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Studies in Linguistics and Linguistic Data Science

Halima Husić

On Abstract Nouns and Countability

An Empirical Investigation into the Countability of Eventuality Denoting Nominals

Linguistic Data Science Lab

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LDSL

Linguistic Data Science Lab

Studies in Linguistics and Linguistic Data Science

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Tibor Kiss
Linguistic Data Science Lab

On Abstract Nouns and Countability

An Empirical Investigation into the Countability of Eventuality Denoting Nominals

Inaugural-Dissertation
zur
Erlangung des Grades eines Doktors der Philosophie
in der
Fakultät für Philologie
der
RUHR-UNIVERSITÄT BOCHUM

vorgelegt von

Halima Husić

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Halima Husić

Zusammenfassung

Das zentrale Thema der vorliegenden Dissertation ist die Identifikation und Ausprägung der Zählbarkeit bei abstrakten Substantiven. Vor dem Hintergrund der Polysemie abstrakter Substantive stellt sich die Frage, wie Zählbarkeit zu bestimmen ist, wenn sie in Abhängigkeit zu einer bestimmten Interpretation oder Verwendung realisiert wird. Die Beispiele in (1) stammen aus dem Contemporary Corpus of American English - COCA (Davies, 2010) und verdeutlichen die Variabilität der Zählbarkeit dieser Substantive anhand der Nomina *virtue* und *knowledge* in Kombination mit den Modifikatoren *many* und *much* und dem indefiniten Artikel *a*.

(1) 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. One of the **many virtues** of pumpkins is the ability to combine equally well with sugar and spices or salt (...)

(2) a. these people don't have **much knowledge** of what's east of the Appalachians.
b. Boys and girls are being thrust into adulthood without **a knowledge** of their past, something unimaginable a generation ago.

Die Variabilität solcher Substantive ist auch in Wörterbüchern sichtbar, die eine Zählbarkeitskategorie für einzelne Bedeutungen festlegen. So finden sich z.B. in BECL (Bochum English Countability Lexicon, Kiss et al., 2016) zahlreiche Abstrakta, dessen Zählbarkeit in Abhängigkeit einer spezifischen Bedeutung variiert, wie in (3)-(9) zu beobachten ist.

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

(4) 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 MASS
d. license#3 excessive freedom; lack of due restraint MASS

(5) 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

(6) a. classification#2 a group of people or things arranged by class or category COUNT
b. classification#3 the basic cognitive process of arranging into classes or categories 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

(9) a. consequence#1 a phenomenon that follows and is caused by some previous phenomenon COUNT
b. consequence#2 the outcome of an event especially as relative to an individual COUNT
c. consequence#3 having important effects or influence MASS

Wie aus den Beispielen oben zu sehen ist, variiert zum einen die Zählbarkeit, zum anderen ist auch die Abstraktheit der einzelnen Bedeutungen nicht immer gewährleistet. So referieren z.B. classification#2 und license#1 auf konkrete Entitäten. Dies weist auf eine zusätzliche Problematik in Zusammenhang mit der Kategorie *abstrakt* beziehungsweise der Abgrenzung zur Kategorie *konkret* hin, nämlich die Definition der Begriffe *abstrakt* und *konkret*. Hier ist zunächst festzustellen, dass beide Begriffe nicht die Nomina näher beschreiben, sondern die Referenz/das Denotat der Nomina.

In der Sprachphilosophie wurden bisher einige Vorschläge zur Einschränkung und Definition der Begriffe *abstrakt* vs. *konkret* gemacht, die in Kapitel 3 in Zusammenhang mit dem Forschungsstand zur Zählbarkeit von Abstrakta diskutiert werden. Darüber hinaus ist anzumerken, dass eine einschlägige Definition von Abstrakta für die Untersuchung der Zählbarkeit dieser Begriffe nicht zwingend notwendig ist. Dies ist in dem aktuellen Forschungstand zur Semantik von zählbaren und nicht-zählbaren Substantiven begründet, auf den ich im Folgenden eingehen werde.

