A vagueness based analysis of abstract nouns[1]

Halima HUSIĆ — *Ruhr-University Bochum*

Abstract. The count/mass distinction is a widely discussed topic across languages and linguistic theories have covered a great part of peculiarities which appear in relation to this phenomenon. Abstract nouns have often been left out of consideration, possibly due to the fact that their reference is abstract and the application of some relevant features of count or mass reference, such as cumulativity, divisiveness or atomicity, does not seem to be possible. This paper presents a thorough study of lexical features of a subset of abstract nouns and their distribution in COCA which suggests that countability in abstract nouns has to be determined relative to their semantic category. Focusing on eventuality denoting nominals which comprise a substantial part of abstract nouns, I argue that these nouns resemble concrete nouns in that the countability distinctions are expressed in surprising similarity. I find that the core feature underlying the distinction between abstract count and abstract mass nouns is the vagueness of the minimal components, an approach pursued by Chierchia (2010) for concrete nouns. The minimal components of the count eventualities appear to be stable in all precisifications, unlike those of mass eventualities which are not determined and vary.

Keywords: count/mass distinction, abstract nouns, nominal semantics, corpus study, eventualities.

1. Introduction

Theories that deal with the semantics of nouns, and in particular with the count/mass distinction, have developed dynamic proposals suggesting a set-theoretic modelling of the extension of count and mass nouns by replacing the traditional universe of entities with a more dynamic one which captures entities denoted by singulars, plurals, groups and mass terms (among others Link, 1983; Krifka, 1989; Chierchia, 1998, 2010; Rothstein, 2010, 2017; Landman, 1989, 2010, 2016; Sutton and Filip, 2016). Importantly, these approaches are limited to concrete nouns, for obvious reasons such as that atomicity, contextual as well as natural, or overlap/disjointness as the core notions underlying these theories refer to denotational properties of these nouns, and it is unclear whether and how this can be applied to a set of nouns whose denotation (i) cannot be impinged by the senses, (ii) does not provide a spatio-temporal collocation or (iii) is not imaginable.[2] Nonetheless, abstract nouns do have countability preferences. Some nouns prefer to have a count-like distribution while other occur rather like mass nouns, as illustrated in (1) with *knowledge* appearing as a mass noun and *virtue* as a count noun.

(1) a. (...) these people don't have **much knowledge** of what's east of the Appalachians.
b. One of the **many virtues** of pumpkins is the ability to combine equally well with sugar and spices or salt (...) [3]

[1]The development of this paper was colored by several discussions with Gennaro Chierchia, Tibor Kiss, Francis Jeffry Pelletier and Agata Renans to which I am very grateful. I would also like to thank Jenny Doetjes, Hana Filip, David Nicolas, Claudia Roch, Radek Šimík, Malte Zimmermann and Roberto Zamparelli for helpful remarks, Jutta Pieper for technical support with the extraction of corpus data, as well as the audiences in Bochum, Düsseldorf, Annual Meeting of the Berkeley Linguistics Society 44 and Sinn & Bedeutung 24.

[2]With the mentioned criteria I refer to ways of defining the notion of *abstract* For a discussion of these criteria I refer to Zamparelli (2019), Rosen (2018) and Asher (1993) among others.

[3]Unless marked otherwise, all the examples used in this paper are corpus occurrences taken from COCA (Davies,

Proceedings of Sinn und Bedeutung 24, vol. 1, pp.359–376. Osnabrück University.

With abstract nouns, as *knowledge* and *virtue*, I speak of *a preference of countability*, instead of a clear classification as count or mass, because of the flexibility these nouns provide. While we have observed that concrete nouns shift their countability by certain means easily, such as the Universal Grinder (Pelletier, 1979), Universal Packager (Bach, 1986) or Universal Sorter (Bunt, 1985), or they are ambiguous between a count and mass classification, as cases of dual-life nouns, such as *cake*, *rope* or *stone*, abstract nouns provide an even greater degree of flexibility in this regard.[4] The use of exactly the same nouns addressed in (1) in the following examples illustrates this phenomenon.

(2) a. But as Vice President Quayle said recently, there's **much virtue** in abstinence and I think that's something that we, as role models and parents or even extended others, need to really preach to the young people (...)
b. Boys and girls are being thrust into adulthood without **a knowledge** of their past, something unimaginable a generation ago.

This paper addresses two challenges with regard to the count/mass distinction in abstract nouns: One is the variation among abstract nouns which affects their countability and two is the application of formal semantic theories of the count/mass distinction to abstract nouns. The paper is structured as follows: Section 2 introduces some related work on countability of abstract nouns and presents the challenges that arise in dealing with them. In section 3, I elaborate on my original investigation of a subset of abstract nouns including a manual annotation task and a corpus study in COCA (Davies, 2010). Section 4 summarizes the results of my research and present an analysis for eventuality denoting nominals. In section 5, I discusses directions for further research with abstract nouns.

2. Background

Any study of abstract nouns requires a definition of the term *abstract*, as well as a characterization of the distinction between *abstract* and *concrete*. Among the criteria used in philosophy and linguistics to determine the notions *abstract*, Zamparelli (2019) summarizes four approaches to determining the notion *abstract*, which are listed in (3).

(3) Four criteria relevant for defining abstract nouns
a. ability to impinge on the senses
According to this criterion only concrete nouns denote entities that can be perceived by means of the five senses.
b. imageability
This way of distinguishing concrete from abstract nouns implies that concrete nouns denote entities which are imaginable.
c. morphological derivation
In this case, abstract nouns are claimed to be derived nominals, such as nouns ending in *-ness*, *-ity*, *-tion* or *-hood*, *-itude*, *-cy*, *-ment*, *-ship* for English.
d. spatio-temporal collocation
This criterion implies that abstract nouns denote entities that do not have a location in space or time

2010).

