(k, z)) \land |x| = n] \]

This ensures, for example in (55), that when combining with a numeral, here *dv* ‘two’, and a kind-denoting root noun, here *[N víno] ‘wine’, which happens to be non-countable at the object-level, the resulting cardinal phrase designates a sum of subkinds of wine whose cardinality is 2.

\[(55) \quad [dv-ojí víno] = \lambda x [\forall z (z < x \land T(Wine, z)) \land |x| = 2] \]

A further welcome result is an explanation of the oddity when combining taxonomic numerals with uniquely denoting noun phrases, as in (56-a), and with proper names, as shown in (56-b): These nouns do not supply the kind terms which *-ojí* requires.

\[(56) \]

\[\begin{align*}
a. \quad & #dv-ojí \quad noha \quad tohoto \quad stolu \\
& \text{two-OJII leg this table} \\
& \text{‘two kinds of this table’s leg’} \\
b. \quad & #dv-ojí \quad Petr \quad Novák \\
& \text{two-OJII Petr Novák} \\
& \text{‘two kinds of Petr Novák’}
\end{align*} \]

Section 2.3 demonstrated a different in interpretation depending on whether a simple cardinal/bare plural was used or a taxonomic numeral was used. Taxonomic uses of simple cardinal and bare plural noun phrases refer to specific, well-establish and named sub-kinds, such as specific types of varieties of wine (Chardonnay versus Riesling). This corresponds to exactly the sort of entities that would be returned by the KU operator, that is, true ‘kind units’. On the other hand, taxonomic entities referred to with taxonomic numeral phrases tended to be upper-level taxonomic contrasts, such as red
versus white wine. In the analysis of taxonomic numeral phrases given here, any taxonomic entities standing in sub-kind/concept relation to the general kind/concept are permitted, thus, it is expected that their interpretation may cover upper-level taxonomic contrasts, and further, will have a tendency to do so if specific sub-kinds are already referenced by simple cardinal phrases.

***END OF NEW MATERIAL***

So far, much of Czech’s nominal system has been able to be analyzed using the elements of Krifka’s (1995) system. We now turn to aspects of Czech’s nominal system which require an extension to this basic framework.

5 Extending the Framework: Counting Groups and Aggregates

The last section demonstrated that, with some minor modifications, Krifka (1995) can be successfully used to treat the basic cases of nominal semantics as well as taxonomic numerals. Yet, in order to cope with the data arising from group numerals and from aggregates in Czech, more substantial extensions are required. We first enrich the system with groups in the sense of Landman (1989) to account for group numerals, and then with mereotopology in the sense of Grimm (2012) to account for aggregates.

5.1 Group Numerals

The system of Krifka (1995) provides a method to analyze certain types of group nouns, such as herd, making uses of measure functions. As shown in (57), the measure function counts groups in the same way it counts atomic objects.

\[(57) \quad \lambda x[R(x, \text{Cow}) \land \text{Herd(Cow}, x) = 3]\]

While this analysis is adequate for the data discussed in Krifka (1995), the derived collective numerals in Czech require a different analysis. In particular, counting with the aid of group numerals involves counting both at the level of the number of groups and the number of individuals inside the groups. As was shown in (21), repeated here as (58), -ice assigns a cardinal value to the members of the groups (troj-ice námořníků ‘a group of three sailors’), and the groups themselves can then also be counted.

30
Accordingly, an analysis of these complex numerals will both need to contribute a generalized way to deliver a semantics which groups objects and counts the number of objects in the group. A straightforward solution is to augment the schema of Krifka (1995) with the group shifting operator ↑ from Landman (1989), which maps sums of individuals to a group.

Unlike the other complex numerals, -ice is the head of the noun phrase and takes a genitive argument describing the group members, here, as sailors. We analyze -ice, shown in (59-a), as first combining with a number, which ultimately feeds the OU operator, and then the property provided by the genitive argument. We assume the plural genitive NP provides an unsaturated property meaning. A minimal example is given in (59-c), where the application of dv- ‘two’ and then mužů to -ice results in the set of sum individuals which are ‘groups of two men’.

