Mass-Count Distinction and the Russian Singulative Suffix -*in*-

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ABSTRACT

The paper addresses the morphosyntax and semantics of the Russian singulative -*in*-. This suffix attaches to a mass noun denoting an aggregate to derive a count noun naming the natural unit that the aggregate consists of (*gorox* 'peas' vs. *goroš-in-a* 'pea'). We propose that -*in*- realizes two functional heads bundled together – the categorizing n^0 and a higher head Div^0 that has a unit-making function and is responsible for the derivation of a count noun. Semantically, -*in*- functions as a mass-to-count operator that applies to aggregates and yields atomic predicates, by triggering division into natural units.

KEYWORDS mass-count distinction · countability · singulative · NP morphosyntax · NP semantics

1 INTRODUCTION

This paper investigates morphological, syntactic and semantic properties of the singulative suffix -*in*- in Russian. This suffix applies to mass nouns that denote aggregates and creates count nouns, as illustrated by the following pairs: *žemčug* 'pearl' (mass) – *žemčuž-in-a* 'a pearl' (count); *gorox* 'pea (mass)' – *goroš-in-a* 'a pea'. We argue that -*in*- appears in a structurally low position and fulfills two functions: that of a nominalizer (n^0) and that of a divider (Div^0), in the sense of Borer (2005). Semantically, we propose that it functions as a mass-to-count operator that applies to aggregate-denoting nouns and renders them atomic predicates, by triggering division into natural units.

The paper is organized as follows. §2 is devoted to a pre-theoretical discussion of the suffix -*in*-. In §3, we address the morphosyntactic properties of -*in*- and discuss their implications for an analysis of -*in*- to be proposed in the following section. In §4, we lay out our analysis of the singulative. §5 concludes the discussion.

2 MEANING AND DISTRIBUTION: DESCRIPTIVE GENERALIZATIONS

The suffix -*in*- that constitutes our object of investigation[1] is sometimes treated in the literature as a singulative (Musatov 2015, Kagan & Nurmio 2024) and sometimes, as a diminutive (Timberlake 2004). While the two functions are indeed cross-linguistically interrelated, we will analyze -*in*- as a singulative, since the contribution of this item is, as will be shown in detail below, to turn mass nouns into count ones.[2] It thus creates

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[1] Like many other Russian suffixes, -*in*-, has a number of homophones with different distributions and semantics. We only deal in this paper with the singulative -*in*- that applies to granular inanimate mass nouns. In particular, we leave the analysis of singulativization of human nouns such as *armjan-e* – *armjan-**in*** 'Armenians – an Armenian (masc.)', which differ from singulatives of non-human nouns in many respects, for further research.

[2] The term "diminutive" has been used in the literature in a broad sense that covers a wide spectrum of uses, many of which are not related to smallness and which include the countizing function (Jurafsky 1996). We

the "unit" interpretation characteristic of singulative suffixes cross-linguistically (cf. e.g. Acquaviva 2015, Nurmio 2019, and references therein) and bears a classifier-like function.[3]

Let us begin by considering the pair *gorox* 'pea (mass)' – *goroš-in-a* 'a pea'. Following the tradition in Russian studies, we call the noun to whose root *-in-* attaches the **motivating noun** – for instance, the motivating noun for *goroš-in-a* 'a pea' is *gorox* 'pea (mass)', and for *rosinka* 'dew drop', it is *rosa* 'dew'. The motivating noun *gorox* is demonstrably a mass noun. First, it does not pluralize: *gorox* 'pea (mass)' – **goroxi* 'pea.PL(mass)'. In addition, it cannot combine with numerals, at least not under the standard meaning "nP-objects": **tri goroxa* 'three peas'. Note that the latter property is independent of pluralization. In Russian, paucal numerals like *tri* 'three' are followed by a genitive **singular** noun; still the expression above is unacceptable. It might be saved in a rich context which could force such interpretations as "three portions of pea" or "three kinds of pea", but that, again, is characteristic of mass nouns. Semantically speaking, *gorox* is characterized by such properties as cumulativity and divisibility (the latter at least down to a certain point). The sum of two instances of *gorox* constitutes *gorox*, too, and if we take a portion of *gorox* and divide it in two, each part will count as *gorox*.

In turn, *goroš-in-a*, which contains the suffix *-in-* (followed by an inflectional suffix *-a* indicating feminine gender), is entirely different in all these respects, and behaves like a typical count noun. It is easily pluralized: *gorošina* 'a pea' – *gorošiny* 'peas'; it can be counted: *tri gorošiny* 'three peas', and it is neither cumulative nor divisible. Thus, two instances of *gorošina* together do not fall under the denotation of *gorošina* (but only under that of the plural predicate *gorošiny*). Similarly, if a *gorošina* is divided into two parts, none of them will count as *gorošina* (but rather, for example, as half a *gorošina*). Additional examples of nouns with *-in-* are provided in (1) below.

(1)
kartofel' – *kartofel**ina***	'potato – a potato'
xvorost – *xvorost**ina***	'brushwood – a long stick'
soloma – *solom**ina***	'straw – a straw'
čerešnja – *čereš**ina***	'sweet cherry – a sweet cherry'
klubnika – *klubnič**ina***	'strawberry – a strawberry'
vinograd – *vinograd**ina***	'grape – a grape'
kukuruza – *kukuruz**ina***	'corn – an ear of corn'
česnok – *česnoč**ina***	'garlic – a clove of garlic'
fasol' – *fasol**ina***	'bean – a bean'
grad – *grad**ina***	'hail – a hailstone'
posuda – *posud**ina***	'kitchenware – a dish'

It should be pointed out that *-in-* is compatible not only with singular mass nouns, but also with some pluralia tantum nouns denoting (sets of) entities consisting of two or many similar parts (2).

(2)
busy – *bus**ina***	'beads – a bead'
brjuki – *brjuč**ina***	'trousers – a trouser leg'
štany – *štan**ina***	'pants – a pant leg'

Finally, the bases of some motivating nouns are not compatible with the "bare" *-in-* morpheme but are compatible with the singulative suffix *-ink-*, which consists of a (possibly not synchronically compositional) combination of *-in-* and diminutive *-k-* (3).