[4]Polikarpov and Kurlov (1994) claim that there is a link between the notion *abstract* and *ambiguity*, according to which the more abstract the nouns denotation is, the greater is the degree of polysemy (cf. Levickij, 2005).

deadjectival	*stupidity, bravery*
deverbal	*classification, approval*
psych	*drama, faith, mercy*
property or quality	*honor, humuliation, justice*
factual	*fact, thing, point, problem, reason, difference, upshot*
communication	*news, message, rumour, report, order, proposal, question*
relational	*opposition, proportion*
measure & time	*value, evening, midday*
sciences & arts	*surgery, philosophy, linguistics*

Table 1: Diversity of abstract nouns

Obviously, there is a great amount of overlap among the nouns addressed by the above presented criteria, as for illustration the noun *happiness* is morphologically derived, and it is not located in space, perhaps in time though. Happiness can only be imagined by means of a bearer of happiness[5] or a situation that evokes happiness as e.g. the birth of a baby, but not without additional entities. And, happiness can also not be impinged by the five senses. Yet, many issues are not accounted for by all four criteria, as e.g. fictive objects, such as unicorns, pokemons or dragons, which are definitely imaginable. Another issue are morphologically underived nouns such as *joy* which do not pass the morphological criterion but all the others.

One of the reasons why abstract nouns are not easy to determine is that this class of nouns is heterogeneous in many ways. Duden (2005) lists nine subclasses of abstract nouns, although they admit that this list is by no means exhaustive, as illustrated in Table (3). With the diversity of abstract nouns in mind, the question arises whether a common semantics underlying these nouns at all is appropriate. Nonetheless, some linguistic research has focused on certain sets of these nouns and their ability to be counted, to which I turn in the next section.

2.1. Related Work

Most of the work on abstract nouns and countability has either focused on a specific phenomenon regarding these nouns or study only a subset of abstract nouns, as e.g. nominalizations. However, the topic of nominalizations has gained much interest in linguistic literature, and when it comes to the count/mass distinction, many of these papers need to be considered (among others: Mourelatos, 1978; Alexiadou et al., 2010; Grimm, 2014; Grimshaw, 1990). Mourelatos (1978), for instance, studies the relation between the Aktionsart of a verb and the countability of the resulting nominalization and claims that the nominalizations of verbs denoting states or activities are not countable, whereas nominals from verbs that denote accomplishments or achievements are countable. Another idea put forth by Brinton (1998) implies that the morphological means used to derive a nominal influence the countability of the resulting nominal. Besides, Grimshaw's seminal work differentiates events (in the nominal domain) with argument strcutres (Complex Event Nominals - CEN) from those without argument structure and claims that CENs cannot be pluralized. Contrary to that, Alexiadou et al. (2010) claim that the pluralization of CENs (or Argument Supporting Nominals, ASN - as they call them)

[5]Noun phrases that are headed by abstract nouns and contain additional modifiers that allow the specification of the abstract concept are called *tropes*. *Tropes* enable abstract nouns to lose their abstractness by way of referring to a specific instance of the abstract term (cf. Moltmann, 2013; Campbell, 1990; Williams, 1953).

is subject to cross-linguistic variation, and that the (in)ability to pluralize ASNs relates to aspectual properties, such as (a)telicity, (im)perfectivity and boundedness. Grimm (2014) tested several hypotheses empirically and presents a thorough corpus investigation of count and mass nominalizations. Based on the inference he draws from the corpus study, he claims that none of the hitherto proposed hypotheses regarding the countability of abstract nouns is sufficient. Instead, he argues that the issue need to be approached from certain semantic subclasses, i.e bodily and mental states, mental and behavioral properties and psych nouns. Another subclass of abstract nouns are nouns derived from gradable adjectives which Nicolas (2003, 2010) analyzes as two-place relations, between an instance of a property, and an individual in which this instance manifests itself. He argues that such abstract nouns resemble mass nouns and thus include measure functions to capture comparative constructions with *more* and *less*. Zamparelli (2019) focuses on the ambiguity within abstract nouns and how it relates to a difference in countability. He proposes that in addition to the common universal thought machines of deriving count nouns from mass nouns or vice versa, several additional shifts of meaning and/or countability are needed for abstract nouns.

2.2. The Challenge

Bearing in mind the hitherto work devoted to studying (subsets of) abstract nouns, it seems that the discrepancies and the variation we are familiar with concrete nouns, are even greater in the realm of abstract nouns. The core challenge in identifying countability distinctions in abstract nouns is their high degree of polysemy and flexibility with respect to countability. Consider the following sets of noun senses with assigned countability features taken from BECL 2.1 (Kiss et al., 2016):[6]

(4) a. access#3 (a way of entering or leaving) COUNT
b. access#1 (the right to enter) MASS

(5) a. license#1 (a legal document giving official permission to do something) COUNT
b. license#4 (the act of giving a formal (usually written) authorization) COUNT
c. license#2 (freedom to deviate deliberately from normally applicable rules or practices (especially in behavior or speech)) state MASS
d. license#3 (excessive freedom; lack of due restraint) MASS

(6) a. life#3 (the course of existence of an individual; the actions and events that occur in living) COUNT
b. life#1 (a characteristic state or mode of living) MASS
c. life#4 (the condition of living or the state of being alive) MASS

(7) a. disappearance #2 (the event of passing out of sight) COUNT
b. disappearance #3 (gradually ceasing to be visible) MASS

(8) a. humiliation#2 (strong feelings of embarrassment) MASS
b. humiliation#3 (an instance in which you are caused to lose your prestige or self-respect) COUNT

[6]The Bochum English Countability Lexicon (BECL) is a lexical resource comprising 7050 English nouns with countability assignments for each sense of the noun. The senses are taken from WordNet (Miller, 1995), and the countability classification is derived through a large-scale annotation task by native speakers of Canadian English. For more details see Kiss et al. (2014, 2016) and the project website `http://count-and-mass.org/`.

The data in (4)—(8) shows that the countability of these nouns is either underspecified or ambiguous. And this effect derived nominals as well as underived as e.g. *licence* or *life*.

3. Empirical Observations

The fact that abstract nouns are indeed flexible with regard to countability is precisely the issue I aim to disentangle. In order to identify the distinctive properties of nouns or noun senses that determine the countability of the nominal, I will study the lexical properties of such nouns by means of a manual annotation process of a subset of abstract nouns in BECL 2.1.