(59) a. \( [-\text{ice}] = \lambda n \lambda P \lambda x [\uparrow x \land P(x)(n)] \)
    b. \( [[\text{NP mužů}]] = \lambda n \lambda x [R(x, \text{MAN}) \land \text{OU(MAN, } x \text{) } = n] \)
    c. \( [[\text{NumP dvojice mužů}]] = \lambda x [\uparrow x \land R(x, \text{MAN}) \land \text{OU(MAN, } x \text{) } = 2] \)

This meaning is again fully countable, designating a singular individual or atom, but in the domain of groups. In particular, the meaning given in (59-c) can be itself be pluralized, as well as counted by means of standard cardinal numbers, where, for instance, the meaning of dvě trojice mužů, as given in (58), consists of the set of two groups of three men. We assume that the simple cardinals which precede the complex cardinals, simply occur as modifiers, that is, the meaning of dvě ‘two’ receives a standard analysis as a modifier as \( \lambda P \lambda x [P(x) \land |x| = 2] \).

5.2 Deriving and Counting Aggregates

The derived aggregate nouns and complex numerals which count aggregates require further extensions to Krifka (1995), namely the adoption of theory of aggregate nouns. First, the derived aggregate nouns and complex numerals

\[22\]We also note that this is a point where the analysis of simple cardinals possessing a built-in OU classifier runs aground, since the objects being counted here are not of the type amenable to being counted by a “natural unit” function, that is, there is no kind (or concept) of group of three sailor which is natural to measure via the OU function.
for aggregates discussed in section 2, unlike the other phenomena discussed here, showed severe restrictions. The derivational suffix -í only applied to restricted set of nouns, while the complex numerals for aggregates only applied to connected entities, which in turn could be morphologically encoded in the noun, as with -í derived nouns or pluralia tantum, or due to a noun’s meaning which proffers such a connectedness relation, as in the case of schody ‘stairs’, which typically come in multiples.

We build on the account of Grimm (2012) to provide a semantics for aggregate nouns in Czech. Grimm (2012) provides a topological extension of mereology in part to treat non-countable aggregate terms in English such as (sand or foliage) as well as to treat morphologically recognized collective/singulative classes in languages such as Welsh. The principle tool is to add connectedness relations to the standard mereological framework. While topological extension of mereology in Grimm (2012) relates to such core topics in countability such as how to define atoms and substances, we only discuss the portion of the account relevant for the Czech aggregate data.

Central to extending mereology with topological relations is including a relationship of CONNECTEDNESS. The intuitive definition of being connected is that two entities are connected if they share a common boundary. Including a definition of connectedness then interacts with the different definitions and axioms of standard mereology, as discussed in detail in Casati and Varzi (1999).

We consider first the basic relation C, CONNECTED, which is required to be reflexive and symmetrical, given as axioms in (60) and (61). There are some further intuitive interactions with the mereological relations part, ≤, and overlap, O, that Casati and Varzi (1999) note. First, the axiom in (62) ensures that parthood implies connectedness. From (62) the relation in (63) follows, whereby overlap implies connectedness.

\begin{align}
(60) \quad & C(x,x) \ (\text{Reflexivity}) \\
(61) \quad & C(x,y) \rightarrow C(y,x) \ (\text{Symmetry}) \\
(62) \quad & x \leq y \rightarrow \forall z(C(x, z) \rightarrow C(z, y)) \\
(63) \quad & O(x, y) \rightarrow C(x, y)
\end{align}

Connectedness can come in a variety of strengths. Two more specific varieties of connectedness relevant for aggregate noun semantics are EXTERNAL CONNECTEDNESS, when two entities touch on their boundaries, notated as \( C_{ext}(x, y) \) and PROXIMATE CONNECTEDNESS, when two entities are sufficiently near relative to some distance \( d \), \( C_{prox}(x, y) \). We now turn to apply
this extended system to aggregates in Czech.