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use the more restricted term "singulative", which reflects the specific semantic function contributed by *-in-* (see Kagan & Nurmio 2024 for a detailed, explicit discussion of the importance of distinguishing between singulativity and diminutivity.)

[3]See also Kagan & Nurmio (2024) for evidence that *-in-* does not contribute a "smallness" entailment. For instance, *kartofel-in-a* (potato-IN-F) need not be a small potato, and *l'dina* (ice-IN-F) can definitely be a very big ice floe.

(3)   *trava – travinka*   'grass – a blade of grass'
       sneg – snežinka   'snow – a snowflake'
       volosy – volosinka   'hair – a hair'
       pux – pušinka   'fluff – a bit of fluff'
       pesok – pesčinka   'sand – a grain of sand'
       ris – risinka   'rice – a grain of rice'
       krupa – krupinka   'groats – a grain of groats'
       sor – sorinka   'litter – a dirt particle'
       pyl' – pylinka   'dust – a dust particle'...

The distinction between *-in-* and *-ink-*, as well as the question of the (non)compositionality of the latter, fall beyond the scope of the present paper (but see Musatov 2015, Khrizman 2019, Kagan & Nurmio 2024 for discussion.) Crucially for the current purposes, *-in-* and *-ink-* share the singulative meaning component to be analyzed in this paper; therefore, both types of examples are equally relevant for the present study. Still, it should be pointed out that *-ink-* introduces an additional, diminutive, meaning component that will not be discussed here.

According to the descriptive generalization made above, and as can be seen from our examples in (1)-(3), *-in-* (as well as *-ink-*) applies to mass nouns in the singular (and, more rarely, to pluralia tantum). However, the generalization has to be narrowed down. The singulative suffix only applies to aggregates. These are mass nouns which despite their mass properties are conceptualized as involving natural units into which the corresponding "mass" can be divided (cf. e.g. Grimm 2013, Grimm & Dočekal 2021). In the absence of an association with such natural units, *-in-* (as well as *-ink-*) cannot apply. Therefore, it is generally unacceptable with substances (4).

(4)   *voda*   'water'   **vodina /*vodinka*
       pivo   'beer'   **pivina / *pivinka*
       vino   'wine'   **vinina / *vininka*
       grjaz' 'dirt'   **grjazina / *grjazinka*
       kaša   'porridge'   **kašina / *kašinka*...

In this respect, we depart from Khrizman (2019), who claims that *-in-* and *-ink-* are compatible with non-granular substances. While occasional examples in which *-in-/-ink-* seem to combine with substance-denoting bases are occasionally found, each such example allows an explanation that is compatible with the "natural unit" view. We consider three such instances below.

One such example, *krov'* 'blood' – *krov-ink-a*, should be excluded from consideration altogether. The word *krovinka* lacks the expected compositional meaning in modern Russian – it is not used with the meaning 'blood droplet'. Rather, it only occurs in certain idiomatic expressions, e.g. *ni krovinki* 'not a single blood droplet' uttered about a very pale face.

Another example is *lëd* 'ice' – *l'dina* 'ice floe'. While ice is a substance, *l'dina* cannot refer to any arbitrarily or contextually picked piece of ice. Rather, it is typically used to refer to a piece of ice floating on the water. Such units are individuated in the sense of having clear physical boundaries and thus being disjoint from other analogous units. We propose that the attachment of *-in-* becomes possible due to the existence of such natural units and reconceptualization of ice as a set thereof.

The third example is *žir* 'fat' – *žirinka* 'globule of fat'. Again, the denotation of *žirinka* does not include any instance of fat; rather, it is limited to easily perceivable globules floating, for example, on the surface of a soup. The noun thus refers to a set of natural units lexically associated with the original noun.

To sum up the discussion thus far, the singulative morpheme *-in-/-ink-* applies to aggregate mass nouns in the singular and (more rarely) pluralia tantum, and creates count nouns. Its application is sensitive to the notion of a natural unit. In the next subsection,
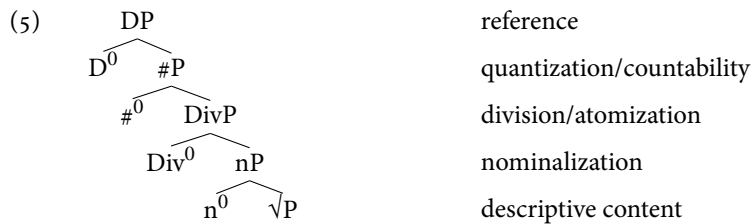
we discuss the morphosyntactic properties of this suffix. For the sake of simplicity, we will not mention *-ink-* separately, but assume that what we say about *-in-* also applies to *-ink-*.

3 MORPHOSYNTACTIC PROPERTIES AND FUNCTIONAL HEADS

We will follow neo-constructionist approaches to the meaning of noun phrases (Acquaviva 2018, Borer 2003, 2005, Borik & Espinal 2020, among others), according to which nouns enter the derivation as mass, but become countable by addition of structure.

As shown in (5), we adopt the extended DP-structure proposed by many researchers such as Cheng et al. (2017), Alexiadou et al. (2007), Borer (2005), Cheng & Sybesma (1999), and Zamparelli (2000), a. o. who, however, use different labels. We complement this structure with an additional decomposition of the nP into an uncategorized root that introduces the descriptive content and the nominalizing head n^0 that categorizes the root as a noun, as is standardly assumed both in Distributed Morphology (Marantz 2001) and in neo-constructionist approaches (e.g. Borer 2003).

To repeat, we assume that the noun at the level of nP has a mass or kind-level denotation and is uncountable. To impose countability, Borer (2005) posited the Div(ision)P, which divides the undivided mass into countable portions/atoms. In classifier languages Div^0 is the locus of numeral classifiers and for that reason this head has sometimes been called Cl(assifier)^0 and the phrase itself, the Cl(assifier) phrase. In the absence of ClP or DivP, the mass interpretation is retained. The #P (Numeral or Quantity phrase above DivP) is responsible for counting and quantization. Its head realizes number (feature [$\pm$PL], cf. Embick & Noyer 2007: p.307. Numerals may be inserted in its specifier. The head D^0 introduces a referential index and maps the whole phrase into a referential argument.