Die Zählbarkeit lässt sich anhand einer Liste von grammatischen Merkmalen bestimmen. Diese Merkmale lassen den Eindruck erwecken, dass Zählbarkeit eine eindeutig festgelegte Kategorie von Substantiven ist. Wenn man jedoch dieses sprachliche Phänomen näher untersucht, stellt man schnell fest, dass es viele Sonderfälle gibt, die von den vermeintlichen Regeln abweichen. In Kapitel 2 gehe ich auf bekannte Problemfälle der Zählbarkeit ein und stelle den aktuellen Forschungstand vor. Was die modelltheoretische Interpretation betrifft, so kann man sagen, dass seit den Arbeiten von Link (1983) eine

dynamische Interpretationsdomäne verfolgt wird, die die Beziehung zwischen Singularen und Pluralen gegenüber Massentermen und Kollektiva berücksichtigt. Die zugrundeliegende lexikalische Semantik und die modelltheoretische Interpretation der Denotate baut auf ontologischen Merkmalen der Referenten auf wie z.B. Kumulativität, Divisivität, Gequantelheit und Atomizität. Für die Anwendung dieser Merkmale werden in den entsprechenden Arbeiten immer konkrete Substantive wie z.B. *Katze*, *Tisch*, *Wasser* oder *Blut* herangezogen. Ob und inwiefern diese ontologischen Merkmale auf Abstrakta angewendet werden können um eine entsprechende Analyse der Semantik dieser Substantive abzuleiten, ist eine offene Frage. Vor diesem Hintergrund erscheint die Auswahl eines bestimmten Kriteriums für die Identifikation von Abstrakta irrelevant, da Abstrakta in diesem Zusammenhang kaum erforscht wurden und die Untersuchung einer beliebigen Teilmenge von Abstrakta nichtsdestotrotz einen entscheidenden Beitrag leisten wird.

Um die Ausprägung der Zählbarkeit zu ergründen, entscheide ich mich eine Teilmenge von Abstrakta anhand der lexikalischen Ressource BECL näher zu studieren. Ich beschränke mich auf die Menge von Substantiven, die in BECL folgende Merkmale hat:

- mehrere polyseme Bedeutungen
- jeweils eine Bedeutung in den Zählbarkeitsklassen *regular count* und *regular mass*
- mindestens eine Bedeutung kann als abstrakt eingeordnet werden

Die Filterung von BECL nach den obigen Kriterien liefert einen Datensatz von ca. 200 Substantiven mit jeweils zwei bis vier Bedeutungen. Die Beispiele in (3)-(9) entsprechen diesen Kriterien.

In der lexikalischen Studie (Kapitel 4) widme ich mich der Annotation von Merkmalen bestimmter Bedeutungen, die die Zählbarkeitsklassifikation begründen sollen. Da kein adäquates Annotationsschema zur Verfügung steht, entwerfe ich ein eigenes Schema mit 14 Merkmalen. Diese Auswahl an Merkmalen ermöglicht klare Tendenzen unter den Substantiven zu identifizieren. (10) und (11) stellt einige dieser Tendenzen dar.

(10) COUNT: bounded, event, object, placeholder

(11) MASS: quality, process, state

Darüber hinaus konnten auf Basis dieser Annotation Fälle von regulärer Polysemie (cf. Apresjan, 1974) erkannt werden, die ich unter folgendem Prinzip zusammenfasse:

(12) 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 (BP)

2.instance thereof (IN)

3.(itemized) placeholders (IPH)

Um diese Schlussfolgerungen zu bestätigen, führe ich eine Korpusstudie in COCA durch (Kapitel 5) und suche systematisch nach diskriminierenden Vorkommen der Substantive wie z.B. in Pluralform, in Kombination mit dem indefiniten Artikel und mit den Modifikatoren *many* und *much*. Die Korpusstudie kann mit Ausnahme der Interpretation *instances* (12-2) alle behaupteten Generalisierungen aus der Annotationsstudie verifizieren. Darüber hinaus, fällt die häufige Verwendung von Abstrakta als *placeholder* auf, sogar auch bei Substantiven, die eine solche Bedeutung nicht in BECL gelistet haben, z.B.:

(13) a. She was glad she'd had enough warning to hide a few **embarrassments**: stuffed animals, posters showing kittens and cloying sentiments about love.
b. Gradually the screws of rampant consumerism were turned, and wants and desires became perceived **necessities**: another process pregnant with geographical implications.
c. 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.
d. Chloe liked to cook when she had the time, so a decent kitchen was a **necessity**.
e. **Delegations** from across the country as well as from China and the Republic of Korea have visited Ben Franklin High to study and emulate its successes.
f. Instead, the scammers printed **forgeries** that were close enough to the real thing to fool some buyers.

