Piotr Gulgowski*, Joanna Błaszczak, and
Veranika Puhacheuskaya

The influence of aspect on the countability of Polish deverbal nominalizations: Evidence from an acceptability rating study

https://doi.org/10.1515/zfs-2020-2014
Received January 1, 2019; accepted September 3, 2020

Abstract: The paper presents the results of a study investigating a possible influence of the viewpoint (perfective vs. imperfective) and lexical (telic vs. atelic) aspect of Polish verbs on the countability of eventive nominalizations (*substantiva verbalia*) derived from these verbs. Polish *substantiva verbalia* preserve many properties of the base verbs, including the eventive meaning and aspectual morphology. Native speakers of Polish rated the acceptability of nominalizations in count and mass contexts. An effect of both viewpoint and lexical aspect was found in mass contexts, where aspectually delimited (perfective, accomplishment) nominalizations were less acceptable than non-delimited (imperfective, state) nominalizations. In count contexts, only an effect of the lexical aspect was clearly present, with accomplishment nominalizations being more acceptable than state nominalizations. The nominalizations were overall rated as more natural in mass than count constructions, regardless of the aspect. The results indicate that aspect plays a role in establishing the countability of a word, but it does not fully determine it.

Keywords: aspect, countability, individuation, nominalization, telicity

***Corresponding author: Piotr Gulgowski,** Faculty of Letters, Institute of English Studies, University of Wrocław, Wrocław, Poland, e-mail: piotr.gulgowski@uwr.edu.pl, ORCID: https://orcid.org/0000-0002-0807-6697
Joanna Błaszczak, Faculty of Letters, Institute of English Studies, University of Wrocław, Wrocław, Poland, e-mail: joanna.blaszczak@uwr.edu.pl, ORCID: https://orcid.org/0000-0002-8332-2827
Veranika Puhacheuskaya, Department of Linguistics, Faculty of Arts, University of Alberta, Edmonton, Canada, e-mail: puhacheu@ualberta.ca, ORCID: https://orcid.org/0000-0002-6347-5877

1 Introduction

Parallels between countability in the domain of nouns and aspect in the domain of verbs have been noticed in the past (Bach 1986; Janda 2004; Krifka 1989; Mourelatos 1978). More specifically, it has been pointed out that predicates with no natural endpoint (e. g. *to sleep*) correspond to mass terms (e. g. *mud*), while predicates leading to some result or transition (e. g. *to fall asleep*) show similarities to count terms (e. g. *a dog*), as illustrated by the examples taken from Bach (1986).

(1) a. *Much mud was in evidence*.
b. ?*Much dog was in evidence*.

(2) a. *John slept a lot last night*.
b. ?*John found a unicorn a lot last night*.

(3) a. *Many dogs were in the yard*.
b. ?*Many muds were on the floor*.

(4) a. *John fell asleep three times during the night*.
b. ?*John slept three times last night*.

In terms of the more fine-grained categories of the lexical aspect (Vendler 1957), events with clearly identifiable atomic parts (accomplishments and achievements) resemble prototypical count nouns, in contrast to events with no clear atoms (activities and states), which behave more like prototypical mass nouns.

(5) a. *one dog*/*two dogs* [count noun]
b. **one mud*/**two muds* [mass noun]

(6) a. *build a house* (*once*)/*build a house more times* [accomplishment]
b. *find a key* (*once*)/*find a key more times* [achievement]
c. **sleep once*/**sleep more times* [state]
d. **work once*/**work more times* [activity]

The imperfective/perfective distinction found for the viewpoint aspect (prominent in Slavic languages like Polish or Russian) has been linked with the conceptual contrast between solid objects and substances, which also underlies the mass/count division in the nominal domain (Janda 2004). Likewise, the use of individuating quantifiers has been linked with perfective aspect and the use of collectivizing quantifiers has been linked with imperfective aspect in Czech and Russian (Kresin 2000).

Aspect and countability meet directly in nominalizations, that is words derived from verbs and performing the typical functions of nouns in the sentence. The aim of the present work was to verify the hypothesis that the aspect of a base

verb is relevant for the count or mass interpretation of a nominalization formed from this verb. The properties of Polish morphosyntax allowed us also to try to disentangle the influence of two types of verbal aspect: lexical and viewpoint. Polish makes a morphological distinction between perfective and imperfective aspect (e. g. *pisać* 'to write$_{\text{IPFV}}$' vs. *napisać* 'to write$_{\text{PFV}}$'). Moreover, Polish has a very productive way of deriving nouns from verbs through a class of nominalizations known as *substantiva verbalia*, which exhibit an interesting mixture of nominal and verbal properties (Rozwadowska 2000). Crucially, they can be derived from all lexical classes of verbs (accomplishments, achievements, states, events) and preserve the perfective/imperfective morphology. At the same time, they are clearly nominal, as evidenced by their full participation in the system of noun affixes encoding case and number.

The paper presents the results of a questionnaire survey, in which native speakers of Polish were asked to rate the naturalness of deverbal nominalizations appearing in count or mass sentential contexts. We hypothesized that both types of aspect can provide a criterion for individuation necessary to count objects and events. The participants' responses indicate that the aspect of the verb used as the nominalization base can indeed influence the countability status of a nominalization. In general, nominalizations derived from aspectually delimited verbs were rated as less acceptable in mass quantification contexts than nominalizations derived from aspectually non-delimited verbs. This suggests that aspectual delimitedness may provide a criterion for individuation also in the domain of nouns.

The paper is structured as follows. First, the categories of countability, aspect and nominalization are introduced along with a brief overview of the relevant theoretical and psycholinguistic studies. A special focus is put on works discussing the connections between aspect and countability. A separate section is devoted to discussing countability, aspect and nominalizations in Polish. This is followed by a description of the present study, with the design and results of the questionnaire survey as well as the analysis of the results. The paper ends with a discussion of the findings.

2 Background

2.1 Countability

Countability refers to a contrasting behavior of nouns in many languages. This phenomenon (under different names) has been extensively discussed by mul-

tiple scholars (Allan 1980; Chierchia 2010; Joosten 2003; Link 1983/2008; Pelletier 2009; Rothstein 2010). Mass and count nouns differ with respect to which grammatical expressions of quantity and partitioning they allow, although the specific countability characteristics can vary from language to language.[1] In general, **count nouns** can appear in a plural form (e. g. *cats*) and combine with a numeral (e. g. *three cats*), but they are not typically used with measuring phrases (e. g. *#one liter of cat, #three square meters of book*). In contrast, **mass nouns** can naturally occur with measuring phrases (e. g. *one liter of water, three square meters of sand*), but not with plural morphology (e. g. #*golds*) or combined with numerals without any measuring phrase (e. g. #*three golds*). Finally, count and mass nouns tend to be compatible with different quantifiers and determiners (compare *every*/*each*/*#much*/*#little cat* and *#every*/*#each*/*much*/*little water*).

A question at the center of the countability research has been whether the morphosyntactic mass/count contrast correlates with some semantic properties. One possibility is that no systematic correlation with meaning exists. Proponents of this theory (Palmer 1972) point out that nouns naming very similar entities can fall into different countability classes, both within a single language (e. g. *wheat* vs. *oats*) and cross-linguistically (e. g. English *hair* vs. French *cheveux* 'hairs'). An alternative approach assumes a conceptual motivation behind the mass/count distinction. Intuitively, there seems to be a general tendency for mass nouns to denote substances and for count nouns to denote solid objects. A common way of accounting for this regularity has been to assume that count nouns provide criteria for dividing their denotation into non-arbitrary individuals and that mass nouns do not individuate their reference (Cowper and Hall 2012; Grimm 2012, 2013; Quine 1964; Willim 2006; Wisniewski 2010).[2] It can be argued that the lexical specification of some nouns contains criteria for individuation making them countable by default, while nouns lacking such lexical information are primarily mass.

A problem with lexical accounts of countability is that most nouns can be used in both mass and count constructions, if the context supports the right interpretation. The shift from a count usage to a mass usage is known as "the universal grinder" (Pelletier 1975) and the shift in the opposite direction is called "the uni-

1 A good example is Greek having plural mass nouns, while in many languages this is not the case (we are thankful for this example to an anonymous reviewer).