3.1. Lexical Annotation

The subset of BECL which has been used for the annotation process has the following characteristics:

(9) **Constraints on the annotated dataset**
the lexical annotation process is conducted on BECL nouns
-which are polysemous
-one sense of which is count, and one is mass
-one sense of which is abstract according to at least one semantic criterion outlined in (3)

The BECL nouns in (4) — (8) fall within these constraints. The purpose of the annotation process is now to study each sense and annotate relevant notions, features or descriptions that seem to differentiate the count and mass senses of one noun. As an illustration consider the following noun-sense pair:

(10) a. approval#1 the formal act of approving COUNT
event, bounded
b. approval#2 a feeling of liking something or someone good MASS
quality, feeling

Among the annotation schemes that were at my disposal none was appropriate to capture the discriminating countability features. Thus, for instance, the WordNet Tops did not discriminate count and mass senses. Similarly, the typology of events by (Bach, 1986: 62) or Asher's schema of types of abstract references (Asher, 1993: 57) could not account for the whole spectrum of the data I aimed to annotate. Hence, the choice of the set of annotations was specified on basis of a first pilot annotation in which I annotated many features freely. The second annotation process was conducted systematically on basis of a closed set of annotations presented in Table 2.

annotation	**description**	**example**
state	non-dynamic condition or way of being that is present during a particular time	accord #1 (harmony of people's opinions or actions or characters)
process	a particular course of action or a phenomenon that last over time, can be bounded in time or space but does not necessarily have to be	carving#2 (removing parts from hard material to create a desired pattern or shape)

event	spatiotemporal particular entity that happens in a certain time and space; can include participants with different functions; is usually completed, accomplished	approval#1 (the formal act of approving)
object[7]	an entity, usually visible and tangible, but does not necessarily have to be so	approval#4 (a message expressing a favorable opinion)
quality	a property or attribute of someone or something	alarm#1 (fear resulting from the awareness of danger)
bounded	imposing boundaries of different kinds, either through time, space, or including an object as to turn a process into an accomplishment (draw a circle)	backlog#3 (something kept back or saved for future use or a special purpose); approval#1 (the formal act of approving)
instance	one particular part/sequence/episode of/extracted from a state, process, event, quality	drama#2 (an episode that is turbulent or highly emotional)
quantity	specified amount of something	fill#1 (a quantity sufficient to satisfy)
accomplishment	when something is done, has fulfilled its mission	deceit#2 (a misleading falsehood)
place	location, can also be a building, town, occasion, an area	church#2 (a place for public (especially Christian) worship)
person	human being	backup#2 (someone who takes the place of another (as when things get dangerous or difficult))
aggregation	a sum/accumulation of (possibly heterogeneous things)	backup#1 (an accumulation caused by clogging or a stoppage)
place-holder	something which is true of being/having the property/state described by the noun	fill#2 (any material that fills a space or container); need#2 (anything that is necessary but lacking)
matter	the way/kind of doing/being something	access#3 (a way of entering or leaving)

Table 2: Annotation features and their description

The above presented annotations provide an insight into the types of abstract nouns and their countability assignments. Some of these annotations occur with count senses only, such as *instance*, *place*, *person* or *accomplished*. *Process* on the other hand is an annotation which appears only with mass senses. Besides these, other annotations show great tendencies towards one countability assignment. Count senses appear often to be annotated as *instances*, *events* and *objects*, which happen to be concrete sometimes; abstract mass nouns represent rather unbounded entities: *qualities*, *states* and *processes*. This state of affairs implies that aspectual properties might be of relevance for the count/mass distinction.

annotation feature	**count**	**mass**
state	8	54
event	77	4
quality	3	69

[7]Objects are mostly non-abstract entities. Despite of that, I include them in the annotation process since they present only one specific sense of an abstract noun.

process	0	59
instance	9	0
quantity	7	3
place-holder	53	7
aggregation	8	11
bounded	194	10
matter	6	12
place	8	0
person	17	0
accomplished	5	0
object	99	19

Table 3: Distribution of annotations in count and mass senses

Table 3 illustrates the above-mentioned tendencies of certain annotations. The category *bounded* is predominantly count and very frequent due to the varying interpretation of this category which can be assigned to bounded events but also to objects or place-holders. Besides *bounded*, the categories *event* and *place-holder* tend, too, to be classified as count. The diagram in Figure 1 pictures the distribution of the different categories in count and mass senses.

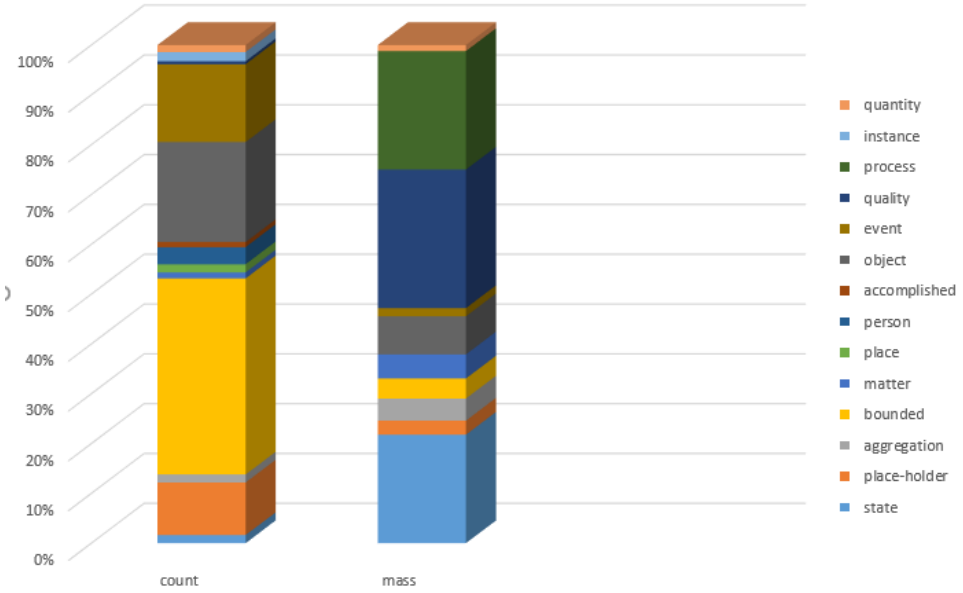


Figure 1: Descriptive results of the lexical property annotation

3.1.1. Intra-sense Relations

Inspired by rule-based mechanism to account for certain cases of polysemy, such as regular polysemy,[8] (Falkum, 2010) defines a set of regular sense derivations which also capture a difference in countability. Analogous to this, I identify three regular ways of deriving a count sense