(5)

DP	reference
D^0 #P	quantization/countability
#^{0} DivP	division/atomization
Div^0 nP	nominalization
n^0 √P	descriptive content

We assume that terminal nodes are realized by morphemes. We follow the standard assumption that the order of the morphemes normally reflects the syntactic derivation of a complex word, with the suffixes that realise lower functional heads being closer to the root than those that realize higher ones (in accordance with Baker's 1985 Mirror Principle).

The question we want to answer is, what piece of the fine-grained NP structure represented in (5) is spelled out by the singulative suffix *-in-* in Russian. In what follows we will first discuss the status of *-in-* as a syntactic head vs. a modifier. Then we will show that the distributional properties of *-in-* suggest that it must be located below #P. We will provide evidence in favor of *-in-* spelling out n^0 and then also arguments in favor of *-in-* spelling out Div^0. Following this evidence, in §4, we will propose that the suffix realizes the fused complex head Div^0/n^0.

3.1 SUFFIX *-in-* AS A HEAD

In this section, we argue that *-in-* spells out a head on the syntactic spine.

Let us begin with the status of *-in-* as a head or a modifier. The distinction of suffixes as heads or as modifiers goes back to Selkirk (1982) and Williams (1981). While suffixes as heads have the ability to project their features in the structure, suffixes as modifiers cannot do so. As Gouskova & Bobaljik (2022) show, the suffix *-onok* can serve variously

as either a head or as a modifier. In (6-a) *-onok* determines the gender of the noun and behaves as a head. The noun derived with *-onok* is masculine, regardless of the feminine gender of the base noun. The declension class also changes. In (6-b) *-onok* behaves like a modifier: it does not determine the gender; rather, the derived noun inherits the feminine gender from the base noun. The head/modifier use of *-onok* corresponds to a difference in meaning. As a head *-onok* is a size diminutive denoting baby animals, while as a modifier it has an evaluative meaning with a dismissive/affectionate flavor.

(6)   a.   *myš'* 'mouse' (F, Cl. III) *myš-onok* 'baby mouse' (M, Cl. IA) *-onok* head
        b.   *lošad'* 'horse' (F, Cl. III) *lošad'-onk-a* 'horse (eval.)' (F, Cl. II) *-onok* modifier

As can be seen in (6-b), while the modifier *-onok* does not determine the gender of the resulting noun, the declension class changes. Gouskova & Bobaljik (2022) claim that declension class should not be treated in the same way as gender, since declension class is a part of morphophonological system rather than a pure morphosyntactic feature. Thus, declension class specification may change even if gender does not (i.e., even if the suffix has the status of a modifier).

Turning back to *-in-*, this suffix always imposes the feminine gender and declension class II on the derived lexeme. (We use the declensional class notation from Timberlake 2004). It is not sensitive to the gender and declensional class of the motivating noun, or to its being a singular or a plurale tantum, as illustrated in Table 1.

motiv. noun	gender decl. class	translation	*-in*-form	gender decl. class	translation
žemčug	M, IA, non-palat.	'pearl'	*žemčužina*	F, II	'a pearl'
jačmen'	M, IA, palatalized	'barley'	*jačmenina*	F, II	'a grain of barley'
pšeno	N, IB	'millet'	*pšeninka*	F, II	'a grain of millet'
klubnika	F, II	'strawberry'	*klubničina*	F, II	'a strawberry'
rož'	F, III	'rye'	*ržinka*	F, II	'a grain of rye'
makarony	no gender, plural	'macaroni'	*makaronina*	F, II	'a piece of macaroni'

Table 1: Gender and inflectional class of *-in*-forms and their motivating noun.

As we can see in Table 1, the singulative suffix *-in-* determines the gender (and declension class) of the derived noun, which is typical for syntactic heads. Therefore, we conclude that *-in-* has the status of a syntactic head rather than of a modifier. However, at this point we cannot decide what kind of head it is. The following subsections are therefore devoted to a deeper investigation of the morphosyntactic properties of *-in-* with the aim to identify its position in the extended nominal projection we introduced in (5) above.

3.2 SUFFIX *-in-* IS BELOW #P

In this subsection, we discuss two distributional facts about *-in-* that indicate that *-in-* must spell out some part of the structure **below** the number phrase #P. The first observation has to do with pluralization. As we have mentioned in §2, singulatives with *-in-* may pluralize and the plural suffix attaches to *-in-*.

(7)   Singular of singulative → Plural of singulative
        grad-in-a   *grad-in-**y***
        hail-IN-F.SG   hail-IN-PL

        'a hailstone'   'hailstones'

Geist & Błaszczak (In press) account for the co-occurrence of singulative morphemes with the plural morpheme. Adapting Mathieu's (2014) argumentation for Welsh and Arabic, they show that the type of plural involved in the pluralization of the singulative in Russian is the so-called counting plural.[4] This type of plural realizes the numeral head $\#^0$. If the plural morpheme in (7) spells out the head $\#^0$, the morpheme *-in-*, which linearly precedes it, must realize some functional head below it.

Secondly, diminutives and augmentatives clearly occupy a position below #P (De Belder et al. 2014, Cinque 2015). As shown in (8), they must follow *-in-*. Accordingly, they must appear above the singulative in the hierarchical structure (5).

(8) a. *-in-* > DIM
žemčuž-in-**k**-a/i
pearl-IN-DIM-F.SG/PL

bus-in-**k**-a/i
bead-IN-DIM-F.SG/PL

b. DIM > *-in-*
*žemčuž-**k**-in-a/i
pearl-DIM-IN-F.SG/PL

*bus-**k**-in-a/i
bead-DIM-IN-F.SG/PL

c. *-in-* > AUG
žemčuž-in-**išč**-a/i
pearl-IN-AUG-F.SG/PL

bus-in-**išč**-a/i
bead-IN-AUG-F.SG/PL

d. AUG > *-in-*
*žemčuž-**išč**-in-a/i
pearl-AUG-IN-F.SG/PL

*bus-**išč**-in-a/i
bead-AUG-IN-F.SG/PL

Given that *-in-* is located below #P, we conclude that it can in principle be located in Div^0 or n^0. We will now consider these two options in turn.