2 A concept related to individuation is atomicity. An object is atomic if it has no proper parts that would have the same properties as the whole. An influential formal description of atomic and non-atomic reference using a mereological semi-lattice theory was proposed by Link (1983/2008).

versal packager" or "the universal sorter" (Bunt 1985; Chierchia 2010; Jackendoff 1992). A shifting operation like this incurs a cognitive cost (Frisson and Frazier 2005). The shifting can be accounted for by assuming that countability depends on mental representations, which can change contextually and are affected by perceptual and pragmatic factors. Wierzbicka (1985) argued that the countability of the name of an aggregate (a collection of small objects, like berries, rice or pills) depends on the salience of its individual components. The salience is determined by how visually distinguishable the components are and whether people tend to interact with them one by one or in bulk. This hypothesis received empirical support from a series of experiments conducted by Middleton et al. (2004). More recently, a study using an automatic visual analysis system in the form of a Convolutional Neural Network (Smith et al. 2017) revealed that the referents of English mass nouns show significantly less variance in low-level visual features than the referents of count nouns, thus suggesting a perceptual grounding of the mass/count distinction. The perceptual or pragmatic individuation account faces challenges in the domain of abstract phenomena, which can be named with count nouns (e. g. *ideas, annoyances*), even though their referents have no perceptual properties and people do not interact with them in the same way they interact with tangible entities. A possible solution may lie in the idea of "anchoring", i. e. linking abstract properties with specific objects, people or situations, as described in Grimm (2013).

Flexible mental individuation cannot be the ultimate explanation of the mass/count distinction, however. Despite the general availability of the grinder and packager mechanisms, not all coerced shifts are felicitous. For example, if there are three puddles of water on the floor, it is not felicitous to describe them as *three waters* even if they are highly salient.[3] Also, some words (e. g. *information*/**informations*) resist shifting more than others (e. g. *trouble*/*troubles*). Such restrictions may reflect the strength of established linguistic conventions (Grimm and Levin 2017; Sutton and Filip 2016, 2018; Willim 2006). The most useful treatment of countability may require considering multiple factors. In his critical survey of the main theoretical approaches to the mass/count distinction, Joosten (2003) points out that it would be wrong to try to reduce this distinction to an exclusively grammatical, ontological, semantic, or contextual issue. Instead, he argues in favor of a multidimensional approach that takes into account parameters such as the basic count- or masshood, degree of lexicalization, conceptualization, and (non)arbitrariness.

3 We would like to thank an anonymous reviewer for this comment.

2.2 Aspect

Aspect as a grammatical category from the domain of verbs refers to the linguistic means for expressing the temporal structure of a situation (Borer 2005; Borik 2002; Borik and Reinhart 2004; Declerck 2007; Slabakova 2001; Verkuyl 1996, 1999). Two kinds of aspect are commonly recognized: the **lexical aspect** (a. k. a. inner aspect, Aktionsart) and the **viewpoint aspect** (a. k. a. outer aspect, grammatical aspect). According to Declerck (2007), the lexical aspect specifies the general ontological type (abstract situation template) of eventuality in terms of a natural endpoint, duration or stativity, whereas the viewpoint aspect allows the speaker to describe a situation as a temporally bounded whole or to refer to its fragments. The two kinds of aspect involve different concepts of delimitedness or termination: a natural endpoint (lexical aspect) and a temporal boundary (viewpoint aspect). Following Vendler (1957), verbs (or verb phrases) are traditionally divided into four basic aspectual classes (based on properties associated with the lexical rather than the viewpoint aspect): accomplishments, achievements, states and activities. Accomplishments (e. g. *to build something*) and achievements (e. g. *to find something*) are both considered **telic**, i. e. involving a natural endpoint. States (e. g. *to love*) and activities (e. g. *to run*) lack such a necessary culmination, hence they are known as **atelic**.

Different aspectual classes give rise to a morphosyntactically contrasting behavior bearing much resemblance to the nominal mass/count difference. For example, some verbs are fully acceptable with adverbials like *a lot*, while other verbs are not, depending on their aspectual category, as shown in the examples below discussed in Bach (1986).

(7) *John slept a lot last night*.

(8) **John found a unicorn a lot last night*.

This contrast, connected with the system of adverbial quantification, can be seen as parallel to the one found for nominal quantifiers used with mass or count nouns. Just like in the case of nominal countability, the morphosyntactic contrasts associated with aspect reflect conceptual distinctions related to individuation, since aspect offers linguistic means for distinguishing individual situations.

A close relation between countability in the nominal domain and aspect in the verbal domain has been suggested by, among others, Bach (1986), Filip (2003), Jackendoff (1992), Krifka (1989), Mourelatos (1978), Wellwood et al. (2018) or Willim (2006). Janda (2004) proposes that countability and aspect are rooted in the same cognitive system: the idealized cognitive model of matter. The system, shaped by childhood interactions with the external world, is based on a funda-

mental distinction between solid objects and substances and includes a set of expectations as to how entities belonging to those ontological types should behave. Using mostly examples from Russian, Janda discusses the semantic properties of the viewpoint aspect, demonstrating that they align well with such expectations. Perfective predicates are like solid objects in that they have clear boundaries, are discrete, inherently quantified and non-homogeneous (they cannot be arbitrarily divided without losing integrity). A metaphorical extension of the model of matter to the domain of situations is also reflected in the way in which aspect is used to communicate chronology. For example, the most likely interpretation of conjoined perfective predicates is as a sequence of situations taking place one after another, whereas multiple imperfective predicates are often interpreted as cooccurring. Janda argues that this resembles the way in which substances, but not solids, can freely mix. Dickey and Janda (2015) point out that aspectual prefixes in Slavic languages act in some ways as equivalents of nominal classifiers. Like classifiers, aspectual prefixes enable classification, individuation and quantification of the things under discussion (situations), with different prefix types paralleling the different types of classifiers in providing default, common or *ad hoc* units. The authors propose the term "lexico-grammatical unitizers" as a general category uniting nominal classifiers with verbal prefixes. A connection between aspectual prefixes and event definiteness is discussed in Ramchand (2008) and Dickey (2000, 2018). The use of individuating quantifiers has also been linked with perfective aspect and the use of collectivizing quantifiers has been linked with imperfective aspect in Czech and Russian (Kresin 2000).

2.3 Nominalizations

Deverbal nominalizations are words functioning morphosyntactically as nouns, created on the basis of verbs and possessing characteristic features of both. They form a class of lexical items in which verbal aspect and nominal countability meet. Most importantly for the present study, they can preserve the aspectual classes of the verbs from which they are derived, while at the same time having count or mass uses as nouns. The properties of nominalizations have long been a subject of interest among linguists (Chomsky 1970). Nominalizations sometimes denote a process (e. g. *The construction of this building took five years*) and sometimes the result of a process (e. g. *This construction looks solid*). This observation was captured by Grimshaw (1990) in terms of a contrast between complex event nominals (CENs) and result nominals (RNs). CENs are in general more verb-like than RNs, possessing an argument structure, being acceptable with aspectual modifiers (*frequent*, *constant*) and, crucially, rejecting plural morphology (Grimshaw 1990; Roy

and Soare 2013; Rozwadowska 2000). This would suggest that eventive nominalizations with preserved aspectual information are not countable. However, evidence from different languages has been collected demonstrating that even more verbal nominalizations can take plural morphology.

Roodenburg (2006) proposed that whether or not an eventive nominalization can be pluralized is subject to a parametric variation. Specifically, plural eventive nominalizations are possible in Romance languages but impossible in Germanic languages. Iordăchioaia and Soare (2008) demonstrated that in Romanian some argument-supporting nominalizations (infinitives) can be easily pluralized, while others (supines) cannot. Thus, within a single language there can be different types of nominalizations with different countability properties. In the corpus study of English derived nominals presented by Grimm and McNally (2013), the investigated nominalizations turned out to have in general mostly singular occurrences; however, in the set of argument-supporting eventive nominalizations, 20 % occurred at least once as plural. San Martin (2009) gives more examples from the literature showing that cross-linguistically such nominalizations can be pluralized.

If some nominalizations are more acceptable than others in plural form (and hence in count contexts), perhaps the aspect of their base verbs may play a role. A direct relation between aspect and countability has been postulated by Mourelatos (1978). He argued that aspectually telic verbs in English (accomplishments and achievements) give rise to count nominalizations, like in the examples below:

(9) *Vesuvius erupted three times.* $\Longrightarrow$ *There were three eruptions of Vesuvius.*

(10) *Mary capsized the boat.* $\Longrightarrow$ *There was a capsizing of the boat by Mary.*

Atelic eventualities (states and activities) tend to form a base for mass nominalizations:

(11) *John pushed the cart for hours.* $\Longrightarrow$ *For hours there was pushing of the cart by John.*

(12) *Jones was painting the Nativity.* $\Longrightarrow$ *There was painting of the Nativity by Jones.*

This possibility has been explored in theoretical works. Iordăchioaia and Soare (2008) account for the split between infinitival nominalizations (count) and supine nominalizations (mass), in that supines contain an imperfective (–bounded) aspect projection blocking the projection of number. San Martin (2009) claims

that a nominalization can pluralize if it contains a classifier head in its morphosyntactic structure, the source of which may be aspectual telicity, but it is also noticed that not all telic verbs contribute this head to the nominalizations derived from them. Huyghe (2011) challenges the link between aspect and countability more directly. After investigating a sample of French nominalizations derived from activity (atelic) verbs, he concluded that, while some activity verbs give rise to mass nominalizations, others derive count nominalizations, and yet others are a base for nominalizations equally acceptable in count and mass contexts. At the same time, Huyghe notices that both count and mass nominalizations derived from activity verbs preserve the aspectual atelicity of the verbal base as indicated by entailment patterns. He proposes that nominalizations can depict events as individuated largely independently of (a)telicity, and that some other factors determine the count or mass nature of a deverbal nominalization.