Die Ergebnisse der empirischen Untersuchung bilden die Basis der semantischen Analyse in Kapitel 6. Für die semantische Analyse beschränke ich mich auf eine Teilmenge der annotierten Daten, nämlich auf die Nomina, die Ereignisse im Sinne von Bach (1986) denotieren. Die Zählbarkeit von Ereignissen scheint stark von ihrer Aktionsart abzuhängen. So sind telische Ereignisse immer zählbar, atelische Ereignisse (Zustände) nicht-zählbar und Prozesse variieren in Abhängigkeit ihrer Telizitität: telische Prozesse sind zählbar und atelische Prozesse sind nicht-zählbar. Ich argumentiere für einen strukturellen Ansatz zur semantischen Analyse der Zählbarkeit solcher Substantive anlehnend an die Theorie von Chierchia (1998a, 2010, to appear) die besagt, dass der Hauptunterschied zwischen den Denotaten von zählbaren und nicht-zählbaren Substantiven in der Vagheit der Atome begründet liegt. Zählbare Nomina denotieren Atome, die in allen möglichen Welten bestehen und somit dauerhaft und stabil sind (stable atoms), während Massenterme die Summe aller Atome dieses Prädikats denotieren, jedoch sind die Atome nicht über mögliche Welten haltbar (non-stable atoms). (14) und (15) stellen am Beispiel von *death* und *need* die Denotate von Ereignissen und Zuständen dar.

(14) a. [[death]] = λwλe.P(w)(e)
where e is of type v
extn = $\{e1, e2, e3\}$
b. [[deaths]] = λwλe.*P(w)(e)
where e is of type v
extn = $\{e1, e2, e3, \{e1, e2\}, \{e1, e3\}, \{e2, e3\}, \{e1, e2, e3\}\}$

(15) [[need]] = λwλe.P(w)(e)
where e is of type v
extn = $\{e1, e2, e3, \{e1, e2\}, \{e1, e3\}, \{e2, e3\}, \{e1, e2, e3\}\}$

Was die Interpretation als *placeholder* betrifft, so wird diese Lesart kompositionell aufgebaut. Ich argumentiere, dass die obige Interpertation als *placeholder* eigentlich die Referenz auf eine thematische Rolle des Ereignisses darstellt. Aus den Beispielen in (13) kann man den Bezug von einem Ereignis auf das Thema oder Patiens ableiten, wie in (16) verdeutlicht.

(16) 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.
$\Rightarrow$ X is certain about death, taxes and someone's out there trying to steal your money
$\Rightarrow$ certainties = death, taxes, someone's out there trying to steal your money

Die Komponente mit der Bedeutung der thematischen Rolle (18) wird von einer funktionalen Projektion eingeführt und mit der Nomenbedeutung kombiniert (19).

(17) [[event]] = λwλe.P(w)(e)

(18) [[theme]] = λwλxλe.TH(w)(e,x)
where TH(w)(e,x) = x is the theme of e in w

(19) [[reference to theme]] = λwλxλe.P(w)(e) $\wedge$ TH(w)(e,x)

Eine Analyse in diesem Sinne umfasst auch die Lesart von deverbalen Nominalisierungen, die unter dem Namen *Result Nominals* bekannt ist (vgl. Grimshaw, 1990; Alexiadou, 2001).

Die vorliegende Erforschung einer Teilmenge von Abstrakta anhand der Annotation von lexikalischen Merkmalen und einer gezielten Korpusstudie in COCA ermöglicht einen Einblick in das Sortenpotential dieser Nomina. Aus dieser Untersuchung lässt sich eine Reihe von Generalisierungen ableiten, anhand derer eine semantische Analyse der Zählbarkeit bei Ereignisnominalisierungen bereitgestellt wurde. Demzufolge trägt diese Ausarbeitung wesentlich zur Diskussion der Zählbarkeit und Ereignissemantik in der aktuellen Forschung bei.

1 Introduction

Across languages, it has been observed that nouns seem to be categorically divided in those that can be counted and those that cannot. While the countability of some nouns may be straightforward, as in the case of object nouns like *car* or *table* which are countable, language learners need to memorize which nouns pattern as count nouns and which as mass nouns in the language they are learning. English Grammar books divide these nouns in the categories count and mass nouns (or countable and uncountable nouns) and propose a list of grammatical features that establish this distinction, such as pluralization. Other languages may provide a different manifestation of countability.