3.3 SUFFIX *-in-* AS A NOMINALIZER

We begin by providing evidence that *-in-* realizes the head that determines the lexical category, namely n^0. We observe that *-in-* is in complementary distribution with other nominalizers. While further derivational suffixes may attach to *-in-*, it does not allow nominalizing suffixes between the root and itself. To argue for the latter point, we can draw upon the following observation of Lopatin & Ulukhanov (2016: p.381). They noticed that the suffixes *-nik* and *-k-* have to be dropped from the motivating nouns for *-in-* to be able to attach to the root. This is illustrated in (9). Retaining *-nik* or *-k-* in any motivating noun in the left column would result in ungrammaticality.[5]

(9) *kartoš-k-a* 'potato'   →   *kartoš-in-a* 'a potato'
moroš-k-a 'cloudberry'   →   *moroš-in-(k)-a* 'a cloudberry'
štaket-nik 'fence consisting of →   *štaket-in-a* 'a plank used for a fence'
      planks'
valež-nik 'coarse woody debris' →   *valež-in-a* 'a single fallen off branch'
kryžov-nik 'gooseberry'   →   *?kryžov-in(k)a* 'a gooseberry'

Given that both *-nik* and *-k-* (on the relevant use) frequently form nouns from otherwise categoryless bound roots, sometimes providing little semantic contribution, or a very vague one (e.g. *moroška* 'cloudberry-in-' above), it is reasonable to treat them as exponents of the root-selecting[6] n^0. The fact that these suffixes have to be dropped in order for *-in-* to attach suggests that *-in-* competes for the same position and functions as a nominalizer.

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[4]Borer (2005: chapter 4) assumes that the plural, at least in English, does not indicate number but rather division, it realizes Div^0. Mathieu (2014) argues that, in addition to the plural that indicates division, it is reasonable to posit the existence of another type of plural, the so-called "counting plural". It is realized in $\#^0$. Counting plural forms sums of atoms made accessible by the division performed by Div^0. We will not discuss other types of plural in this paper, but see Geist & Błaszczak (In press) for details.

[5]*Kryžov-in(k)a* is judged at least a possible word by many speakers.

[6]The system of Kramer (2015) allows for n^0 heads that select other n^0. In these terms, *-in-* and *-k-* spell out the lowest n^0 head in the structure.

Still, there is a difference in the semantic contribution of nominalizing suffixes like *-k-/-nik* and *-in-*, which, in a neo-constructionist approach, which we stick to here, suggests that they cannot be entirely structurally identical. We will discuss this issue in the next subsection.

3.4 SUFFIX *-in-* AS A DIVIDER

As we mentioned in §3.1, in neo-constructionist approaches to the meaning of noun phrases (see, a.o., Borer 2003, 2005 for a variety of languages and Borik & Espinal 2020 specifically for Russian) it has been assumed that countability is not lexically encoded in the noun but is rather syntactically derived from the non-countable mass interpretation by combining the nP with the Div head that hosts countability features. On this view, nPs are uncountable and have an abstract kind-level denotation. It has been proposed that, as a diagnostic for such a denotation, one can use the occurrence of a nominal as an argument of kind-level predicates such as *be widespread, be invented*. Examples (10-a)-(10-b) show that nouns with nominalizing suffixes *-nik* and *-k-*, which we considered in the previous section as exponents of n^0, can serve as the subject of such predicates. Aggregate mass nouns with a zero nominalizing suffix are licensed in such contexts, too, see (10-c).

(10)　　a.　Kryžovnik　rasprostranën na Kavkaze.
　　　　　gooseberries common　　　on Caucasus
　　　　　'The gooseberry is common in the Caucasus.'
　　　b.　Kartoška popala v Rossiju čerez　　Evropu.
　　　　　potatoes arrived in Russia through Europe
　　　　　'Potatoes arrived in Russia through Europe.'
　　　c.　Gorox kak kuľtura byl raspostranën v Evrope uže　　v seď mom
　　　　　peas　as　crop　　was common　　in Europe already in 7th
　　　　　veke　　do　našej èry.
　　　　　century before our　era
　　　　　'The pea as a crop was common in Europe already in the 7th c. BCE.'

Interestingly, the corresponding nouns with *-in-* are infelicitous in these contexts (11).

(11)　　a.　#Kryžovina　　　rasprostranena na Kavkaze.
　　　　　gooseberry.IN.F widespread　　　on Caucasus
　　　b.　#Kartošina　popala v Rossiju čerez　　Evropu.
　　　　　potato.IN.F came　in Russia　through Europe
　　　c.　#Gorošina kak kuľtura byla raspostranena v Evrope uže　　v seď mom
　　　　　pea.IN.F　as　crop　　was common　　in Europe already in 7th
　　　　　veke　　do　našej èry
　　　　　century before our　era

We propose that the contrast between (10) and (11) is due to the fact that *-in-* realizes Div^0 head, which performs division into atomic instances of a kind, and thereby rules out the kind-level interpretation.

Further evidence in favor of this view comes from the properties of kind-level modification, which in Russian is possible with postponed adjectives (Trugman 2013: p.329) as in (12). Kind-level modifiers have been analyzed in the literature as properties of kind-level individuals, rather than of particular objects. These modifiers are integrated very low in the structure (McNally & Boleda 2004). However, such adjectives are infelicitous with nouns containing *-in-*, as shown in (13).