5.2.1 Derived mass nouns

We now give a semantics to the morpheme -i, whereby it applies to a root noun and returns a connected set of individuals, which we will term a cluster individual, described by a root noun. We first define a transitive connection relation in (64). In prose, x and y are transitively connected relative to a property P, a connection relation C, and a set of entities Z, when all members of Z satisfy P and x and y are connected through the sequence of zs in Z.

\[
(64) \quad \text{TransitiveC}(x, y, P, C, Z) = \text{def} \forall z \in Z [P(z) \land (x = z_1 \land y = z_n) \land C_{z_1 z_2} \land C_{z_2 z_3} \ldots \land C_{z_{n-1} z_n}] \quad \text{where} \quad Z = \{z_1, z_2, \ldots, z_n\} \quad \text{(Transitively Connected)}
\]

Cluster individuals, relative to a property and connection type, are defined in (65) as a set of entities of the same type connected to one another by virtue of each being transitively connected to the others (through a set Y relative to the same property and connection relation).

\[
(65) \quad \text{Cluster}(x, P, C) = \exists Z [x = \bigoplus Z \land \forall z, z' \in Z \exists Y [\text{TransitiveC}(z, z', P, C, Y)]]
\]

With the additional topological machinery, we are now able to give a semantics to -i. We analyze -i nouns as aggregate nouns which refer to cluster individuals, that is, listi ‘foliage’ refers to connected clusters of leaves and combinations thereof. For -i-derived nouns, the relevant connectedness relation is proximate connectedness, that is, all the individual leaves, or alder trees and other examples from table 1, must be spatially close to one another (to a degree relevant for the noun at hand). Importantly, this is a stronger condition than just being a plural individual, and distinguishes the meaning of -i-derived nouns from simple plural meanings. As given in (66), the morpheme -i applies to the root (designating the kind) and returns the connected clusters. As no individual objects are at issue, the OU operator is existentially bound.

\[
(66) \quad [-i] = \lambda k \lambda x \exists n [R(x, k) \land x \in CLUSTER \land OU(k, x) = n]
\]

The semantics given here delivers on the nouns’ properties as discussed in section 2. Since the OU operator is existentially bound, it follows that these nouns resist pluralization and counting with basic cardinal numerals, since composition with such elements would fail. Unlike typical non-
countable nouns such as *water* which allow contextual shifts to countable uses by adding a contextually specified measure function which counts units, -i-derived nouns resist contextual shifts to countable uses since the OU operator is already part of the denotation, it cannot be supplied from context. Finally, the application of -i was seen to have severe lexical restrictions. The given analysis, which results in cluster individuals, is constrained to apply just to those nouns which describe entities which do come in connected sets, which is a much more restricted class of entities than those to which, e.g., plural morphology would legitimately apply.

Although the analysis just given is, we argue, sufficient to account for the core facts concerning -i nouns, we note that there is clearly more to be said to give a full account of the special semantics of terms such as lanoví ‘rigging/ropes’ (< lano ‘rope’) or krajkoví ‘lacework’ (< krajka ‘lace’). Mere spatial connectedness of a set of ropes is necessary but not sufficient for them to constitute a ship’s rigging, since, for example, the ropes must be of the appropriate types and organized in the fashion required as specified with respect to the function of rigging on a ship. We, however, leave such intriguing details to the side on this occasion.

5.2.2 Aggregate Numerals

Armed with a semantics for -i-derived nouns, we now return specifying the semantics for the complex numerals for aggregates -oje. As the complex numerals count -i-derived nouns, they clearly count cluster individuals; however, complex numerals for aggregates cannot count arbitrary cluster individuals, as there may be many such clusters in a given connected set: cluster individual of n alder trees will of course contain many smaller cluster individuals of alder trees, n − 1 and so on.