[8]I am following the definition of regular polysemy in (Apresjan, 1974: 16) who identifies it as a reoccurring pattern. For experimental research on the acceptability of certain cases of regular polysemy see Rabagliatii et al. (2011).

from a mass senses in the domain of abstract entities. Taking all the possible derivations into account, it seems difficult to generalize and cover them all under one function. Instead, I will limit my observations to three mass categories, i.e. *qualities*, *states* and *processes*. These three annotations are mostly mass categories but allow count interpretations with modified meanings regularly. The process of deriving these count interpretations from the basic mass meaning can be formalized as follows:

(11) if a noun **X** has a mass sense **a** which denotes a quality, a process or a state:
⇒ then it will have a count sense **b** with one of the possible interpretations:
1.bounded process / event (BP)[9]
2.instance thereof (IN)
3.(itemized) place-holders (IPH)

In these specific shifts, it seems that the derivation has to go from mass to count and not the other way round, because the meanings which are referred to with the mass senses are all more general than the count senses. The count senses describe either modified cases of qualities, states and processes or a specification in which the focus is only on a part or an instance of these processes, states or qualities. I provide examples from BECL for each shift in (12)-(14).

(12) transplant#2 $\Rightarrow_{BP}$ transplant#1
a. transplant#2 (the act of removing something from one location and introducing it in another location MASS
b. transplant#1 (an operation moving an organ from one organism (the donor) to another (the recipient)) COUNT

(13) hope#2 $\Rightarrow_{IN}$ hope#1
a. hope#2 (the general feeling that some desire will be fulfilled) MASS
b. hope#1 (a specific instance of feeling hopeful) COUNT

(14) need#4 $\Rightarrow_{IPH}$ need#2
a. need#4 (a state of extreme poverty or destitution) MASS
b. need#2 (anything that is necessary but lacking) COUNT

3.2. Corpus Study

This section elaborates on certain tendencies of the syntactic distribution of the abstract nouns under consideration using COCA (Davies, 2010). This corpus study targets discriminating occurrences, in particular the use in plural form and in combination with the indefinite article.

By means of corpus studies we can only observe certain tendencies of nouns to occur in specific distributions. That some nouns do not appear in a particular context must not be interpreted as if it were ungrammatical in such a distribution. Instead, there might be independent reasons for why certain nouns lack certain distributions, as for instance the specific genre of the corpus, or a small number of total occurrences. The results I will report should, therefore, not be taken as conclusive, but rather as an affirmation or rejection of the generalizations made on basis of the

[9]I use the terms bounded process and event synonymously. The difference between processes and events is that process are atelic, and events are terminated, hence telic. Many eventive nouns have a mass sense which focuses on the mere atelic process, and a count sense describing a telic event which includes this specific process, hence the term bounded process, e.g. *transplant*.

lexical investigation described in the previous section.

The corpus study is conducted on basis of a substantial portion of the COCA corpus (Davies, 2010) provided by the AFM-project[10] and parsed with the Stanford Dependency Parser. I further analyzed the data by creating python scripts with the library *pandas* which extracted certain patterns of occurrences along with distributional information and frequencies.

3.2.1. Plurals

Let us first look into the use in plural number. Following the classification of these nouns in BECL, it is expected that all nouns are grammatical in plural use, since they have (at least) one sense which is countable. Yet, the nouns in this dataset do not provide an equal share of the use in plural number. As illustrated with the frequencies in Table 4 and 5, some nouns appear to be very frequent in plural, even more than in singular form, while some other nouns appear in plural rarely.

noun	**total**	**plurals**	%
access	36800	143	0,39
camouflage	1369	0	0
disintegration	959	7	0,73
fill	1750	0	0
presence	29633	198	0,67
salvation	4070	0	0
survival	11962	47	0,39
synchronization	301	0	0
unfairness	385	2	0,52
vindication	432	3	0,69

Table 4: Low frequencies in plural form

noun	**total**	**plurals**	%
marking	1026	1013	98,73
ruin	3566	3373	94,59
constraint	6208	5096	82,09
expectation	8959	7284	81,3
skill	52840	40819	77,25
aspiration	4410	3380	76,64
consequence	21500	15496	72,07
fatality	1262	834	66,09
resource	54918	36155	65,83
remark	7997	5235	65,46

Table 5: High frequencies in plural form

Comparing the nouns in these two tables does not give a straightforward explanation as to why these nouns have such different distributions, since in both groups we have eventive nouns and nouns that are morphologically derived as well as underived (or zero-derived), such as *fill* or *skill*. However, if we look into specific occurrences of these nouns, we will observe that we find much more lexicalized meanings of the event's result in Table 5, such as *ruins* (15b) or *markings* (15a):

(15) a. Even if the graffitists are the least dangerous of these, their ever-present **markings** serve to persuade the passenger that, indeed, the subway is a dangerous place.
b. The classical **ruins** at Mantinea lie in a field next to a weird modern Orthodox church, which looks like a Red Grooms version of the Venetian Gothic cathedral at Torcello.

In addition to these rather concrete uses of abstract nouns, one can also find cases which I describe as (itemized) place-holders in (11) where the use of the abstract noun refers to an

[10] AFM - *Accounting for the Foundation of Mass* is funded by the Alexander-von-Humboldt-Foundation (AvH). One of the greatest contributions of this project is the development of an English sense-based lexicon with countability assignments, `http://count-and-mass.org/`.

entity which is true of that predicates. It thus functions as a place-holder for another entity, which can then be an object, or an event or a proposition. Consider as an illustration the following exmples:

(16) a. Many regard graduate school not simply as the place to acquire a certain level of knowledge and proficiency in a field but as an open-ended status where the aspiring Ph.D. can sit and "mellow" (like a wine?), "ripen" (like a cheese?), and "grow" (like a vegetable?) – the organic metaphors flourish in the prose of departments seeking more time and support for their students. These **expectations** were explicit in Irving Babbitt's opposition of Germanic "specialization" to the more "humane" growth as a man.

b. If, in the hierarchy of values held by the academic community of which one is a part, the value of freedom of inquiry is higher than the value of equality (the value that gives rise to conspicuous benevolence), then such **constraints**, such self-suppression of research into inconvenient questions, will no longer be effective.

c. She was glad she'd had enough warning to hide a few **embarrassments**: stuffed animals, posters showing kittens and cloying sentiments about love.