(12)　　a.　Kryžovnik　obyknovennyj – rasprostranënnyj sort.
　　　　　gooseberry common　　　wide-spread　　variety
　　　　　'The common gooseberry is a wide-spread variety.'

b.   Kartofel' gatčinskij   dopuščen k ispoľzovaniju v Russijskoj
     potato   from.Gatchina admitted to use   in Russian
     Federacii s   1969 goda.
     Federation since 1969 year
     'The Gatchina potato has been approved for use in the Russian Federation
     since 1969.'

c.   Gorox kormovoj raspostranën v severnoj polose Rossii.
     pea   fodder   is.common   in north   region Russia
     'The fodder pea is common in the northern regions of Russia.'

(13)   a.   #Kryžov-in-a   obyknovennaja – rasprostranënnyj sort.
            gooseberry-IN-F common   wide-spread   variety
            intended: 'The common gooseberry is a wide-spread variety.'

       b.   #Kartofel-in-a gatčinskaja   dopuščena k ispoľzovaniju v Russijskoj
            potato-IN-F   from.Gatchina admitted   to use   in Russian
            Federacii s   1969 goda.
            Federation since 1969 year
            intended: 'The Gatchina potato has been approved for use in the Russian
            Federation since 1969.'

       c.   #Goroš-in-a kormovaja raspostranena v severnoj polose Rossii.
            pea-IN-F   fodder   is.common   in north   region Russia
            intended: 'The fodder pea is common in the northern regions of Russia.'

All in all, these data show that singulatives in Russian can only have an object-level interpretation. Assuming that ordinary nPs have a kind-level denotation, nouns with the singulative *-in-* cannot be adequately analyzed as bare nPs.

We propose that such nominals are DivPs. As we have shown in §2, *-in-* combines with motivating nouns denoting aggregates and indicates division into natural units, which are object-level entities. Division of mass into units is a typical function of exponents of the functional head Div^0. Numeral classifiers in classifier languages (Borer 2005), but also singulative morphemes in Arabic, Celtic and Nilo-Saharan (Mathieu 2012, 2014), have been analyzed as realizations of Div^0. Since Russian *-in-* performs a similar function, it can be analyzed as an exponent of Div^0, too. One distinction between typical Div-exponents and *-in-* is that *-in-* **combines division with the nominalizing function**.

To conclude this section, the discussion of morphological and semantic properties of *-in-* shows that it behaves like a head rather than a modifier. Specifically, it serves as a nominalizer, and it simultaneously functions as a divider that derives nouns denoting natural units. In the next section we provide an analysis that accounts for these properties of *-in-*.

4   ANALYSIS OF *-in-* AT THE SYNTAX/SEMANTICS-INTERFACE

To account for the distributional and interpretational properties of the singulative suffix *-in-* discussed in the previous sections, we propose that it realizes the combination of two heads, the nominalizing head n^0 and the divider head Div^0. In 4.1 we introduce semantic background for our analysis of *-in-* at the syntax/semantics-interface, which is presented in 4.2. In 4.3 we develop our analysis of singulative forms and we discuss the implications in 4.4.

4.1   SEMANTICS OF NOUNS AND MASS/COUNT DISTINCTION

In this subsection we introduce the analysis of nouns proposed by Chierchia (2010). Chierchia (2010) claims that nouns may have various semantic denotations: kind, non-atomic (number neutral) property, and atomic property. For a noun like *dog* the three denotations are given in (14). Chierchia takes these denotations to be semantically related

by type shifting operators, so that the kind-denoting noun is the original type, from which the number neutral property and the atomic property can be derived in turn.

(14) dog as kind: dog_k type e
      dog as number neutral property: $^{\cup}dog_k = \lambda y[y \leq dog_k]$ type <e,t>
      dog as atomic property: $\lambda x[AT(P)(x)]$ type <e,t>

Kinds may be represented as individuals of type e.[7] A kind is related to a property of being an instance of that kind (which is represented by the "part of relation ≤"). Such properties may be derived from the kind by the $^{\cup}$ operator. The application of this operator to the kind-denotation dog_k yields the property of being part of the dog-kind. This property is number neutral because it does not differentiate between singular and plural instances, i.e., it applies to individual dogs as well as to groups or sums of dogs. Chierchia takes number neutral properties to represent the extension of the bare plural nouns in English. We assume that in Russian, such denotations may be expressed by singular generic nouns such as in our examples in (10) above. Following Borik & Espinal (2020), such generics in Russian can be derived by combination of number neutral properties with an argument-forming zero determiner.[8]

The third representation in (14) is the denotation of the countable noun dog in the singular. It denotes a property/a set of dog individuals. To derive this denotation from number neutral properties, Chierchia uses the function AT(omic). It extracts from number neutral properties atoms to the exclusion of sums. If applied to number neutral property $^{\cup}dog_k$, AT operator extracts individual dogs from it. Atomic property can serve as input for combination with numerals. Numerals require stable atoms in Chierchia's sense and can only be combined with atomic properties.

Now consider mass nouns. Chierchia assumes that not only count nouns but also mass nouns draw their denotation in the atomic domain. As opposed to count nouns, which, according to Chierchia, denote *count kinds*, mass nouns like *beer* and *rice* denote *mass kinds*. The difference is this: for count kinds, it is relatively clear what unit qualifies as an atom. Atoms in the domain of count nouns, e.g. *dog*, are *stable*, i.e. they remain the same in every precisification. In the domain of mass nouns, atoms are not stable but rather vague. The elements in a denotation of a mass noun may be split into components more than one way. What counts as an atom depends on the precisification.

How do we succeed in uttering phrases like *three beers*? Consider beer as a mass kind for the substance. The number neutral property $^{\cup}beer_k$ derived from the kind can apply to different amounts of beer. Beer naturally occurs in standard servings like glasses and bottles. We can refer to such standard amounts of beer with expressions like *one beer* or *three beers*, which trigger reinterpretation of *beer* as a count noun by the coercion known as "universal packaging". It causes the reinterpretation of mass as a standardized bounded amount thereof. For the formal implication of such a coercion Chierchia uses covert operator Π_{ST} for a context-sensitive standardized partition over sums.