Grimm (2013) conducted a corpus study of almost two thousand English deverbal nominalizations divided into four groups based on the lexical aspect of the base verbs: activities, states, accomplishments and achievements. Mass and count instances in each group were counted. All four aspectual classes were predominantly count, so aspect did not fully determine the dominant mass or count use of nominalizations. However, Grimm found that the proportion of count to mass uses was significantly lower for (atelic) states than for (telic) accomplishments.

The review above reveals a complex picture. Under a strict formulation of the hypothesis linking countability with aspect, it could be expected that whether a given nominalization is treated as a count or mass word would be fully determined by the bounded or unbounded aspectual profile of the base verb. Studies like San Martin (2009), Huyghe (2011) and Grimm (2013) show that this formulation is most likely false. However, a correlation found in the data by Grimm (2013) suggests that some weaker version of the hypothesis might hold true.

2.4 Countability, aspect and nominalizations in Polish

Polish distinguishes singular and plural forms expressed through a system of case/number suffixes on nouns. Mass nouns (e. g. *muzyka* 'music', *beton* 'concrete', *próżnia* 'vacuum') do not take plural morphology (except for the universal sorter or packager shifts). Count nouns (e. g. *drzewa* 'trees', *informacje* 'pieces of information', *fasole* 'beans') pluralize easily. Measuring phrases can be used to count portions of mass substances (e. g. *trzy szklanki mąki* 'three glasses of

flower', *kilogram piasku* 'a kilogram of sand'). Certain quantifiers combine exclusively with count nouns (e. g. *wszystkie psy* 'all dogs', *każda okazja* 'every opportunity'), while others combine with mass nouns (e. g. *pełne wody* 'full of water', *dużo wrzawy* 'much commotion'). For a discussion of mass nouns as a class of "defective" nouns in Polish, see Dyszak (2001).

Aspect in Polish (and in Slavic languages in general) is a complex topic. An exhaustive coverage of all the facts would not be possible here, so only a brief overview is provided. Polish verbs distinguish morphologically between two viewpoint aspect values: imperfective and perfective.[4] Imperfective forms are unmarked (e. g. *gotować* 'to $\text{cook}_{\text{IPFV}}$'), while perfective forms are most often marked by a prefix (e. g. *ugotować* 'to cook_{PFV} (completely)').[5] Some prefixes are purely aspectual indicating that the event is over (e. g. *napisać* 'to $\text{write}_{\text{PFV}}$'),[6] while others may also change the lexical semantics of the verb (*przepisać* 'to $\text{rewrite}_{\text{PFV}}$'). There are also so-called secondary imperfective forms, that is imperfective verbs created with suffixes attaching to perfective verbs, sometimes resulting in an iterative meaning (e. g. *przepisywać* 'to $\text{rewrite}_{\text{S-IPFV}}$'). For a concise overview of aspect in Polish, see Klimek-Jankowska and Błaszczak (2020) or Klimek-Jankowska et al. (2018).

Nominalizations in Polish come in two major classes. On the one hand, there are zero-derived forms (e. g. *przepis* 'a rule' from *przepisać* 'to $\text{rewrite}_{\text{PFV}}$'). This mechanism has low productivity and nominalizations created this way are usually words well established in the Polish lexicon, often significantly different in terms of lexical semantics from their historical verbal bases. On the other hand, there are forms known as *substantiva verbalia*, derived with a fully productive *-nie*/*-cie* suffix resembling the English suffix *-ing* (e. g. *pisanie* '$\text{writing}_{\text{IPFV}}$' from *pisać* 'to $\text{write}_{\text{IPFV}}$'). They preserve many properties of the base verbs, like an eventive reading or argument structure and, crucially, keep the perfective and imperfective morphology (*pisanie* '$\text{writing}_{\text{IPFV}}$' vs. *przepisanie* '$\text{rewriting}_{\text{PFV}}$'). This property makes *substantiva verbalia* good targets for investigating the influence of both types of verbal aspect on countability. The contrast between states and accomplishments

4 A small set of biaspectual verbs can be found in Polish (e. g. *anulować* 'to $\text{cancel}_{\text{IPFV/PFV}}$' and *aresztować* 'to $\text{arrest}_{\text{IPFV/PFV}}$'). There are also *perfectiva tantum* verbs (e. g. *oniemieć* 'to be struck dumb (PFV)'), where the perfective form does not have an imperfective counterpart, and *imperfectiva tantum* verbs (e. g. *mieć* 'to $\text{have}_{\text{IPFV}}$'), which cannot be perfectivized.

5 Underived perfective verbs in Polish include *dać* 'to give_{PFV}', *wziąć* 'to take_{PFV}' and *kupić* 'to buy_{PFV}'.

6 This issue is a matter of some controversy. Janda et al. (2013) argued that even prefixes forming natural perfectives by performing a seemingly pure aspectual function are not completely semantically empty.

is not marked morphologically on Polish verbs and, consequently, deverbal nominalizations, but a test involving aspectual predicates can be applied to demonstrate that nominalizations preserve the telicity value.

(13) *Klaudia dokończyła pisanie listu.*
Klaudia finished writing$_{\text{IPFV}}$ letter
'Klaudia finished writing the letter.'

(14) #*Klaudia dokończyła martwienie się problemem.*
Klaudia finished worrying$_{\text{IPFV}}$ REFL problem
'Klaudia finished worrying about the problem.'

For further discussion on nominalizations in Polish, see Puzynina (1969) or Rozwadowska (2000).

3 Present study

3.1 Research question and predictions

With conflicting reports from the literature, it is still an open question whether the aspect of a verb systematically affects the countability of a nominalization derived from this verb. It is especially unclear whether any differences exist in this respect between the viewpoint and lexical aspect. Previous studies focused mostly on the lexical aspect (telicity vs. atelicity), while the viewpoint aspect (perfectivity vs. imperfectivity) has been somewhat neglected. Given that both types of aspect could be argued to introduce some kind of delimitedness, they could both serve as a source of individuation for the interpretation of a nominalization.

Polish offers an interesting opportunity to test this possibility as a language with a system of overt perfectivity markers not only on verbs but also on nominalizations, in particular on *substantiva verbalia*, as discussed above.

In order to find out whether manipulating the viewpoint and lexical aspect can affect the mass and count properties of *substantiva verbalia*, we conducted a questionnaire survey. Our hypothesis was that both types of aspect can provide a criterion for individuation necessary to count objects and events. Aspectually delimited (perfective, accomplishment) nominalizations were predicted to be more acceptable in count contexts and less acceptable in mass contexts than aspectually non-delimited (imperfective, state) ones. The discussion of this topic in the available literature did not allow us to make any predictions whether one of the aspect types would have a stronger effect on countability than the other or whether both would affect the mass/count status of the nominalizations equally.

3.2 Materials

3.2.1 Nominalizations and control nouns

A questionnaire was designed to test the countability readings of 48 Polish deverbal nominalizations. All nominalizations used in the study belonged to the class of *substantiva verbalia* (see above). The verbs selected as the bases for the nominalizations belonged to different semantic domains. All were common Polish words that should be familiar to any adult Polish speaker. Half of them were derived from perfective verbs (e. g. *zniszczenie* 'destroying$_{\text{PFV}}$' from *zniszczyć* 'to destroy$_{\text{PFV}}$') and the other half from imperfective verbs (e. g. *niszczenie* 'destroying$_{\text{IPFV}}$' from *niszczyć* 'to destroy$_{\text{IPFV}}$'). Within both the imperfective and the perfective groups, half were nominalizations derived from accomplishment (telic) verbs (e. g. *drukowanie* 'printing$_{\text{IPFV}}$') and the other half were derived from psychological state (atelic) verbs (e. g. *dziwienie się* 'wondering$_{\text{IPFV}}$').[7] As a result, the 48 investigated nominalizations could be divided into 4 experimental conditions: imperfective accomplishments, imperfective states, perfective accomplishments, perfective states. Table 1 presents examples of items from each condition.

In addition to nominalizations, the study included 40 control nouns not derived from verbs: 20 nouns naming substances (e. g. *błoto* 'mud') and 20 nouns naming tools (e. g. *młotek* 'hammer'). Because substance nouns are prototypically mass and tool nouns can be expected to be count,[8] they were used to test the validity of the chosen method for assessing countability. Table 2 provides examples of nouns from both classes. The total number of the tested items (nouns and nominalizations) was 88. For the full lists of items, see Appendix.