One problematic issue with regard to countability is variation. Although many nouns can be classified as mass or count according to their morpho-syntactic features, there are some contexts in which this classification does not hold, in that a count noun appears in a mass context or vice versa. There are two possibilities for explaining this variation or flexibility. A common way of doing so is to assume that grammatical features distinguish two basic categories of nouns, i.e. count and mass, and every item of variation is explained independently. The other option is to assume that every noun can actually be both count and mass depending on certain lexical and/or syntactic constraints.

To illustrate this, consider the minimal pair in (1) expressing the count/mass distinction:

(1) a. Show me those two pillows.
    b. (*) Show me those two bloods.

The first approach would argue that *blood* is a mass noun and the direct combination with numerals is odd, because mass nouns require classifier/container or measure phrases for expressing the quantity of the mass noun's referent, such as *Show me those two tubes of blood*. At the same time those approaches will explain that (1-b) is not ungrammatical *per se*, because under certain conditions a mass noun can actually appear in such ordinary count distribution in which case it yields a slightly different interpretation than when used as an ordinary mass noun. According to that interpretation, (1-b) can be totally acceptable in a context where a group of people is investigating different types of blood and speaking of two specific types, one person says to another the *apparently ungrammatical* utterance in (1-b). It would be accepted and understood as meaning *two types of blood* without any complication.

The second approach would not have such problems in explaining the (in)acceptability

of (1-b) since it would not dismiss such constructions from the beginning. This approach would instead assume that *blood* occurs in count distribution when referring to specific types of blood (or any other salient count interpretation), and in mass distribution when referring to the substance.

Both approaches have their advantages and disadvantages. In a nutshell the variation approach can account for all types of variation without difficulties, but cannot explain why certain nouns are more flexible while others have a very strong classification with respect to countability. The structural approach, however, is motivated by precisely these strong tendencies among nouns and examines the variation systematically, but is limited to the cases which are hitherto explained and accounted for. The count/mass distinction, however, applies to many more nouns than just to those denoting things or objects and stuff or substances.

In semantics, many issues relating to countability of nouns have been discussed and analysed. There is however a set of nouns that has been neglected throughout the research, i.e. abstract nouns, such as *hope*, *inquiry*, *license*, *death* or *necessity*. Abstract nouns provide countability distinctions, too, as illustrated in (2).

(2) a. I gained a lot of knowledge in my experience as a midwife.
b. (*)I gained a lot of knowledges in my experience as a midwife.

There are several reasons why an analysis of these nouns is challenging. One of the greatest challenges among them is precisely the variation. Although we are familiar with it from the phenomenon of countability in the realm of concrete nouns, abstract nouns seem to provide even larger variation possibilities. Just like (1-b) can be accounted for by means of countability shifts, one could argue that (2-b) is acceptable in a given context, such as e.g. a midwife telling her story about different kinds of knowledge she gained.

The claim relating to the variation among abstract nouns is further supported when lexical resources are consulted. As an illustration, consider the following entries from the Bochum English Countability Lexicon 2.1 (Kiss et al., 2016) which provide countability assignments for English noun senses.

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

(4) 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

(5) a. consequence#1 a phenomenon that follows and is caused by some previous phenomenon COUNT
b. consequence#3 having important effects or influence MASS

c. consequence#2 the outcome of an event especially as relative to an individual
COUNT

(3)-(5) exemplify typical cases of abstract nouns in which the individual meanings are related. Even though the senses are related and the difference between them is rather insignificant, there is still a change in countability. The aim of this thesis is to study the differences that emerge between count and mass senses of abstract nouns in order to gain a better understanding on how countability is manifested within abstract nouns. Furthermore, I want to tackle the question of how (if at all) hitherto proposed theories of the semantics of count and mass nouns can be extended in so far as to account for the countability of abstract nouns. I will approach this issue with a lexical annotation task of a set of abstract nouns and a corpus study of the same set of nouns targeting discriminating contexts in which these nouns might occur. An empirical investigation of such kind will provide an objective report of the actual state of countability distinctions in abstract nouns.