Instead, the complex cardinals for aggregates count maximal clusters, defined in (67), which are then disjoint. We then employ maximal clusters, notated MaxCluster, in our semantics for -oje given in (68).

\[
\text{(67)} \quad \text{MaxCluster}(x, P) = \exists C[\text{Cluster}(x, P, C) \land \forall y (\text{Cluster}(y, P, C) \land O(y, x) \leftrightarrow y \leq x)]
\]

\[
\text{(68)} \quad [-\text{oje}] = \lambda n \lambda P \lambda x [P(x) \land \exists Y [\forall z (z < x \land \text{MaxCluster}(z, P) \leftrightarrow z \in Y) \land |Y| = n]]
\]

-oje first combines with a numeral, similarly to the other complex numerals, and then with a noun, whose denotation is filtered to a derived set containing just the maximal clusters of the specified cardinality. As with group numer-
als, aggregate numerals combine with predicate noun type, as opposed to taxonomic numerals which select for the kind denotation. While in the case of group numerals, we assumed that the genitive NP complement was an unsaturated NP meaning as it entered into the composition with the group numerals, for aggregate numerals there are several cases to consider. They can count derived nouns like \textit{listí} ‘foliage’, which directly supply clusters, and, in what is not doubt something of a simplification, we will assimilate pluralia tantum nouns under this class, too. Aggregate numerals also count what are in one sense standard countable nouns such as \textit{hranolky} ‘French fries’, \textit{karty} ‘cards’ or \textit{klíče} ‘keys’ but which also regularly occur in connected sets, and thus also supply clusters, although we leave it open here whether this is lexically specified or pragmatically accommodated. The semantics of \textit{listí} ‘foliage’ and \textit{hranolky} ‘French fries’ are given as example meanings in (69) and (70), respectively. For \textit{hranolky} ‘French fries’ and other such predicates, we assume they undergo a shift to the number-neutral predicate before entering into composition with the aggregate numeral, which has the effect of binding off the number argument.\(^{23}\)

\[(69) \quad \llbracket \text{NP } \text{listí} \rrbracket = \lambda x\exists n[R(x, \text{LEAF}) \land x \in \text{CLUSTER} \land \text{OU}(\text{LEAF}, x) = n]\]

\[(70) \quad \llbracket \text{NP hranolky} \rrbracket = \lambda x\exists n[R(x, \text{FRY}) \land \text{OU}(\text{FRY}, x) = n]\]

We put the different elements together for the case of \textit{hranolky} ‘French fries’, and abbreviating (70) as \text{FRY}(x), producing the meaning in (71):

\[(71) \quad \llbracket \text{NumP dvoje hranolky} \rrbracket = \lambda x\exists n[\text{FRY}(x) \land \exists Y[\forall z(z < x \land \text{MaxCluster}(z, \text{FRY}) \leftrightarrow z \in Y) \land |Y| = 2]]\]

As such, the semantics arrives at a representation of \text{-oje} numerals already given in traditional grammatical descriptions of Czech, that they count just objects which are somehow connected.

Further, this analysis provides an explanation for the contrast given in (72), where \text{-oje} is infelicitously used with a noun which does not designate connected entities.

\(^{23}\)The assumption that Czech nouns are ambiguous between predicates (\langle e, t \rangle) and kinds (\langle k \rangle) receives some additional support from adjectival modification. Taxonomic numerals are not compatible with stage-level adjectives modifying its head noun – \textit{dvojí včerejší chleba} ‘two-kinds of yesterday bread’ but completely grammatical with kind level adjectives \textit{dvojí tmavý chleba} ‘two-kinds of dark bread’. But there is no such restriction with complex numerals for aggregates: \textit{dvoje včerejší/elektronické noviny} ‘two-sets of yesterday/digital newspapers’.

35
Petr viděl na dvorku dv-oje psy.  
‘Peter saw two sets of dogs in the yard.’

Other uses of -oje numerals indicate that it can be used even when a noun’s semantics does not include (maximal) clusters in its denotation. The example in (73) shows an instance where -oje counts entities described by a non-countable noun which has been coerced into a packaging reading, where the packages are themselves complex objects for which the number of objects is further specified.24

(73) dv-oje vody po šesti  
two-OJE water DIST six  
‘two packages of water, each consisting of six bottles’

Thus, -oje numerals are at once compatible with nouns which provide the appropriate semantic type, cluster individuals, but may also impose such an interpretation on nouns which do not standardly designate it.