3.2.2. Indefinite Article

The indefinite article is - next to plural number - one of the signature characteristics of count nouns (cf. for instance Payne and Huddleston, 2002). In sum, the nouns under consideration do not appear that frequent with the indefinite article, since the average occurrence with the indefinite article lies at 8.59%. Below, I will discuss the most peculiar cases.

Ruin and *marking* are nouns which occur much more often in plural use, and their distribution with the indefinite article is accordingly very low. In Table 7 we observe again cases such as *copy* (17) which provide a highly lexicalized meaning as the resulting object, which resembles the count uses of *marking* and *ruin*.

(17) Before my trip my father handed me a **copy**, but added a critique of his own literary style.

noun	**total**	**indefs**	%
access	36800	203	0.55
marking	1026	6	0.58
respiration	559	3	0.54
ruin	3566	17	0.48
transplantation	653	4	0.61
want	1199	7	0.58

Table 6: Low frequencies with the indef. article

noun	**total**	**indefs**	%
copy	17317	5711	32.98
decrease	3843	1858	48.35
respite	1059	374	35.32
sense	79941	26060	32.6

Table 7: High frequencies with the indef. article

Other eventuality denoting nouns like *transplantation* or *respiration* which occur rarely with the indefinite article (Table 6) are often accompanied by further modifiers within the NP, as in the examples below:

(18) a. And many questions whether a machine will ever amount to anything more than a miseryprolonging understudy for a heart **transplantation**.
b. The organism was thus prepared for flight or fight with a general physiological arousal-exaggerated **respiration**, dilation of the arteries to the skeletal muscles, increased heart rate and cardiac output, and so forth.

3.3. Remarks on the results

In a nutshell, we can state that although the nouns under consideration are lexically classified as being both, count and mass, some preferences in terms of frequencies can be observed. Some nouns occur more often in count than in mass use, which can be observed in the significantly higher number of plural occurrences than singular occurrence. This observation, however, does not yield any further conclusion as to which type or category of nouns behaves like that due to the (almost) equal distribution of certain categories (such as deverbal, deadjectival, zero-derived) in both groups (count and mass). One important factor which manipulates the findings in this corpus study is the degree of lexicalization of certain nouns which have an abstract reading or sense, but the other sense is very dominant and might be perceived as not abstract at all, as e.g. copy#1 or marking#1.

(19) a. copy#1 a reproduction of a written record (e.g. of a legal or school record)
b. marking#1 a distinguishing symbol

As mentioned at the beginning of this section, the presented statistics have to be considered with caution. Corpus evidence can only be indicative, and with this in mind I will reflect on the inferences it draws regarding the count uses I elaborated on in section 3.1. Out of the three types of mass to count transformation in (11), two of them were quite frequent in COCA, i.e. the bounded process (20) and (itemized) placeholders (21).

(20) BOUNDED PROCESS / EVENT
a. Many syndicalists saw the strike and the uproar over the trial as **vindications** of their ideology, and even as models on which to base future actions.
b. The passage on the queen celebrates the ethic of chivalry as **a late survival** rather than as daily equipment for living in an earlier age.

(21) (ITEMIZED) PLACE-HOLDERS
a. Well, with all due respect to Ben Franklin, there are probably three **certainties**: death, taxes and someone's out there trying to steal your money.
b. Chloe liked to cook when she had the time, so a decent kitchen was a **necessity**.

Interestingly, I did not come across examples which I could interpret as instances of certain processes or states, as were some of the count senses described in BECL, such as *hope* in (13). Speaking of what is being counted when an abstract noun is countable, Grimm (2014) proposes that countable abstract nouns permit anchoring in either participants or events. The event uses in (20) can certainly be interpreted as anchored in events, participant anchoring is also possible, as exemplified in (22).

(22) a. Accepting the law's validity, however, not only defers and alters Lithuania's plans for secession but also sharply curtails the **hopes** for independence of others – Estonians, Latvians, Moldavians and western Ukrainians, all of whom were forcibly

incorporated after the same 1939 pact between Hitler and Stalin.

b. However, small successes reverse a negative spiral into an achievement-success cycle that can turn **lives** around.

Comparing the outcome of the corpus study with Grimm's proposed anchoring interpretation yields a verification of such interpretations. However, anchoring in participants and events does not exhaust the possibilities of countable uses of abstract nouns as the examples in (21) show. The reference to certain entities which are true of the predicate under consideration, the respective state or event, is one of the peculiar count uses of abstract nouns, which have not been addressed previously.

4. An analysis of countability distinctions among eventualities

In the following I will reflect on the outcome of both the annotation process as well as the corpus study and give an analysis for a subset of these abstract nouns. I will, however, not be able to account for the whole versatile set of abstract nouns. Instead, I limit the object of study to nouns that fulfil two criteria:

1. MORPHOLOGICAL
   which are depredicated, i.e. derived from verbs, adjectives, other nouns.[11]

2. SEMANTICAL
   which denote an eventuality, in the sense of (Bach, 1986: 62), including dynamic and static states, as well as protracted and momentaneous events among others.

For the purpose of classifying nominals into count or mass, it appears to be useful to take aspectual properties into consideration. In particular, the sole distinction between states and processes on one side and accomplishments and achievements on the other which corresponds to the division of telic and atelic aspect is of relevance for the countability distinctions among these nouns (cf. Verkuyl, 1989). I agree with Krifka (1989) and Hinrichs (1985) (among others) that atelic predicates (processes and states) resemble mass nouns, while telic predicates (accomplishments, achievement) are more like count nouns - an observation which can be witnessed in many examples throughout the empirical study of this paper.