1.1 Thesis statement and contributions

The starting point of this thesis is the class of *abstract nouns*. As I approach this set of nouns, I will need to limit myself to smaller subsets of them for the purpose of deriving appropriate generalizations. The object of study discussed in this thesis should therefore be understood as being taken through a funnel in order to provide the most accurate results: starting the research question from the general term *abstract nouns*, I will move over a heterogeneous sample of 200 abstract nouns from BECL, and further to a subset of these which denote eventualities for which I will offer a semantic analysis. On this road I will establish some generalizations.

> *Abstract nouns comprise a heterogeneous class of nouns including morphologically and semantically different nouns. Due to that lack of homogeneity within this class, a uniform semantics for these varying types of abstract nouns seems unlikely.*

Abstract nouns include both deadjectival and deverbal nouns as well as primary nouns. From a semantic point of view, besides denoting eventualities, abstract nouns are also relational nouns, measure and time terms, psych nouns and factual terms.

In order to study the countability distinctions among abstract nouns, I annotated a set of 200 polysemous English abstract nouns which have countability assignments in BECL. In addition to that, I conducted a corpus study of the occurrences of these nouns in COCA (Davies, 2010), particularly focusing on discriminating count and mass contexts. This empirical investigation of a set of abstract nouns shows some tendencies among nouns that denote eventualities.

> *Abstract mass nouns frequently refer to unbounded processes, states or qualities. Countable abstract nouns describe events, bounded processes, objects (which are ambiguous between a concrete and abstract reference) and placeholders. Some of these categories are interrelated, such as unbounded processes and bounded events as well as eventualities and placeholders. Some eventualities have a basic mass interpretation and shift their countability when referring to bounded events or placeholders.*

In order to propose a semantic analysis of a set of abstract nouns, I narrowed down the object of study to eventuality denoting nominals which are de-predicated. I pursue a structurally driven analysis which explains the pertinent tendencies of certain eventualities to be categorized as count or mass. For this particular set of nous I conclude:

> *The core feature underlying the countability distinctions in eventuality denoting nominals is the Aktionsart. Telicity corresponds to countness. Among the nouns which denote eventualities three categories differ with regard to countability: states, events and processes. States are predominantly mass while events are predominantly count. Processes can be both count or mass depending on the inner aspect of the individual occurrence.*

I will pursue the theory developed in Chierchia (2010, to appear) which considers the vagueness of the minimal components of a mass reference as the reason why they cannot be counted. An explanation along these lines can also account for the uncountability of states and atelic processes. I will defend this line and propose to extend the model designed in Chierchia (to appear) in order to account for eventualities.

1.2 Outline of the thesis

The thesis is structured as follows:

Chapter 2 introduces the notion of the count/mass distinction. It gives an overview of the grammatical properties of countability and presents some major ontological claims with regard to the referential differences between count and mass nouns. This chapter outlines common peculiarities with regard to countability and summarizes the most influential semantic approaches to this phenomenon.

Chapter 3 is a study of abstract nouns and related work in linguistics which targets countability preferences of these nouns. This chapter emphasizes the challenges abstract nouns pose for theories of the semantics of nouns as well as the need to study the countability distinction within abstract nouns.

Chapter 4 presents the bulk of my research. I will present the lexical resource I used for deriving generalizations concerning the countability of abstract nouns, i.e. BECL 2.1 (Kiss et al., 2016). This chapter elaborates on the annotation task I conducted and shows some

regular patterns in the classification of countability classes which relate to the boundedness of the nouns under consideration. These observations are further used to derive regular cases of polysemy with a change in countability.

Chapter 5 is a corpus study of a subset of the annotated nouns in chapter 4 based on the Contemporary Corpus of American English - COCA (Davies, 2010). It presents the common distribution of these nouns in discriminating environments for count and mass nouns, such as their usage in plural form, in combination with the indefinite article as well as with the modifiers *many* and *much*. The descriptive observations of the mere frequencies within these discriminating contexts shows the flexibility of these nouns with regard to countabilty. A closer look at specific occurrences reveals that some of the interpretations proposed in chapter 4 can be verified .

Chapter 6 presents an analysis for eventuality denoting nominal of depredicated nouns. The analysis accounts for the variation among eventualities and explains how the vagueness of minimal counting components corresponds to certain eventualities being uncountable. In this chapter, I propose common shifts of countability present among eventualities and analyse them according to their structural and semantic differences.