3.2.2 Sentences

Four sentence templates were created using different quantification. Two templates were intended to elicit a count reading and the other two were intended

7 Most of the state nominalizations selected for the study (with one exception: *wątpienie* 'doubting$_{\text{IPFV}}$') were accompanied by the reflexive marker *się*. The marker was absent for the accomplishment nominalizations. For Polish accomplishment verbs, the reflexive marker is also a marker of intransitivity. All the accomplishment verbs used as bases for nominalizations in the present study were transitive.

8 Tools are perceptually distinguishable objects that people tend to interact with individually. These properties are associated with the denotations of count nouns (Middleton et al. 2004; Wierzbicka 1985).

Table 1: Nominalization classes.

	Imperfective	**Perfective**
Accomplishment	1. *budowanie* 'building$_{IPFV}$'	1. *wybudowanie* 'building$_{PFV}$'
	2. *komponowanie* 'composing$_{IPFV}$'	2. *skomponowanie* 'composing$_{PFV}$'
	.....	.....
	12. *kopanie* 'digging$_{IPFV}$'	12. *wykopanie* 'digging$_{PFV}$'
State	13. *dziwienie się* 'wondering$_{IPFV}$'	13. *zdziwienie się* 'wondering$_{PFV}$'
	14. *martwienie się* 'worrying$_{IPFV}$'	14. *zmartwienie się* 'worrying$_{PFV}$'
	.....	.....
	24. *interesowanie się* '(IPFV) being interested in'	24. *zainteresowanie się* '(PERF) being interested in'

Table 2: Noun classes.

Substance Nouns	**Tool Nouns**
1. *śnieg* 'snow'	1. *młotek* 'hammer'
2. *piasek* 'sand'	2. *gwóźdź* 'nail'
3. *błoto* 'mud'	3. *śrubokręt* 'screwdriver'
4. *plastik* 'plastic'	4. *pędzel* 'paintbrush'
.....	.....
20. *beton* 'concrete'	20. *łyżka* 'spoon'

to elicit a mass reading. The count templates consisted of the plural form of the critical item preceded by the quantifier *wszystkie* 'all' (count quantification 1) or the numeral *trzy* 'three' (count quantification 2). The mass templates consisted of the singular form of the critical item preceded by the quantifier *za dużo* 'too much' (mass quantification 1) or the adjective *pełny* 'full of' (mass quantification 2). Each noun and nominalization appeared in all four templates (see examples in Table 3 and Table 4).

Table 3: Mass and count quantification types with the noun *nóż* 'knife'.

COUNT	**Quant1:**	*Wszystkie noże okazały się przydatne.* all knives turned.out REFL useful 'All knives turned out to be useful.'
	Quant2:	*Trzy noże okazały się przydatne.* three knives turned.out REFL useful 'Three knives turned out to be useful.'
MASS	**Quant1:**	*Jak dla mnie to za dużo noża.* how for me it too much knife 'As far as I'm concerned, there is too much knife.'
	Quant2:	*Cała szuflada była pełna noża.* whole drawer was full.of knife 'The whole drawer was full of knife.'

Table 4: Mass and count quantification types with the nominalization *montowanie maszyny* 'assembling$_{\text{IPFV}}$ a machine'.

COUNT	**Quant1:**	*Wszystkie montowania maszyn okazały się męczące.* all assemblings$_{\text{IPFV}}$ machines$_{\text{GEN}}$ turned.out REFL tiresome 'All assemblings of machines turned out to be tiresome.'
	Quant2:	*Trzy montowania maszyn okazały się męczące.* three assemblings$_{\text{IPFV}}$ machines$_{\text{GEN}}$ turned.out REFL tiresome 'Three assemblings of machines turned out to be tiresome.'
MASS	**Quant1:**	*Jak dla mnie to za dużo montowania*[9] *maszyny.* as for me it too much assembling$_{\text{IPFV}}$ machine$_{\text{GEN}}$ 'As far as I'm concerned, there is too much of assembling the machine.'
	Quant2:	*Cały dzień był pełny montowania maszyny.* all day was full assembling$_{\text{IPFV}}$ machine$_{\text{GEN}}$ 'All day was full of assembling the machine.'

Because aspectual categories like "accomplishment" are likely to be properties of larger verbal phrases, all nominalizations were derived from verbs with objects and the objects were preserved in the context of the nominalized forms. For accomplishments, the object indicated the theme of the telic process (e. g. *montowanie maszyny* 'assembling$_{\text{IPFV}}$ a machine', *narysowanie obrazka* 'drawing$_{\text{PFV}}$ a picture'). For states, the corresponding position was filled with the so-called in-

9 The singular form in mass contexts looks the same as the plural form in count contexts because of case/number syncretism: *montowania* means both 'assembling$_{\text{IPFV}}$.NOM.PL' and 'assembling$_{\text{IPFV}}$.GEN.SNG'. This kind of syncretism is quite common in Polish.

strumental complement (Bondaruk and Rozwadowska 2018, 2019) (e. g. *martwienie się problemem* 'worrying$_{\text{IPFV}}$ about a problem', *ucieszenie się dobrą wiadomością* 'enjoying$_{\text{PFV}}$ good news'). In the count contexts, where the nominalization was plural, the object was plural too. In the mass contexts, both were singular.

3.3 Procedure

The 88 items in sentential contexts were divided into two lists, each containing 44 items (half from each condition). Half of the participants saw list A and the other half list B. This was done in order to decrease the time needed to fill in the questionnaire. The order of items in both lists was pseudo-randomized. A short instruction was attached to each questionnaire. The participants were asked to evaluate how "natural" each use of every word was on a scale from 1 (completely unnatural) to 5 (completely natural) by marking their responses on small horizontal scales printed next to each sentence. The instructions contained an example in the form of the word *szybko* 'quickly' in grammatical and ungrammatical contexts. The questionnaires were distributed as printed copies. Filling a questionnaire took around 20 minutes.

3.4 Participants

Forty-eight students of the University of Wrocław (39 female and 9 male) took part in the study. All were native speakers of Polish aged 19 to 30 (M = 22.9, SD = 2.5). The participants were undergraduate students of English philology, which means that they all had had some exposure to academic linguistic concepts.

3.5 Results

3.5.1 Control nouns

The first analysis was conducted on nouns naming substances and tools, because they were intended to be control items testing the efficacy of the chosen method.

We used R (R Core Team 2019) and the *ordinal* package (Christensen 2019) to fit a cumulative link mixed model. An ordinal regression approach was chosen because the dependent measure (ratings of "naturalness" on a Likert scale 1–5) was an ordinal variable. The model measures the probability of specific ratings being above certain thresholds without assuming that the thresholds are equidistant or

Table 5: Fixed effects coefficients in the cumulative link mixed model for the "naturalness" ratings of control nouns.

	Estimate	Std. Error	z	p-value
Countability (*count*)	0.7774	0.1673	4.646	<.001
Item Type (*subst*)	0.4003	0.1862	2.150	.032
Countability (*count*) × Item Type (*subst*)	−3.9613	0.1824	−21.713	<.001

Table 6: Random effects coefficients in the cumulative link mixed model for the "naturalness" ratings of control nouns.

Group	Name	Variance	SD
Participant ID	Tool-Mass	3.387	1.840
Participant ID	Substance-Count	1.326	1.151
Participant ID	Substance-Mass	1.506	1.227
Participant ID	(Intercept)	2.089	1.445
Item	Tool-Mass	3.595e-10	1.896e-05
Item	Substance-Count	3.206	1.790
Item	Substance-Mass	0.393	0.627
Item	(Intercept)	0.295	0.543

symmetric. A logit link and flexible thresholds between the ordinal scores were used.

As fixed effects, we entered Countability (*count, mass*) and Item Type (*substance nouns, tool nouns*) as well as their interaction into the model. Because both participants and items constitute crossed random effects, to control for their variability we entered random intercepts for subjects and items, as well as by-subject and by-item random slopes, separately for each factor level. Correlation parameters were omitted, since those are prone to be incomputable for factorial predictors and to render the model non-converging.

The estimates and z-values for the fixed effects coefficients in the computed model are given in Table 5. Information about the random effects is provided in Table 6.

Both the main effect of Countability and of Item Type were significant. Those effects, however, could not be interpreted because of a significant interaction, which suggested that count and mass contexts affected the two types of nouns differently. An examination of the data revealed the nature of this difference.