(15) Standardized partition
      $\lambda P.\Pi_{ST}(P)$

The partition operator is a function of type $<<e, t>, <e, t>>$. According to Chierchia, it applies to the substance denoted by the mass noun and "packs" it into standardized units, typically associated with contextually salient containers, e.g., bottles, glasses, plates, etc. It "spells out the universal packaging function" and imposes "partition for P most salient

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[7]To be more precise, kinds are individual concepts of type <s,e>. However, for the sake of simplicity, we will omit the world coordinate in our semantic representations of kinds and properties.

[8]Borik & Espinal (2020) differ from Chierchia analyzing 'numberless properties' as properties of kinds:

(i) $\lambda y^k[dog(y^k)]$

in [context] *c*" (Chierchia 2010: p.129, p.130). The result is a count noun denoting a (stable) atomic property that can be pluralized and combined with a numeral.

We propose that the function of the singulative suffix *-in-* in Russian is similar to that of Chierchia's Π_{ST}, with the exception that *-in-* imposes division into natural units. We elaborate on this approach in the next subsection.

4.2 SUFFIX *-in-* AS THE SPELLOUT OF THE COMPLEX HEAD DIV

For our analysis of *-in-* at the syntax/semantics interface we will combine semantic ingredients borrowed from Chierchia (2010) with syntactic structure we introduced in §3. We situate our analysis within the Distributed Morphology (DM) framework (Harley & Noyer 1999, Marantz 1997, 2001) endowed with a semantic analysis (Harley 2012). In DM, the syntax operates on abstract bundles of syntacticosemantic features like [Pl] ('plural') or [$\sqrt{}$dog] ('dog'). Such feature bundles serve as input to semantic composition and interpretation at the level of Logical Form, after syntactic computation is finished.

Our semantic analysis of *-in-* is inspired by Chierchia's (2010) partition operator approach. We believe that *-in-* is an exponent of partition operator that triggers a mass-to-count shift. However, the two operators differ in that Π_{ST} is context-sensitive, whereas partition operator spelled out by *-in-* is not. Instead, the latter imposes division that is based exclusively on the concept of natural units (NU) in the sense of Krifka (1989).

We will call the partition operator realized by *-in-* Π_{NU} and assume that it is the semantic contribution of the feature [SINGULATIVE] associated with the Div^0 head in the syntax. The denotation of this feature is given in (16-a). This feature fixes the relevant minimal parts of P by taking natural units thereof.

As we have argued in §3, the singulative suffix *-in-* combines the function of singulativization with the nominalizing function, thus it spells out not only the feature [SINGULATIVE] but also the category feature [N] (noun). Assuming that nouns syntactically start their life as roots with kind denotation, the nominalizing feature in n^0 triggers the shift of the kind into numberless property. Following Chierchia we assume that this is done by the $^\cup$ operator, cf. (16-b). Vocabulary item *-in-* thus spells out feature bundle [SINGULATIVE,N], cf. (17).

(16)   a. $[\text{SINGULATIVE}]_{Div^0} = \lambda P.\Pi_{NU}(P)$
             undefined if P is not divisible into natural units
        b. $[\text{N}]_{n^0} = \lambda k[^\cup k]$

(17)   SINGULATIVE, N $\Leftrightarrow$ /in/

How can we explain that not all roots can combine with the feature bundle expressed by *-in-*? The restriction of divisibility into **natural units**, subject to the speakers' conceptualization of the property in question, plays a crucial role in accounting for this restriction. As argued in §1, *-in-* attaches to roots denoting aggregates but not substances. Although aggregates and substances both have units in their denotation (Chierchia 2010), only aggregates have natural units (e.g. *gorox* 'peas' includes a collection of individual peas in addition to pluralities thereof, as well as half peas and smaller particles of peas). In contrast, *beer* is not conceptualized as (a collection of) natural beer-units. Therefore, we assume that *-in-* with the features [SINGULATIVE, N] does not combine with the root $\sqrt{}$piv- 'beer' but it may combine with the root $\sqrt{}$ros- 'dew', since dew is conceptualized as a set of individuated, perceptually distinct, disjoint drops and pluralities thereof.

4.3 DERIVATION OF A SINGULATIVE FORM

In this subsection we will first lay out the derivation of the aggregate mass noun *gorox* 'pea' and then of the singulative noun *gorošina* 'a pea'. Both forms originate from the root $\sqrt{}$pea. It denotes the mass kind *pea$_k$* generated out of unstable atoms. The combination

with the nominal feature N associated with n^0 yields an nP denoting the number neutral property $^\cup pea_k$.
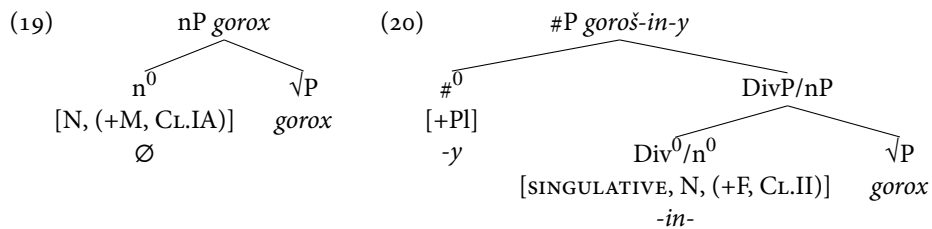
We propose that n^0 also bears the gender and declension class specification. This view is based on the assumption that roots bear no gender features (see e.g., Kramer 2015). However, although these features originate on n^0, they are dissociated in the post-syntactic component and expressed on inflectional suffixes along with case and (if available) number (Embick & Noyer 2007, Kramer 2015). In our example, n^0 bears masculine gender and IA non-palatalized declension class. These features are spelled out by zero morpheme.

As a number neutral property, *gorox* can be combined with an argument-forming zero determiner in D and occur as the subject of a kind-level predicate (Borik & Espinal 2020), see (10-c) repeated here in a simplified form in (18).

(18)   Gorox raspostranen v Evrope.
        peas   is-widespread in Europe
        'The pea is common in Europe.'