2 The count-mass distinction

The count-mass distinction is commonly acknowledged as one which divides nouns that can be counted from nouns that cannot. There are different ways in which a language can manifest the countability of nouns. Chierchia (1998a, 2010) classifies languages into three types according to the distribution of count and mass nouns: number-marking languages, classifier languages and number neutral languages. In number marking languages counting usually involves certain morpho-syntactic processes within the NP which can differ from language to language. In English, for instance, counting requires the noun to be in plural form while in Turkish the noun must not be in plural form when the number of entities is already specified by the numeral, as illustrated in (2).

(1) a. five apples
b. *five apple

(2) a. beş elma
five apple
'five apples'
b. *beş elmalar
five apple-s
'five apples'
c. elmalar
apple-s
'apples'

Besides pluralization, there are other characteristics underlying the count-mass distinction. In order to better understand the nature of count and mass nouns, one needs to distinguish (i) the genuine characteristics or properties of count and mass nouns which are often called "grammatical", "morpho-syntactic" or "distributional" properties from (ii) those properties that have been assigned by various researches to the denotation of count and mass nouns which are also called "ontological", "conceptual" or "semantic" properties. Genuine properties are what we observe on the surface, in grammar and in natural language use. Denotational properties, on the other hand, are not properties of the nouns but rather of the nouns' reference and they result from research conducted in this field. While the former properties are stable and directly relate to the object of research, i.e. language, the latter have to be considered with caution. The difference between count

and mass nouns appear in the grammar of a language, whether this relates to a division between the references of such nouns can and must be questioned in order to gain a complete description of countability and to propose an appropriate analysis regarding this issue.

In what follows I will first present overt grammatical properties of English count and mass nouns and then turn to ontological properties of their reference which are claimed to be representative for count and mass nouns.

2.1 Grammar

The main characteristic in grammar that distinguishes count nouns from mass nouns is their ability to inflect in **number**. Count and mass nouns also differ with regard to their being combined with the indefinite article, their modification by numerals and the use of a classifier, as well as their being combined with quantifiers and determiners (cf. Rothstein, 2010; Chierchia, 2010 among others). All these properties and differences can better be explained through an example. I will use *car* as an example for a count and *blood* as an example for a mass noun.

While count nouns pluralize regularly, mass nouns are rather odd when they appear in the plural, as illustrated by the minimal pairs of examples in (3)-(4)[1].

(3) a. cars
b. I've seen cars on the street.

(4) a. *bloods
b. I've seen blood on the street.
c. *I've seen bloods on the street.

Number inflection relates directly to the ability to be either counted or measured. Count nouns tend to always be prone to the modification by **numerals** - hence their name "count nouns". The difference concerning the counting and measuring constructions with prototypical count nouns such as *car* or mass nouns like *blood* can be seen in the following examples:

(5) a. one car
b. three, five, thousand cars

(6) a. one litre/bottle of blood
b. three, five, thousand litres/bottles of blood
c. *three, five, thousand bloods

[1]Some mass nouns can occasionally appear in count use, i.e. in plural or with numerals but this construction induces a marked interpretation. More on this will follow in section 2.3.2

So, count nouns combine directly with numerals when counted. In order for mass nouns to be combined with numerals one needs to use a **measure phrase**, such as *litre*, or a **container** like *bottle* or an appropriate **classifier** like *piece* or *item* to express something on the quantity of the mass noun.

The second important property that distinguishes count from mass nouns is their relation to the **indefinite article**. While count nouns can always be combined with the indefinite article, mass nouns are rather odd in this combination.

(7) a. a car
b. *a blood

Furthermore, count and mass nouns differ in the use of their modifiers, as for instance *much* and *many* which are commonly used as distinctive properties of count and mass nouns. In particular for languages acquisition and teaching, *many* and *much* turned out to be the most frequent features used for differentiating between count and mass nouns (cf. Christie et al., 2012; Ramsey et al., 2002 among others). Mass nouns are modified by *much*, while *many* modifies only count nouns.

(8) a. many cars / *many bloods
b. much blood / *much car

Another important genuine property of count and mass nouns is their relation to quantifiers and determiners, some of which are also sensitive to the countability assignment of the noun. While some quantifiers and determiners such as *the* and *some* can be used unrestrictedly for all nouns - including count and mass - others are only used in a combination with one certain type of nouns. *Each*, *every*, *few* and *several* accompany for example only count nouns, and cannot be used in combination with mass nouns:

(9) a. each/ every car/ *blood
b. few/ several cars /*blood

Other quantifiers, like *a lot/ plenty of* can, however, only combine with mass nouns and plurals, but not with singular count nouns.