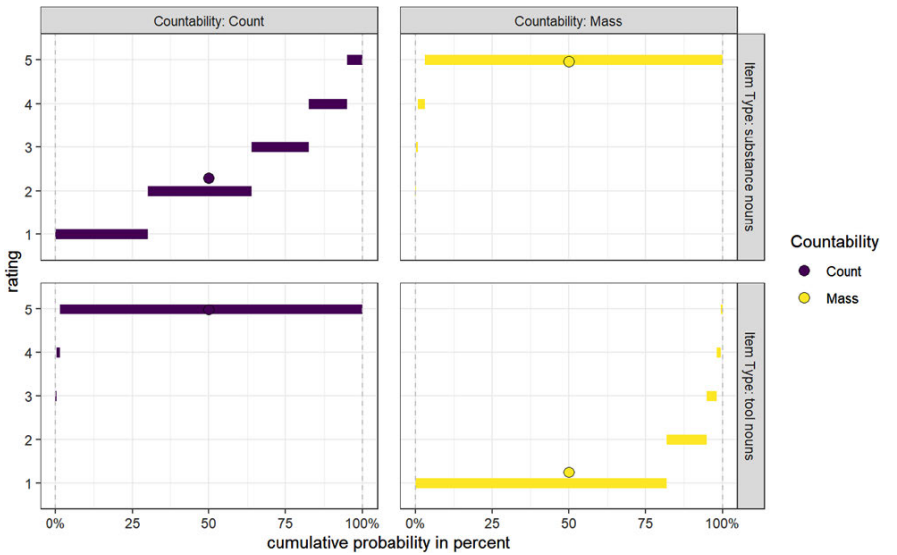

Figure 1: Modeled probabilities of ratings for substance and tool nouns presented in count and mass contexts.

The modeled rating probabilities are depicted in Figure 1. The length of each horizontal bar on the diagram equals the modeled probability of a given rating. The dots represent the expectation values for a given rating in each condition.[10]

Substance nouns received high ratings in mass context and low ratings in count contexts. Tool nouns showed the opposite pattern: they were rated highly in count contexts and poorly in mass contexts. This confirmed the validity of the chosen quantification types as tests for count and mass uses of a word.

Responses for sentences matching the predicted dominant use of the nouns (count for tool nouns and mass for substance nouns) were almost perfectly consistent (the modeled probability of the highest rating was close to 100 % in both cases). In contrast, responses for mismatching contexts were less uniform, most likely reflecting the availability of the universal grinder and the universal packager/sorter. Moreover, the spread of ratings was greater for substance nouns in count contexts than for tool nouns in mass contexts, suggesting a higher degree of meaning flexibility in the former class of nouns.

10 The expectation values were computed as $\sum$ P(rating) · rating. Since the ratings are on an ordinal scale, this should be treated only as a rough indication of the overall differences between the distributions.

Table 7: Fixed effects coefficients in the cumulative link mixed model for the "naturalness" ratings of nominalizations.

	Estimate	Std. Error	z	p-value
Countability (*count*)	−0.96823	0.06203	−15.609	<.001
Viewpoint Asp (*imp*)	1.01420	0.11956	8.483	<.001
Lexical Asp (*accomp*)	−0.15897	0.11650	−1.365	.172
Quant Type (*quant1*)	0.21643	0.06227	3.476	<.001
Countability (*count*)×Viewpoint Asp (*imp*)	−0.90812	0.06455	−14.068	<.001
Countability (*count*)×Lexical Asp (*accomp*)	0.64049	0.06137	10.436	<.001
Countability (*count*)×Quant Type (*quant1*)	0.28597	0.06572	4.351	<.001
Viewpoint Asp (*imp*)×Lexical Asp (*accomp*)	0.25723	0.11670	2.204	.028
Viewpoint Asp (*imp*)×Quant Type (*quant1*)	0.08682	0.06218	1.396	.163
Lexical Asp (*accomp*)×Quant Type (*quant1*)	−0.26648	0.06264	−4.254	<.001

3.5.2 Nominalizations

The main hypothesis was tested on nominalizations. Once again, a cumulative link mixed model was created using R (R Core Team 2019) and the *ordinal* package (Christensen 2019). A logit link and flexible thresholds between the ordinal scores were used.

The dependent variable was the ratings of "naturalness" for nominalizations. As fixed effects, we entered Countability (*count*, *mass*), Viewpoint Aspect (*imperfective*, *perfective*) and Lexical Aspect (*state*, *accomplishment*) into the model. Additionally, following a suggestion of an anonymous reviewer, we decided to check for possible differences between the two different quantification types used in count and mass contexts (see section 3.2.2) by introducing Quantification Type (*quantification1*, *quantification2*) as a fourth predictor. The model also contained the following interactions of main predictors: Countability×Viewpoint Aspect, Countability×Lexical Aspect, Countability×Quantification Type, Viewpoint Aspect×Lexical Aspect, Viewpoint Aspect×Quantification Type and Lexical Aspect×Quantification Type. We controlled for the crossed random effects of participants and items by adding random intercept and as many random slope parameters for the individual factor levels as necessary to keep the model converging. Interaction and correlation parameters were again omitted because of convergence issues (see the results for control nouns).

The estimates and z-values for fixed effects coefficients in the computed model are given in Table 7. Information about the random effects is provided in Table 8.

Table 8: Random effects coefficients in the cumulative link mixed model for the "naturalness" ratings of nominalizations.[11]

Group	Name	Variance	SD
Participant ID	(Intercept)	2.5749	1.6047
Item	(Intercept)	0.4375	0.6614
Participant ID	dummy4	2.4030	1.5502
Participant ID	dummy11	2.1684	1.4725
Participant ID	dummy2	1.2159	1.1027
Participant ID	dummy3	1.3986	1.1826
Participant ID	dummy10	1.4365	1.1985
Item	dummy11	0.9110	0.9545
Item	dummy10	0.6233	0.7895
Item	dummy8	0.4638	0.6811
Participant ID	dummy14	1.7578	1.3258
Participant ID	dummy9	1.3076	1.1435
Participant ID	dummy1	0.8411	0.9171
Participant ID	dummy12	1.1840	1.0881
Participant ID	dummy13	1.5322	1.2378
Item	dummy7	0.8938	0.9454
Participant ID	dummy6	0.7835	0.8852

Significant main effects were again rendered uninterpretable by significant interactions. Research questions and predictions concerned the possible influence of verbal aspect on the countability of deverbal nominalizations. Both relevant interactions, Countability×Viewpoint Aspect and Countability×Lexical Aspect, were significant. An inspection of the data revealed that aspect types indeed (differentially) affected the acceptability of nominalizations in count and mass contexts.

11 In order to model the possibility that the participants and items behave differently in all combinations of fixed effects without making the model so complex that it would not converge, dummy variables were created. Each dummy variable represented some combination of levels of all four fixed effects variables (countability, quantification type, lexical aspect and viewpoint aspect). For example, *dummy4* represented the combination of count+imperfective+state+quant2 (technically each combination was a vector of fourteen 0s and a 1). We added as many random slopes for those dummy variables to the model as was justified by the data as long as it still resulted in a model that converged. Only 4 slopes were ultimately needed for items, whereas participants required 11 slopes. This asymmetry was related to a higher variability of participants compared with items as revealed by both larger standard deviations for random intercepts for participants and by the fact that participant slopes tended to be larger than item slopes.

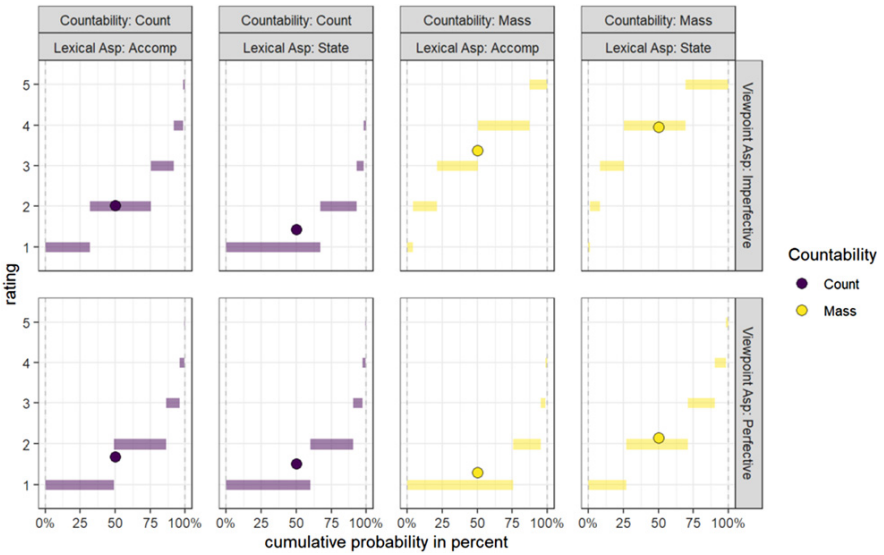

Figure 2: Modeled probabilities of ratings for nominalizations derived from perfective or imperfective (viewpoint aspect) and accomplishment or state (lexical aspect) verbs presented in count and mass contexts.[12]

The modeled probabilities of ratings in different conditions are depicted in Figure 2. The length of each horizontal bar equals the modeled probability of a given rating. The dots represent the expectation values for a given rating in each condition (see footnote 10).