6 Outlook: Countability from the Perspective of Czech

We have made the case that increased attention to languages with complex nominal morphology is valuable for gaining insight into countability. In this section, we conclude by inverting the usual perspective and considering the English nominal system from the perspective of Czech.

Czech demonstrates that aggregates, groups and taxonomic kinds can be counted in their own right through particular morphological means. From the perspective of Czech, the nominal system of English underspecifies the contrasts visible in Czech morphology. More nuanced differences arise as well as the overall properties of the different systems in Czech and English.

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24 Under strong pragmatic pressure even examples as (72) can be acceptable but only if the context provides the connected meaning which is required by the -oje numerals, for example, in a scenario where the two pluralities of dogs are harnessed to two different sleds. (Thanks to an anonymous reviewer for pressing this point.) Yet, there is a palpable difference between nouns which denote connected entities due to their lexical meaning (and consequently are always compatible with the -oje numerals) and other nouns as witnessed by a simple Google search: dvoje nádobi ‘two sets of dishes’ returns 142 results, many of which are in “out of the blue” contexts, while dvoje psy ‘two sets of dogs’ returns 6 results, all of them used in a context providing connected meaning, for instance, two sets of dogs, each set owned separately, or housed in different locations.
affect how different interpretations are accessed. In both Czech and English, the plural morpheme delivers sums of objects or sums of taxonomic subkinds and therefore, in the terminology of programming languages, is “overloaded” (in the same way that the + operator is often “overloaded” to perform addition on integers and concatenation on strings). Yet, in Czech the presence of overt grammatical means to count taxonomic sub-kinds, namely taxonomic numerals, impinges on the distributional range of the taxonomic plural, which is restricted to non-episodic contexts, and its interpretational range, which is restricted to specific, well-established kind units. In contrast, the taxonomic sub-kind interpretation in English is not grammatically nor interpretationally restricted, but, apparently, only by pragmatic and/or conceptual possibility.

Similarly, we have argued that the restricted interpretative possibilities of bare nouns in Czech with respect to countability are both a function of the richer interpretative possibilities overtly expressed in morphology as well as, and probably more critically, a function of the presence of bare singular count nouns. It remains to be seen how well this generalizes typologically. At present, it is clear that there is no positive evidence for extending to Czech theories which claim that there is a derivational relation between “ground” interpretations of nouns and interpretations as individuals — for example, Bale and Barner (2009) assert that ground interpretations are foundational and that “all count nouns are derived from lexical items that denote non-individuated semi-lattices.” Considering English from the perspective of Czech, ground interpretations are a peripheral phenomenon, which only occurring in limited contexts, not foundational.

In sum, Czech would appear to be a well-regimented language, where clear constraints determine which morphosyntactic context different nominal interpretations may arise; in contrast, English would appear to be very permissive and less constrained by morphosyntactic contexts and more open to contextual shifts in meaning. These observations connect to what has been repeatedly observed in other areas of grammar: what are hard grammatical constraints in one language are soft statistical constraints in another (Givón, 1979; Bresnan et al., 2001). Thus, the oft-noted particular contextual requirements to produce, e.g., ground interpretations could be seen as a soft statistical constraint against secondary interpretations of nouns designating whole individuals.

***REMOVED PARAGRAPH***

Clearly much work remains in order to gain a fuller understanding of the relation between morphosyntax and lexical semantics in nominals. Ultimately, this should aid us in understanding the causal foundations of count-
ability: Why do languages make the countability distinctions that they do? Further investigations will undoubtedly discover more distinctions, and even within Slavic languages there is much more variation than needs to be investigated and understood.

References


Scott Grimm. Plurality is distinct from number neutrality. In Lena Fainleib, Nicholas LaCarra, and Yangsook Park, editors, *Proceedings from the 41st meeting of the Northeast Linguistic Society*, Amherst, MA, 2013. GLSA.