Be that as it may, there are several tendencies which are very stable across eventualities and with regard to these tendencies I wish to establish the following claims:

(23) **Generalizations over the count/mass distinction in abstract nouns**

1. Telic eventualities are predominantly count. The telicity is either inherent in the lexical meaning of the noun, as e.g. *death* or *birth*, or a result of a modification of a process by means of framing it as a terminated event (cf. bounded processes in (11)).

2. Processes are flexible regarding countability. In their core meaning they are unbounded and atelic and as such they are mass nouns, but they regularly shift to telic events which are countable.

[11] The morphological criterion applies also to nouns in the grey area where it is not entirely clear whether the noun is derived from the verb or the other way round, e.g. *license*, as well as zero-derived nominals, such as *run* or *jump*. Gerunds will be excluded from consideration due to their structural resemblance with verbs.

3. States are predominantly mass. They are difficult to count and they resist some mass to count coercions. States resemble ordinary concrete mass nouns, as *mud* or *blood*, which are also true of the most minimal parts. Similarly, states go down to the minimal instances of experiencing that state.

A noun that denotes a telic eventuality is thus always count. What is being counted are whole events, transplants or embarrassments, for instance. There is (or can be) a matter of variation of how to count the units, but nevertheless counting is possible because we are dealing with bounded units and we are able to determine the individual events (*a change/an embarrassment/a transplant*), contrary to previous assumptions by Strawson (1959) that eventualities fail to provide a (prima facie) stable and reliable sortal 'principle for distinguishing and counting individual particulars', as illustrated by many examples throughout this paper, as for instance in (18) and (20).

Processes are not as stable as telic events, because they vary a lot and it is not particularly clear when a certain process starts and ends. This is visible on the lexical level, as well as in corpus use of such nouns which can appear as count and as mass. It appears naturally possible, however, to count processes. Importantly, although they are atelic activities, once a process occurs in count syntax, it is no longer perceived as atelic. Instead, the count use sets a frame around the process and turns it to a telic event. *Inquiry*, for instance, can be thought of as an atelic process, yet when we put an indefinite article in front of it or pluralize it, we get a count interpretation of an event which consists of the process of inquiry. By this, we limit the process to its temporal boundaries. Consider the self-constructed minimal pairs below which reflect this contrast:

(24) a. There has been **much inquiry** into President Trump's interactions with Ukraine's President Zelensky.
b. There have been **many inquiries** into President Trump's interactions with Ukraine's President Zelensky.

Counting processes is just setting boundaries to a certain process and referring to this event which occupies a certain time period. Processes and events are inter-related. Every event consists of a starting point, a process of the action under consideration and a termination point. It follows that every process becomes an event once it terminates, or once the context poses a certain frame, as e.g. through a direct object which is quantized (*drinking a glass of wine* vs. *drinking wine*). This relation does not have to go in both directions. It is easy to conceptualize a process as a bounded event. The other way round is tricky. It can be achieved with some event nouns. If we think of the event of *drawing a circle* we can conceptualize a process of drawing that circle which took a certain amount of time, but this is certainly not a regular or productive operation which relates to the complexity of events.[12]

Nouns denoting states present a very stable mass category, as the examples below illustrate. States have (just like ordinary mass nouns, e.g. *blood*, **water**) a divisive reference.

(25) a. He didn't have **much faith** that James or Dill would fall for Julianna's plan,

[12]An event, such as *embarrassment* varies a lot, but if we imagine a situation in which something happened that makes us feel embarrassed, it is difficult to capture this (what makes us feel embarrassed) in form of a process that is homogeneous and runs for certain time. It is rather punctual, a reaction of someone or something alike.

though lacking a better one, he'd agreed to it.

b. An elderly professor, the attendant was internationally eminent, a sensible man without **much need** for vanity.

c. I don't have **a lot of certainty** about reincarnation, but I have a lot of interest in what lies ahead.

They are true of all the minimal instances. They are difficult to turn to count expressions of the form of a bounded eventuality as is possible with processes.

It appears that what makes such an eventive nominal count or mass is the extent to which the minimal counting units are vague - analogous to what Chierchia (2010) proposes for concrete nouns. What is being counted with events can be determined in a base world, i.e. a telic event. Such an event atom will stay an atom in all further precisifications of the world, i.e. a minimal unit where no proper part is true of that event. Contrary to that are processes. Processes such as *run*, *dance*, *inquiry* and alike have vague minimal parts. Although we can distinguish the presence of a process from its absence, such as when run is true and when not, but within the process run which can last over some time we cannot determine the units of run. It is unclear whether, for instance, the process run starts when the person is holding both legs up, or when the movement of a person reaches a certain speed.

Even if we were able to imagine what counts as one process in that we cut a part of the process run and determine it as the atom in the world w, we will have to face that in another precisification of the world, e.g. w', a part of that alleged run atom could still count as run. This relation resembles much that of concrete mass nouns. The only option to quantify over such processes is in terms of terminated events. But this yields then a count noun. States on the other hand are different. States, such as *faith*, *love*, *need* are divisive in that they are true of any so minimal parts. We cannot count these states since we cannot determine the minimal units of these states, the minimal atoms of need or love or faith. A part of a state is difficult (if possible at all) to identify because states go down to instances, resembling substances like water or blood.

Since telic events E, processes P and states S denote (some kind of) eventualities, the semantic type of their denotation is event (v); accordingly their extension has to include events. The difference between P and S one one side and E on the other is the same as between ordinary concrete count nouns and ordinary concrete mass nouns. P(x) and S(x)are mass predicates, contrary to E(x) which is count.

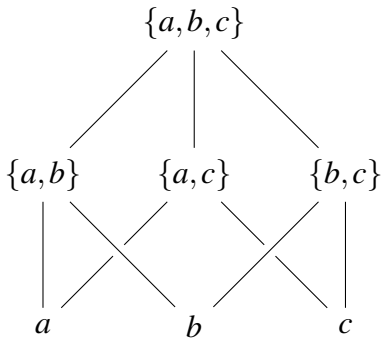
I will make use of Chierchia's model M which is as a tuple of the form <U, W, C,α, F>[13] and add a set of events E, which stores the extension of event nominals.

(26) $E \subseteq U$ is the set of events

Following the previous generalizations concerning telic events, I assume that since they can be individuated and provide a singular/plural alternation, their domain should be in form of a complete, atomic, join semilattice (as assumed in the majority of theories on plurality), which is partially ordered by $\leq$ and closed under a join operation $\cup$, as illustrated in (27).