Borik & Espinal (2020) have convincingly shown that although generic nouns like *gorox* in (18) are morphologically singular in Russian, they are semantically numberless and lack a syntactic layer responsible for division or atomization (i.e., in our analysis, they lack the DivP layer). As we have mentioned in §2, *gorox* cannot pluralize and cannot combine with numerals. This ban can be straightforwardly explained in our analysis: the numberless property $^\cup pea_k$ corresponding to nP layer provides no stable atoms for counting. The precondition for combination with numerals is that the property applies to stable minimal entities (i.e., these entities must be the same ones in every precisification). *Pea* can be infinitely subdivided into units of different sizes while preserving its quality as PEA.

Now consider the derivation of the singulative form *gorošina* 'a pea'. This form is derived from the same kind-denoting root by combining it with the nominalizing feature [N] in n^0 and with the feature [SINGULATIVE] in Div^0. These features each constitute a distinct locus of vocabulary insertion. However, two feature nodes appear to correspond to a single overt exponent, the vocabulary item *-in-*, which cannot be morphologically segmented. We resolve this mismatch using the operation of Fusion (Halle & Marantz 1993: p.116). Fusion manipulates the representation of the syntax prior to vocabulary insertion. In our derivation it combines Div^0 and n^0 into a single terminal node with the features of both input nodes, but no internal structure. A fused node provides a single locus for insertion of *-in-*. This proposal is based on the common view (see e.g. Bobaljik & Thráinsson 1998 for the IP, Munn & Schmidt 2005 for NP, De Belder 2011 for DivP) that languages select features from the set provided by the UG, but that in one language these features may be projected as split syntactic heads, while they can be projected as unsplit, "fused", heads in another language. The tree in (19) represents the analysis of the mass noun *gorox*; (20) gives the structure of the singulative form *gorošina*. The semantic analysis for (19) is given in (21) and for (20) in (22).

(19)   nP *gorox*   (20)   #P *goroš-in-y*

        n^0 √P $\#^0$ DivP/nP
    [N, (+M, CL.IA)]   *gorox*   [+Pl]
        Ø   *-y* Div^0/n^0 √P
                                            [SINGULATIVE, N, (+F, CL.II)]   *gorox*
                                                    -in-

(21)   a. $[\sqrt{\text{pea}}] = pea_k$ e   (22)   a. $[\sqrt{\text{pea}}] = pea_k$ e
    b. $[\text{N}]_{n^0} = \lambda k[^{\cup}k]$ $<e,t>$ b. $[\text{SINGULATIVE, N}]_{Div^0/n^0} =$
    c. $[\text{N}, \sqrt{\text{pea}}]_{nP} =$ $\lambda k[\Pi_{NU}(^{\cup}k)]$ $<e,t>$
      $\lambda k[^{\cup}k](pea_k) = {^{\cup}pea_k}$ $<e,t>$ c. $[\text{SINGULATIVE, N}, \sqrt{\text{pea}}]_{DivP/nP}$
                 $= \lambda k[\Pi_{NU}(^{\cup}k)](pea_k)$
                 $= [\Pi_{NU}(^{\cup}pea_k)]$ $<e,t>$
    d. $[\text{+Pl, SINGULATIVE, N},$
      $\sqrt{\text{pea}}]_{\#P} = {^*\Pi_{NU}(^{\cup}pea_k)}$
                 $<e,t>$

The plural in (22-d) is derived by the closure operation '*' (e.g. Link 1983). Applied to the atomic property derived in DivP/nP, it yields sums of natural units of peas.

We propose that the head Div^0/n^0 also bears feminine gender and declensional class II. Since it is a syntactic head rather than a modifier, it projects these features to the whole phrase. These features are dissociated in the postsyntax and may be expressed on inflectional suffixes, as specified above. However, as always in Russian, gender is neutralized in the plural and spelled out by *-y*.

(23) $\text{+Pl} \Leftrightarrow /\text{y}/$

Our analysis straightforwardly explains our empirical finding that nouns derived with singulative suffix *-in-* are incompatible with kind-level predicates and can only receive an object-level interpretation (see our examples in (10) in §3.4 above). According to Borik & Espinal (2020) only nouns that are nPs (i.e., that lack higher functional projection responsible for making a noun countable) can receive a kind-level interpretation in Russian.[9] Since *-in-* spells out the fused head Div^0/n^0, there is no way for a separate realization of nP without DivP for spelling out a kind-level property/for reference to a kind. To put it differently, *-in-* blocks the possibility of realizing the nP without realizing Div. Since the partition operator Π_{NU} in Div always requires the object-level interpretation, a kind-level interpretation is structurally excluded for such nominals. For that reason they are not compatible with kind-level predicates.

Our analysis can also account for the fact mentioned in the Introduction that singulative formation is possible with pluralia tantum like *bus-y* 'beads'. The plural suffix *-y* has to be removed before *-in-* can be added (*bus-in-a* 'a bead'). Following Geist & Błaszczak (In press), based on Alexiadou (2011) for Greek, the plural of pluralia tantum nouns in Russian can be considered a type of idiosyncratic plural and the plural morpheme can be analyzed as an exponent of n^0 in this case. This analysis predicts that *-in-* as an exponent of the fused Div^0/n^0 head and the plural morpheme *-y* as an exponent of n^0 cannot co-occur.

4.4   SOME IMPLICATIONS OF OUR ANALYSIS

Now we will show how our analysis can account for morphosyntactic characteristics of *-in-* discussed in §3 and its distribution.

Pluralization and integration of diminutive and augmentative suffixes. The node $\#^0$ may be realized by a plural morpheme bearing feature specification [+Pl]. Since $\#^0$

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[9]Ordinary singular count nouns in Russian can have object level and kind level interpretations, cf. (i).

(i)   Afrikanskij slon   est travu.   kind/object reference
    African   elephant eats grass
    'The African elephant eats grass.' (Borik & Espinal 2020: p.253)

We can account for this fact by the different sizes of the nominal phrase. *Slon* 'elephant' may realize either $[n^0 [\sqrt{}]]$, which yields the interpretation at the kind-level, or $[Div^0 [n^0 [\sqrt{}]]]$, where Div^0 is associated with the operator AT(omic). The latter derivation yields the interpretation of the noun at the object level.

is hierarchically higher than DivP/nP, the order of the morphemes is straightforwardly accounted for. The $Div^0/n^0/\sqrt{}^0$ merges with $\#^0$ and the order ROOT-IN-PL is derived.