In terms of Countability×Viewpoint Aspect, a visual examination indicated that perfective nominalizations were less acceptable in mass contexts than imperfective nominalizations. Acceptability in count contexts was similar for perfective and imperfective nominalizations. This was confirmed by contrasts performed with the *emmeans* package (Lenth 2019). The *imperfective* vs. *perfective* contrast was significant only for the mass context. This result was partially consistent with the main hypothesis, which predicted perfective nominalizations to be more semantically delimited or individuated and therefore more count and less mass than imperfective nominalizations.

In terms of Countability×Lexical Aspect, accomplishment nominalizations were less acceptable in mass contexts and more acceptable in count con-

12 The quantification type was omitted in this plot for visibility, since its influence is a minor modulation not changing the overall structure of the other factors' effect. See Figure 3 for a visualization including this predictor.

Table 9: Contrasts assessing the influence of viewpoint aspect on the "naturalness" ratings of nominalizations in count and mass contexts.

Countability	Contrast	Estimate	Std. Error	z	p-value
Count	*imperfective - perfective*	0.212	0.247	0.857	.391
Mass	*imperfective - perfective*	3.845	0.294	13.074	<.001

Table 10: Contrasts assessing the influence of lexical aspect on the "naturalness" ratings of nominalizations in count and mass contexts.

Countability	Contrast	Estimate	Std. Error	z	p-value
Count	*accomplishment - state*	0.963	0.247	3.906	<.001
Mass	*accomplishment - state*	−1.599	0.279	−5.728	<.001

texts than state nominalizations. Contrasts conducted with the *emmeans* package (Lenth 2019) confirmed that these differences, even though relatively small, were statistically significant. This result was fully consistent with the hypothesis, which predicted accomplishment nominalizations to be more semantically delimited than state nominalizations.

It should be noted that the acceptability of nominalizations in count contexts was overall very low, regardless of the aspect. Even for perfective accomplishments, the theoretically doubly delimited condition, the computed expectation value was lower than 2 on a five-point naturalness scale. Another potentially important observation from the data represented in Figure 2 is that the results in none of the conditions are fully clear-cut. Perfective accomplishments in mass contexts come closest to a clear outcome with around 75 % of ratings being 1 ("completely unnatural"). The responses in the remaining conditions were more widely distributed over ratings.

Quite unexpectedly, the Countability×Quantification Type interaction turned out to be significant. We had no predictions concerning the type of quantification. The two count and the two mass sentence templates were expected to be roughly equivalent in terms of countability requirements. However, the model indicated a small but significant divergence, visualized in Figure 3.

The difference between the two types of quantification was more pronounced for count than mass contexts. In a contrast conducted with the *emmeans* package (Lenth 2019), *quantification1* was significantly more acceptable than *quantification2* in the count condition, as opposed to the mass condition.

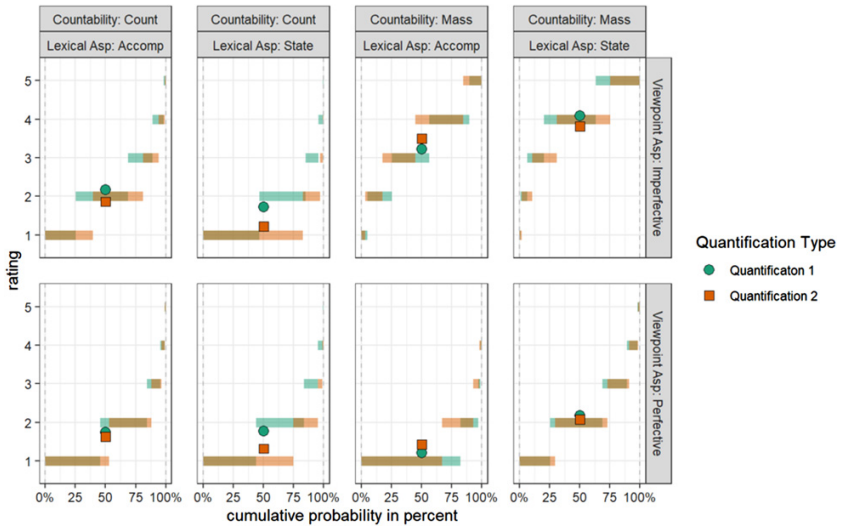

Figure 3: Modeled probabilities of ratings for nominalizations including the effect of QUANTIFICATION TYPE (*quantification1, quantification2*).

Table 11: Contrasts assessing the influence of the quantification type on the "naturalness" ratings of nominalizations in count and mass contexts.

Countability	Contrast	Estimate	Std. Error	z	p-value
Count	*quantification1 - quantification2*	1.005	0.148	6.808	<.001
Mass	*quantification1 - quantification2*	−0.139	0.209	−0.665	.506

This means that, within the count sentences, expressions containing the quantifier *wszystkie* 'all' were more acceptable than expressions with the numeral *trzy* 'three'.

3.6 Discussion

The results of the questionnaire indicate that the aspect of a verb can affect the countability of a nominalization derived from this verb. An effect of both viewpoint and lexical aspect has been found. In mass contexts, nominalizations delimited in terms of either the lexical aspect (accomplishment) or the viewpoint aspect (perfective) were rated as less "natural" than non-delimited (state, imperfective) nominalizations. In count contexts, nominalizations delimited in terms of the lex-

ical aspect (accomplishment) were rated as more "natural" than non-delimited (state) nominalizations, but there was no difference for the viewpoint aspect (perfective vs. imperfective). This suggests that both kinds of delimitation (natural endpoint for the lexical aspect and temporal boundaries for the viewpoint aspect) can separately contribute to the conceptual individuation of events. The lexical aspect affects the countability of a nominalization more consistently (affecting judgments in both mass and count contexts) than the viewpoint aspect (affecting judgments in mass contexts only). However, comparing the strengths of those interactions is difficult. Even though manipulating the viewpoint aspect produced an effect only in mass sentences, this difference is numerically bigger than the differences observed in either mass or count sentences for lexical aspect manipulations. It is also hard to derive any predictions in this area from the literature.

The results provide evidence for a relation between nominal countability and verbal aspect. However, the acceptability in count contexts was overall quite low in all aspectual conditions (including the "doubly delimited" perfective accomplishment condition) in comparison with the acceptability in mass contexts. This suggests that the nominalizations examined in the present study were overall regarded by the participants as predominantly mass. This rules out a strong interpretation of the hypothesis linking countability with aspect, under which accomplishment and perfective nominalizations could be expected to be clearly count while state and imperfective nominalizations could be expected to be mass. A weaker version of this hypothesis, however, appears to be on the right track. Aspectual delimitedness provides criteria for event individuation also in the nominal domain, although it is most likely only one of several contributing factors (along lexical semantics, pragmatics or arbitrary language conventions). This is consistent with the results of the corpus study presented in Grimm (2013).

Some conclusions can also be formulated regarding the category of countability in general. The relatively wide distribution of ratings for substance nouns in count contexts and for most nominalization conditions illustrate the non-binary nature of the count or mass status of many words, resulting possibly from the availability of the universal grinder and sorter shifting mechanisms. In the present study, the somewhat fuzzy status of words in some conditions might have also stemmed from the fact that nominalizations (especially the highly verbal *substantiva verbalia*) are non-prototypical nouns.

There are some caveats to our findings. First, the stimuli used in the experiment belonged to a small set of specific lexical domains: substances and tools for control nouns, processes and psychological states for nominalizations. This allowed us to avoid too much stimulus diversity and focus on a narrowly formulated research problem. It is not clear, however, how well the obtained results would

hold more generally. Additional studies with bigger and more varied sets of nouns and nominalizations are needed.

A separate concern applies to the experimental task. The acceptability judgment task is an inherently uncertain method, because different participants may have different ideas of what makes a sentence acceptable or natural. This can be an even bigger issue for sentences containing nominalizations, which are less frequent and more grammatically complex than ordinary nouns.

An anonymous reviewer pointed out that perfective and imperfective contexts may give rise to a token or type reading, respectively, along the lines proposed by Grimm and McNally (2015), which can affect the judgments. However, all the nominalizations used in the present study involved the same type of nominal morphology, and were used in clearly episodic contexts. For those reasons, the most likely reading of the investigated nominalizations was always a token interpretation, regardless of the aspect.