(27)

[13] In this model Chierchia makes use of the set of individuals U, the set of worlds W, the set of contexts C, partial order over C α and the interpretation function F.



The singletons at the bottom present the atomic events, referred to by singular event nominals and the sets above are the sums of these atomic events, which form the extension of plural event nominals.

Let us take some examples for the above categories: *inquiry* for processes (P), *need* for states (S) and *transplant* for events (E). Events have a number alternation; in singular they will denote a set of atomic events, and in plural the sets of sums of atomic events (including the atomic events):

(28) denotation of count eventualities (events - E)
[[transplant]] = λw.λe.P(w)(e), extn = $\{a,b,c\}$
[[transplants]] = λw.λe.*P(w)(e), extn = $\{a,b,c,\{a,b\},\{a,c\},\{b,c\},\{a,b,c\}\}$
where x is of type *v*

For states (S) and processes (P), I assume they denote the whole semi-lattice including both the atomic events as well as all the sums generated from the atoms at the bottom. Importantly, the atoms in the extension of states and processes are not stable across worlds.

(29) denotation of mass eventualities (processes - P and states - S)
[[inquiry]] = λw.λe.P(w)(e)
[[need]] = λw.λe.P(w)(e)
where x is of type *v*
extn = $\{a,b,c,\{a,b\},\{a,c\},\{b,c\},\{a,b,c\}\}$

Telic events denote atomic entities - the singletons at the bottom of the lattice. The corresponding plural property will be obtained via the closure operation * and yields the whole set including sums and atoms: *P = $\{a,b,c,\{a,b\},\{a,c\},\{b,c\},\{a,b,c\}\}$. Mass eventualities, on the contrary, do not pluralize since they are sum-closed and by that inherently plural.

However, under certain conditions mass eventualities can shift to a count interpretation. One way of doing so is by switching from an atelic process to a telic process or event. Another way is by referring to what I called (itemized) place-holders in (11). This particular interpretation differs from the previous in that it no longer refers to the event, but rather to a thematic role of that event, most probably (but not exclusively) the *theme*.

The shift from atelic processes to telic events can be accomplished by the common procedure of packaging. I will adopt here Chierchia's partition operator $\sqcap$[14] which derives countable units

[14]In Chierchia (2010) the operator $\sqcap$ is of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$ and applies to predicates of type $\langle e,t\rangle$. I will - for the purpose of applying it to events - assume that it is type preserving, hence when it applies to predicates of type

or packages of the process. Applying ⊓ to a mass eventuality will yield an atomic property which satiesfies the requirement of relative atomicity:

(30) AT(⊓(P)) = ⊓(P)
If x is a member of a partition of P, no proper part of x is (relative atomicity)

4.1. Reference to thematic roles

During the lexical annotations process I identified a count use of eventualities which has been confirmed by the corpus study, i.e. that countable eventive nouns (can) refer to entities which have the property denoted by the predicate, or which describe the result of the event, as illustrated in (16) and (14). I called such occurrences *(itemized) place-holders*. It appears that this interpretation can be understood as referring to an argument of the event, e.g. the theme or patient. I therefore argue that event denoting nominals can also refer to the thematic roles, most probably (but not exclusively) the *theme*. This specific interpretation of derived nominals includes also cases which Grimshaw (1990) and Alexiadou et al. (2010) call *result nominals*, or Melloni (2007) *referential nouns*. Result nominals, too, refer to the result of the event which can be understood as the thematic role of the event. The denotation of such a nominal differs from the one in (28) in that it refers to the theme of the event, as illustrated in (31).

(31) λw.λxλe.P(w)(e) $\wedge$ TH(w)(e,x)
where TH(w)(e,x) = x is the theme of e in w

Importantly, (31) is not the lexical entry of the eventive noun. I believe that the lexical entries for eventive nominals are uniform throughout the different interpretation as proposed in (28), but the reference to a thematic role has to be adjoined at a higher position of a functional projection. A detailed elaboration of the architecture of (31) can be found in Husić (2020).

5. Summary and Discussion

This paper has tried to bring us a bit closer in solving the puzzle of countability distinctions in abstract nouns. By an empirical study of a set of abstract nouns, I was able to determine generalizations that relate to a subset of abstract nouns - eventuality denoting nominals. In a nutshell: the aspectual properties of the events denoted by these nominals seem to be responsible for the countability assignment. Telic eventualities are always countable, while atelic eventualities, such as processes or states are predominantly mass. However, processes are related to events in that they can turn to telic predicates by compositional means which then yields a count noun. This state of affairs confirms previous observations which relate telicity to countness.

With regard to eventualities, I argued that such nouns can also refer to thematic roles of the underlying event. The more common description of similar cases in linguistic literature is *Result Nominals* (Grimshaw, 1990; Alexiadou et al., 2010) which is a more restricted interpretation than the reference to thematic roles. What I call *reference to thematic roles* applies also to states which do not have a result per se, as for instance *certainty* and *necessity* in (21). The idea of referring to a thematic role of the event by the event nominal itself sheds new light on the event semantics in the nominal domain.

I argued in favor of a vagueness based approach to the countability of nouns which offers a

$\langle v,t\rangle$ it will be of type $\langle\langle v,t\rangle,\langle v,t\rangle\rangle$ such as to enable the derivation of count events from mass processes.

possibility to conceptualize the differences in count and mass eventualities. It remains to be tested whether such an approach can also account for the countability distinction among other non-eventive abstract nouns, such as measure and time terms.

References

Alexiadou, A., G. Iordăchioaia, and E. Soare (2010). Number/Aspect Interactions in the Syntax of Nominalizations: A Distributed Morphology Approach. *Journal of Linguistics 46*(3), 537–574.

Apresjan, J. D. (1974). Regular Polysemy. *Linguistics 14*(2), 5 – 32.

Asher, N. (1993). *Reference to Abstract Objects in Discourse*, Volume 50 of *Studies in Linguistics and Philosophy*. Kluwer Academic Publishers.

Bach, E. (1986). The Algebra of Events. *Linguistics and Philosophy 9*(1), 5–16.