In subsection 3.2 we saw that diminutive morphemes such as *-k-* and augmentative morphemes such as *-išč-* follow *-in-*. Since, as Steriopolo (2008) has shown, such diminutive and augmentative morphemes serve as modifiers rather than heads, we can account for their occurrence after *-in-*, if we assume that they adjoin to DivP/nP phrase.

Interaction with nominalizers and derivational suffixes. The interaction of *-in-* with the nominalizing suffixes *-nik* and *-k-*, see examples in (9) above, is accounted for as follows: *-nik* and *-k-* are exponents of a root-selecting n^0. Assuming that one syntactic head can be realized only once, and *-in-* realizes the n^0/Div^0 combination and is also root-selecting, it cannot co-occur with such nominalizing suffixes in n^0.

Compounding. Stems containing *-in-* can occur as non-heads in compounds, although such examples are relatively uncommon. To convince the reader of the reality of such compounds, we provide two naturally occurring phrasal examples in (24).

(24)   a.   *snež-ink-o-podob-n-aja*   *forma*
              snow-IN-DIM-CNCT-like-ADJ-AGR form
              'snowflake-like form'
                        https://www.bookvoed.ru/book?id=606971 [accessed 6/25/2021]
        b.   *bus-in-o-vid-n-ye*   *ukrašenija*
              bead-IN-DIM-CNCT-outlook-ADJ-AGR decorations
              'bead-shaped decorations'
                        https://infopedia.su/7xobyknovenn7c98.html [accessed 6/25/2021]

The standard assumption is that non-heads of compounds correspond to a very low part of the extended structure of the noun phrase, the nP (e.g. Steddy 2019), or even in some cases $\sqrt{}$P, as has been claimed for Dutch in De Belder (2017). This conclusion follows from analyses of compounding as incorporation of a non-head of the compound into the head. Since incorporation generally targets relatively small parts of nominal structure (Borik & Gehrke 2015), it was argued that big parts of the nominal structure, e.g. the whole DP, may not be incorporated and hence cannot occur as a non-head of a compound. Harley (2011) claims that Num^0 cannot be part of a non-head in a compound in English. However, Harðarson (2021) shows that, in Icelandic, even number and case inflection may attach to a non-head of a compound. We take this observation as evidence that additional nominal projections in principle may be part of a non-head of a compound. We assume that in Russian, nominals headed by the fused Div^0/n^0 can serve as a non-head of a compound.

5 CONCLUSIONS

Russian, alongside the Celtic languages, some Nilo-Saharan languages, and Arabic, employs singulative morphemes that perform mass-to-count shifts. We have provided a formal analysis of the singulative morphemes *-in-* and *-ink-* in a neo-constructionist approach to noun phrases (Borer 2005, among others), according to which a root becomes a countable noun by combining with additional functional heads in the syntax.

Following the neo-constructionist view that assumes a universal structure for noun phrases, we have argued that the functional heads Div^0 and $\#^0$ are involved in count noun derivation in Russian. Furthermore, we have shown that in addition to performing the unitizing function of Div^0, *-in-* and *-ink-* also perform the nominalizing function of n^0. To account for the two functions of the singulative morphemes, we have proposed that they spell out the fused head Div^0/n^0, creating a count noun in one step. This analysis allows us both to capture the distribution of singulative suffixes in Russian and to predict the following restriction on the meaning of singulative nouns. Our novel empirical findings show that singulative forms in Russian can only receive an object-level interpretation,

while a kind-level interpretation is not available for them. This distinguishes singulative nouns from notionally count nouns like *slon* 'elephant', which may receive a kind-level as well as an object level interpretation. Assuming that the interpretation of a noun depends on functional projections present in its structure and, moreover, that nP is associated with the kind-level interpretation, while DivP is associated with the object-level interpretation, the ban on kind-level interpretation for singulative nouns receives a natural explanation. Since in the case of Div^0/n^0 fusion the nP cannot be realized separately (without the DivP), the kind-level interpretation of singulatives is excluded for structural reasons.

A wider implication of our proposal is that one of the sources of cross-linguistic variation in encoding countability lies in whether some of the functional heads that bear respective functional features are fused, and if so, which ones are. The language specific properties can be accounted for if we assume that although languages select features from the set of universal features, in one language these features may be projected as split syntactic heads, while in another language they can be realized in a fused head.

The assumption that singulative suffixes in Russian serve as nominalizers in addition to being dividers means that they are integrated in the structure lower than their counterparts in other languages, in which singulative morphemes have been assumed to spell out only the higher Div^0 head (Mathieu 2012, 2014). According to neo-constructionist approaches and Distributed Morphology, the domain of the nP is associated with a less-productive derivation with idiosyncratic restrictions, while the domain above nP is the locus of more regular and less restricted derivation and inflection (Borer 2003, Harley & Noyer 1999, Marantz 1997, 2001). Since the singulative morphemes in Russian reside in a lower structural domain than their counterparts in other languages, we expect that singulative formation in Russian is less productive and is subject to more restrictions than singulative formation in other languages. This prediction seems to be borne out. Preliminary results of the empirical study in Geist (2021), which compares the range of singulative formation in Russian with Welsh, suggest that singulativization in Russian is less productive and has some accidental gaps. For instance, the singulative morphemes in Russian do not target nouns denoting small animals, insects and trees, although in Welsh such nouns regularly combine with singulative suffixes (Stolz 2001).

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ABBREVIATIONS

ADJ	adjective	IN	suffix *-in-*
AGR	agreement	M	masculine
AUG	augmentative	N	neuter
CNCT	conective element	NU	natural unit
DIM	diminutive	PL	plural
DM	distributed morphology	SG	singular
F	feminine		

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