Finally, we found a statistically significant difference between the two quantification types used to test the acceptability of a word in count contexts. Expressions containing the quantifier *wszystkie* 'all' turned out to be more acceptable than expressions with the numeral *trzy* 'three'. This might be due to the fact that a specific numeral, like *three*, requires a greater degree of individuation than a generalizing quantifier, like *all*.

4 Summary and conclusions

The results of the present study provide evidence in favor of the link between aspect and countability postulated in the literature (Bach 1986; Filip 2003; Jackendoff 1992; Krifka 1989; Mourelatos 1978; Wellwood et al. 2018). In an acceptability judgment study, participants rated nominalizations derived from aspectually delimited verbs as less natural in mass contexts than nominalizations derived from non-delimited verbs. This was true for both types of aspect: viewpoint and lexical. The results for count contexts also showed that aspectual delimitation may make a nominalization more count, although the effect in this case was limited to the lexical aspect only. Thus, the lexical aspect (the general situation profile involving a natural endpoint) seems to interact with the mass or count reading of a nominalization more consistently than the viewpoint aspect (perceiving the situation as temporally bounded whole or as ongoing). The results are consistent with the possibility that linguistic ontology in the nominal and verbal domains is founded on similar cognitive principles, including the fundamental distinction between solid objects and fluid substances (Janda 2004). However, aspect cannot fully account for the mass or count status of a nominalization, since the nominalizations used

in the present study were overall rated rather poorly in count contexts, regardless of the aspectual class. This is in line with the account assuming that countability (for ordinary nouns as well as for nominalizations) is a multidimensional phenomenon with multiple sources of reference individuation (Grimm 2013; Joosten 2003).

Acknowledgment: This work was supported by the Foundation for Polish Science (Grant FOCUS no. F5/09/P/2013 of January 27, 2014) and by the National Science Centre (NCN) (Grant no. 2013/09/B/HS2/02763). The authors wish to thank the anonymous reviewers for their helpful comments as well as Felix Golcher from the Humboldt-Universität zu Berlin for his help with the statistical analysis.

Appendix A

Table 12: Nominalizations with objects/instrumental complements.

	IMPERFECTIVE	PERFECTIVE
ACCOMPLISHMENT	*budowanie domu* 'building a house'	*wybudowanie domu*
	komponowanie utworu 'composing a song'	*skomponowanie utworu*
	niszczenie dokumentu 'destroying a document'	*zniszczenie dokumentu*
	pisanie listu 'writing a letter'	*napisanie listu*
	rzeźbienie figurki 'sculpting a figurine'	*wyrzeźbienie figurki*
	burzenie domu 'demolishing a house'	*zburzenie domu*
	malowanie obrazu 'painting a picture'	*namalowanie obrazu*
	drukowanie dokumentu 'printing a document'	*wydrukowanie dokumentu*
	montowanie maszyny 'assembling a machine'	*zmontowanie maszyny*
	rysowanie obrazka 'drawing a picture'	*narysowanie obrazka*
	ostrzenie noża 'sharpening a knife'	*zaostrzenie noża*
	kopanie dołka 'digging a hole'	*wykopanie dołka*

Table 12: (continued)

	IMPERFECTIVE	PERFECTIVE
STATE	*dziwienie się podjętej decyzji* 'wondering about an undertaken decision'	*zdziwienie się podjętej decyzji*
	martwienie się problemem 'worrying about a problem'	*zmartwienie się problemem*
	niepokojenie się problemem 'being anxious because of a problem'	*zaniepokojenie się problemem*
	cieszenie się dobrą wiadomością 'enjoying good news'	*ucieszenie się dobrą wiadomością*
	smucenie się złą wiadomością 'being sad because of bad news'	*zasmucenie się złą wiadomością*
	złoszczenie się na podjętą decyzję 'being angry about an undertaken decision'	*rozzłoszczenie się na podjętą decyzję*
	wstydzenie się błędu 'being ashamed because of a mistake'	*zawstydzenie się błędu*
	wątpienie w podjętą decyzję 'doubting an undertaken decision'	*zwątpienie w podjętą decyzję*
	irytowanie się podjętą decyzją 'being annoyed about an undertaken decision'	*zirytowanie się podjętą decyzją*
	denerwowanie się problemem 'being angry about a problem'	*zdenerwowanie się problemem*
	niecierpliwienie się opóźnieniem 'being impatient because of a delay'	*zniecierpliwienie się opóźnieniem*
	interesowanie się ceną benzyny 'being interested in a petrol price'	*zainteresowanie się ceną benzyny*

Table 13: Nouns.

TOOLS	SUBSTANCES
młotek 'hammer'	*śnieg* 'snow'
gwóźdź 'nail'	*piasek* 'sand'
śrubokręt 'screwdriver'	*błoto* 'mud'
pędzel 'paintbrush'	*plastik* 'plastic'
miotła 'broom'	*lawa* 'lava'
latarka 'flashlight'	*magma* 'magma'
nóż 'knife'	*powietrze* 'air'
widelec 'fork'	*wełna* 'wool'
wiertarka 'drill'	*bawełna* 'cotton'
pilnik 'file'	*jedwab* 'silk'
piła 'saw'	*cement* 'cement'
kosa 'scythe'	*gleba* 'soil'
kosiarka 'lawn mower'	*drewno* 'wood'
sierp 'sickle'	*złoto* 'gold'
grzebień 'comb'	*srebro* 'silver'
szczotka 'brush'	*rtęć* 'quicksilver'
długopis 'pen'	*żwir* 'gravel'
łopata 'spade'	*metal* 'metal'
motyka 'hoe'	*miedź* 'copper'
łyżka 'spoon'	*beton* 'cement'

References

Allan, Keith. 1980. Nouns and countability. *Language* 56(3). 541–567. 10.2307/414449.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9(1). 5–16.

Bondaruk, Anna & Bożena Rozwadowska. 2018. Stative and eventive passives of subject experiencer verbs in Polish. *Poznan Studies in Contemporary Linguistics* 54(4). 437–467. 10.1515/psicl-2018-0019.

Bondaruk, Anna & Bożena Rozwadowska. 2019. Polish Object Experiencer verbs in the stative and eventive passive. https://www.researchgate.net/publication/330349588_Polish_Object_Experiencer_verbs_in_the_stative_and_eventive_passive.

Borer, Hagit. 2005. *Structuring sense: Volume I: In name only*. Oxford: Oxford University Press.

Borik, Olga. 2002. *Aspect and reference time*. Utrecht: LOT.

Borik, Olga & Tanja Reinhart. 2004. Telicity and perfectivity: Two independent systems. In László Hunyadi, György Rákosi & Enikő Tóth (eds.), *Proceedings of the Eight Symposium on Logic and Language (LOLA)*, 13–34. Debrecen, Hungary.

Bunt, Harry C. 1985. *Mass terms and model-theoretic semantics*. Cambridge: Cambridge University Press.