Brinton, L. (1998). Aspectuality and Countability: A Cross-Categorial Analogy. *English Language and Linguistics 2*.

Bunt, H. C. (1985). *Mass Terms and Model-Theoretic Semantics*. Cambridge University Press.

Campbell, K. (1990). *Abstract Particulars*. Blackwell.

Chierchia (1998). Plurality of Mass Nouns and the Notion of 'Semantic Parameter'. In S. Rothstein (Ed.), *Events in Grammar*, pp. 53–103. Kluwer.

Chierchia, G. (2010). Mass Nouns, Vagueness and Semantic Variation. *Synthese 174*(1), 99–149.

Davies, M. (2010). The Corpus of Contemporary American English as the First Reliable Monitor Corpus of English. *LLC 25*(4), 447–464.

Duden (2005). *Duden. Die Grammatik*. Mannheim: Bibliographisches Institut & F.A. Brockhaus AG.

Falkum, I. L. (2010). Systematic Polysemy and the Count-Mass Distinction *. *UCL Working Papers in Linguistics*, 16–40.

Grimm, S. (2014). Individuating the Abstract. In *Proceedings of Sinn und Bedeutung 18*, pp. 182–200.

Grimshaw, J. (1990). *Argument Structure*. Cambridge, Mass.: MIT Press.

Hinrichs, E. W. (1985). *A Compositional Semantics for Aktionsarten and NP Referene in English*. Ph. D. thesis, The Ohio State University.

Husić, H. (2020). *On Abstract Nouns and Countability. An Empirical Investigation into the Countability of Eventuality Denoting Nominals.* Ph. D. thesis, Ruhr-University Bochum.

Kiss, T., F. J. Pelletier, H. Husic, R. N. Simunic, and J. M. Poppek (2016). A Sense-Based Lexicon of Count and Mass Expressions: The Bochum English Countability Lexicon. In *Proceedings of the 10th International Conference on Language Resources and Evaluation, LREC 2016*, pp. 2810 – 2814.

Kiss, T., F. J. Pelletier, and T. Stadtfeld (2014). Building a Reference Lexicon for Countability in English. In *Proceedings of the 9h International Conference on Language Resources and Evaluation, LREC 2014*, pp. 995–1000.

Krifka, M. (1989). Nominal Reference, Temporal Constitution and Quantification in Event Semantics. In R. Bartsch, J. F. A. K. van Benthem, and P. van Emde Boas (Eds.), *Semantics and Contextual Expression*, pp. 75–115. Foris Publications.

Landman, F. (1989). Groups, I. *Linguistics and Philosophy 12*(3), 559–605.

Landman, F. (2010). Count Nouns - Mass Nouns, Neat Nouns - Mess Nouns. *The Baltic*

International Yearbook of Cognition, Logic and Communication 6(1), 1–67.

Landman, F. (2016). Iceberg Semantics for Count Nouns and Mass Nouns: Classifiers, Measures and Portions. *Baltic International Yearbook of Cognition, Logic and Communication 11*(1).

Levickij, V. V. (2005). Polysemie (Polysemy). In R. Köhler, G. Altmann, and R. G. Piotrowski (Eds.), *Quantitative Linguistik / Quantitative Linguistics*, pp. 458–463. DeGruyter.

Link, G. (1983). The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretical Approach. In R. Bauerle, C. Schwarze, and A. von Stechov (Eds.), *Meaning, Use and Interpretation of Language*, pp. 250–209. Berlin: de Gruyter.

Melloni, C. (2007). *Polysemy in Word Formation: The Case of Deverbal Nominals*. Thesis, Universita Degli Studi di Verona.

Miller, G. A. (1995). WordNet: A Lexical Database for English. *Commun. ACM 38*(11), 39–41.

Moltmann, F. (2013). *Abstract Objects and the Semantics of Natural Language*. Oxford University Press.

Mourelatos, A. P. D. (1978). Events, Processes, and States. *Linguistics and Philosophy 2*(3), 415–434.

Nicolas, D. (2003). The Semantics of Nouns Derived from Gradable Adjectives. In *Proceedings of Sinn und Bedeutung 8*, pp. 197–207.

Nicolas, D. (2010). Towards a semantics for mass expressions derived from gradable expressions. *Recherches Linguistiques de Vincennes 39*, 163–198.

Payne, J. and R. Huddleston (2002). Nouns and Noun Phrases. In R. Huddleston and G. K. Pullum (Eds.), *Cambridge Grammar of the English Language*. Cambridge: Cambridge University Press.

Pelletier, F. J. (1979). *Non-Singular Reference: Some Preliminaries*, pp. 1–14. Dordrecht: Springer Netherlands.

Polikarpov, A. A. and V. Kurlov (1994). Stilistika, semantika, grammatika: opyt analiza sistemnych vzaimosvjazej (po dannym tolkovogo slovarja). *Voprosy jazykoznanija 1*, 62–82.

Rabagliatii, H., G. F. Marcus, and L. Pylkkänen (2011). Rules, Radical Pragmatics and Restrictions on Regular Polysemy. *Journal of Semantics 28*, 485–512.

Rosen, G. (2018). Abstract Objects. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2018 ed.). Metaphysics Research Lab, Stanford University.

Rothstein, S. (2010). Counting and the Mass/Count Distinction. *Journal of Semantics 27*(3), 343–397.

Rothstein, S. (2017). *Semantics for Counting and Measuring*. Key Topics in Semantics and Pragmatics. Cambridge University Press.

Strawson, P. (1959). *Individuals*. Methuen.

Sutton, P. R. and H. Filip (2016). Counting in Context : Count / Mass Variation and Restrictions on Coercion in Collective Artifact Nouns *. *Proceedings of SALT 26*, 350–370.

Verkuyl, H. J. (1989). Aspectual Classes and Aspectual Composition. *Linguistics and Philosophy 12*, 39 – 94.

Williams, D. C. (1953). On the Elements of Being: I. *The Review of Metaphysics 7*(1), 3–18.

Zamparelli, R. (2019). Countability Shifts and Abstract Nouns *. In F. Moltmann and L. Tovena (Eds.), *Mass and Count in Linguistics, Philosophy, and Cognitive Science*. Benjamins, Amsterdam.