Chierchia, Gennaro. 2010. Mass nouns, vagueness and semantic variation. *Synthese* 174(1). 99–149. 10.1007/s11229-009-9686-6.
Chomsky, Noam. 1970. Remarks on nominalization. In Roderick Jacobs & Peter Rosenbaum (eds.), *Readings in English transformational grammar*, 184–221. Waltham, MA: Ginn and Company.
Christensen, Rune Haubo B. 2019. *ordinal: Regression models for ordinal data* (R package version 2019.4–25) [Computer software]. http://www.cran.r-project.org/package=ordinal/.
Cowper, Elisabeth & Daniel C. Hall. 2012. Aspects of individuation. In Diane Massam (ed.), *Count and mass across languages*, 27–53. Oxford: Oxford University Press.
Declerck, Renaat 2007. Distinguishing between the aspectual categories "(a)telic", "(im)perfective" and "(non)bounded". *Kansas Working Papers in Linguistics* 29. 48–64. 10.17161/KWPL.1808.1787.
Dickey, Stephen M. 2000. *Parameters of Slavic aspect: A cognitive approach*. Stanford, CA: CSLI Publications.
Dickey, Stephen M. 2018. Thoughts on the 'Typology of Slavic aspect'. *Russian Linguistics* 42(1). 69–103. 10.1007/s11185-017-9189-x.
Dickey, Stephen M. & Laura A. Janda. 2015. Slavic aspectual prefixes and numeral classifiers: Two kinds of lexico-grammatical unitizers. *Lingua* 168. 57–84. 10.1016/j.lingua.2015.09.005.
Dyszak, Andrzej S. 2001. Rzeczowniki i czasowniki defektywne w systemie fleksyjnym współczesnej polszczyzny. *Bulletin de la Société Polonaise de Linguistique* 57. 141–154.
Filip, Hana. 2003. Prefixes and the delimitation of events. *Journal of Slavic Linguistics* 11(1). 55–101.
Frisson, Steven & Lyn Frazier. 2005. Carving up word meaning: Portioning and grinding. *Journal of Memory and Language* 53(2). 277–291. 10.1016/j.jml.2005.03.004.
Grimm, Scott. 2012. *Number and individuation*. Stanford, CA: Stanford University dissertation. http://parles.upf.edu/llocs/sgrimm/publications/grimm_dissertation.pdf.
Grimm, Scott. 2013. Individuating the abstract. *Proceedings of Sinn und Bedeutung* 18. 182–200. https://ojs.ub.uni-konstanz.de/sub/index.php/sub/article/view/312.
Grimm, Scott & Beth Levin. 2017. Artifacts: Reference, countability, and categorization. (*North East Linguistic Society (NELS)* 47. 55–64.
Grimm, Scott & Louise McNally. 2013. No ordered arguments needed for nouns. In Maria Aloni, Michael Franke & Floris Roelofsen (eds.), *Proceedings of the 19th Amsterdam Colloquium*, 123–130. Amsterdam: ILLC. http://www.academia.edu/download/41705759/No_ordered_arguments_needed_for_nouns20160128-5384-ehcte8.pdf.
Grimm, Scott & Louise McNally. 2015. The -ing dynasty: Rebuilding the semantics of nominalizations. *Semantics and Linguistic Theory* 25. 82–102. 10.3765/salt.v25i0.3070.
Grimshaw, Jane B. 1990. *Argument structure*. Cambridge, MA: MIT Press.
Huyghe, Richarrd 2011. (A)telicity and the mass-count distinction: The case of French activity nominalizations. *Recherches Linguistiques de Vincennes* 40. 101–126. 10.4000/rlv.1952.
Iordăchioaia, Gianina, & Elena Soare. 2008. Two kinds of event plurals: Evidence from Romanian nominalizations. *Empirical Issues in Syntax and Semantics* 7. 193–216.
Jackendoff, Ray. 1992. Parts and boundaries. In Beth Levin & Steven Pinker (eds.), *Lexical and conceptual semantics*, 9–45. Oxford: Blackwell.
Janda, Laura A. 2004. A metaphor in search of a source domain: The categories of Slavic aspect. *Cognitive Linguistics* 15(4). 471–527. 10.1515/cogl.2004.15.4.471.

Janda, Laura A., Anna Endresen, Julia Kuznetsova, Olga Lyashevskaya, Anastasia Makarova, Tore Nesset & Svetlana Sokolova. 2013. *Why Russian aspectual prefixes are not empty: Prefixes as verb classifiers*. Bloomington, IN: Slavica Publishers.

Joosten, Frank. 2003. Accounts of the count-mass distinction: A critical survey. *Nordlyd* 31(1). 216–229. 10.7557/12.26.

Klimek-Jankowska, Dorota & Joanna Błaszczak. 2020. How incremental is the processing of perfective and imperfective aspect in Polish? An exploratory event-related potential study. *Journal of Slavic Linguistics* 28(1). 23–69. 10.1353/jsl.2020.0001.

Klimek-Jankowska, Dorota, Anna Czypionka, Wojciech Witkowski & Joanna Błaszczak. 2018. The time course of processing perfective and imperfective aspect in Polish – evidence from self-paced reading and eye-tracking experiments. *Acta Linguistica Academica: An International Journal of Linguistics* 65(2–3), 293–351.

Kresin, Susan C. 2000. Aspect, singularization, and pluralization in Czech and Russian. *The Slavic and East European Journal* 44(3). 393–412. 10.2307/309588.

Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In Renate Bartsch, Johan van Benthem & Peter van Emde Boas (eds.), *Semantics and contextual expression*, 75–115. Dordrecht: Foris.

Lenth, Russell. 2019. *emmeans: Estimated marginal means, aka least-squares means* (R package version 1.4) [Computer software]. https://CRAN.R-project.org/package=emmeans.

Link, Godehard. 1983/2008. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), *Meaning, use, and interpretation of language*, 303–323. Berlin & New York: de Gruyter. Reprinted in Paul Portner & Barbara H. Partee (eds.), *Formal semantics: The essential readings*, 127–146. Hoboken, NJ: Wiley-Blackwell. 10.1002/9780470758335.ch4.

Middleton, Erica L., Edward J. Wisniewski, Kelly A. Trindel & Mutsumi Imai. 2004. Separating the chaff from the oats: Evidence for a conceptual distinction between count noun and mass noun aggregates. *Journal of Memory and Language* 50(4). 371–394. 10.1016/j.jml.2004.02.005.

Mourelatos, Alexander P. D. (1978). Events, processes, and states. *Linguistics and Philosophy* 2(3). 415–434. 10.1007/BF00149015.

Palmer, Frank. 1972. *Grammar*. 1st edn. Harmondsworth: Penguin Books.

Pelletier, Francis J. (1975). Non-singular reference: Some preliminaries. *Philosophia* 5(4). 451–465. 10.1007/BF02379268.

Pelletier, Francis J. 2009. Mass terms: A philosophical introduction. In Francis J. Pelletier (ed.), *Kinds, things, and stuff*. New York: Oxford University Press. 10.1093/acprof:oso/9780195382891.001.0001.

Puzynina, Jadwiga. 1969. *Nazwy czynności we współczesnym języku polskim: Słowotwórstwo, semantyka, składnia*. Warszawa: Państwowe Wydawnictwo Naukowe.

Quine, Willard V. O. 1964. *Word and object*. Cambridge, MA: MIT Press.

R Core Team. 2019. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/.

Ramchand, Gillian C. 2008. Perfectivity as aspectual definiteness: Time and the event in Russian. *Lingua* 118(11). 1690–1715. 10.1016/j.lingua.2007.03.008.

Roodenburg, Jasper. 2006. The role of number within nominal arguments: The case of French pluralized event nominalizations. Paper presented at the *36th Linguistic Symposium on Romance Languages*, Rutgers University, April 2006.

Rothstein, Susan. 2010. Counting and the mass/count distinction. *Journal of Semantics* 27(3). 343–397. 10.1093/jos/ffq007.

Roy, Isabelle & Elena Soare. 2013. Event related nominalizations. In Gianina Iordăchioaia, Isabelle Roy & Kaori Takamine (eds.), *Categorization and category change*, 123–152. Cambridge: Cambridge Scholars Publishing.

Rozwadowska, Bożena. 2000. Aspectual properties of Polish nominalizations. *Journal of Slavic Linguistics* 8. 239–261.

San Martin, Itziar. 2009. Derived nominals from the nominal perspective. *Anuario del Seminario de Filología Vasca "Julio de Urquijo"* 43(1–2). 831–846.

Slabakova, R. (2001). *Telicity in second language*. John Benjamins.

Smith, David A., Sandro Pezzelle, Francesca Franzon, Chiara Zanini & Raffaella Bernardi. 2017. Can you see the (linguistic) difference? Exploring mass/count distinction in vision. In *IWCS 2017 — 12th International Conference on Computational Semantics* – Short papers. https://www.aclweb.org/anthology/W17-6939.pdf.

Sutton, Peter & Hana Filip. 2016. Counting in context: Count/mass variation and restrictions on coercion in collective artifact nouns. *Semantics and Linguistic Theory* 26. 350–370. 10.3765/salt.v26i0.3796.

Sutton, Peter & Hana Filip. 2018. Restrictions on subkind coercion in object mass nouns. *Proceedings of Sinn und Bedeutung* 21(2). 1195–1214. https://ojs.ub.uni-konstanz.de/sub/index.php/sub/article/view/193.

Vendler, Zeno. 1957. Verbs and times. *The Philosophical Review* 66(2). 143–160.

Verkuyl, Henk J. 1996. *A theory of aspectuality: The interaction between temporal and atemporal structure*. 1st paperback edn. Cambridge: Cambridge University Press.

Verkuyl, Henk J. 1999. Tense, aspect, and aspectual composition. In Mila Dimitrova-Vulchanova & Lars Hellan (eds.), *Topics in South Slavic syntax and semantics*, 125–164. Amsterdam: Benjamins. 10.1075/cilt.172.07ver.

Wellwood, Alexis, Susan J. Hespos & Lance Rips. 2018. How similar are objects and events? *Acta Linguistica Academica* 15(2–3). 473–501. 10.1556/2062.2018.65.2-3.9.

Wierzbicka, Anna. 1985. "Oats" and "wheat": The fallacy of arbitrariness. In John Haiman (ed.), *Iconicity in syntax*, 311–342. Amsterdam: Benjamins. 10.1075/tsl.6.16wie.

Willim, Ewa. 2006. *Event, individuation and countability: A study with special reference to English and Polish*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego.

Wisniewski, Edward J. 2010. On using count nouns, mass nouns and pluralia tantum: What counts? In Francis J. Pelletier (ed.), *Kinds, things, and stuff*, 166–190. New York: Oxford University Press. 10.1093/acprof:oso/9780195382891.001.0001.