(10) a lot/plenty of blood/cars/*car

The here mentioned characteristics are what is presented in grammar books such as Payne and Huddleston (2002) regarding the distribution of English count and mass nouns. However, while being very useful and overall acceptable, the list of these characteristics is not finite with regard to English language and it is certainly not cross-linguistically universal. Cross-linguistic research shows that the same grammatical properties as listed in Table 2.1 are attested in some other languages too (e.g. German), but are rejected

in others (e.g. number neutral or classifier languages). We will however focus on the properties and characteristics of English nouns in this research, an overview of which I am providing in the following table.

	count	**mass**
plural	cars	*bloods
indef. article	a car	*a blood
numeral modifier	one car five cars	*one blood *five bloods
classifiers	*two pieces of car	two bottles of blood
much	*much car	much blood
many	many cars	*many bloods
each/every	each/every car	*each/every blood
few/several	few/several cars	*few/several bloods
lot/plenty	a lot/plenty of cars	a lot/plenty of blood
some/the	some/the car/cars	some/the blood

Table 2.1: Grammatical properties of count and mass nouns

We will now turn to properties of count and mass nouns which are theoretically assumed and are not overtly present and visual in natural language. These are ontological properties of the referents denoted by the nouns under consideration. Since ontology plays a major role in standard analyses of the semantics of count and mass nouns, I will present some of the most relevant notions coming from this field.

2.2 Ontology

Starting from the assumption that countability is a binary distinction of nouns, a study of the referents of these nouns shows that they have common properties. There have been three properties discussed in the relative literature that I will refer to in the following, trying to explain the core ideas behind each one of them. These are: cumulative, divisive and quantized reference. Studies that have already been addressing these issues usually consider countability through a very small sample of count and mass nouns. These "celebrity nouns", as Grimm (2012a) refers to them, are:

(11) COUNT NOUNS
ocean, wheel, table, chart, friend, person, man, woman, opera, bus, bomb, grandparent, musical, drapes, carpets, orange, dog, pot, effect, shoe, virtue, boy, star, apple, book, story, dream, man, statue, eye, man, star, wastebasket, planet, horse, beaver

(12) MASS NOUNS

water, wiring, piping, gold, equipment, gasoline, drapery, carpeting, information, phosphorus, fruit, mail, pottery, furniture, blood, honesty, rice, wood, hay, milk, meat, wine, news, time, garbage, ice cream, mud, oatmeal, smoke, ice, software, sugar, snow

One of the first to come up with commonalities regarding the referents of mass nouns was Quine (1960) who states that mass nouns refer **cumulatively**. According to this theory, a predicate P is cumulative when adding more P to it results in it being the same referred predicate P. This theory can be explained through an example of a huge bowl filled with a certain amount of water in which one pours more water. Adding the extra water does not change the outcome of the referred subject inside the bowl. It is still water. "Any sum of parts which are water is water" - as explained in Quine (1960: 91).

However, if one were to take a bee and put it in a bowl, adding another bee to it would not make the sum of the entities inside the bowl the same as before: Inside the bowl is not bee any more, like in the example of water but rather bees or - more precisely - two bees.

(13) cumulativity

a. water + water = water

b. bee + bee $\neq$ bee

This *cumulative reference condition* for mass nouns was later formalized by Krifka (1989) as (14) and it reads: a predicate is cumulative if for all x and y for which the predicate is true of, so is the predicate true the sum of x and y.

(14) $\forall P[CUM(P) \leftrightarrow \forall x,y[P(x) \wedge P(y) \rightarrow P(x \cup y)]]$ (Krifka, 1989: 78)[2]

The second important ontological property of mass nouns is argued to be **divisiveness**. Divisiveness is usually attributed to Cheng (1973) and referred to under the name *Cheng's condition*. He defines this property as follows: "Any part of the whole of the mass object which is w is w." (Cheng, 1973: 287). This definition - when applied to the above mentioned example of water would imply that the object inside the bowl - even when taken out in any (unspecified) amount or divided into separate bowls of any kind - would nevertheless be referred to as water. In contrast to mass nouns, count nouns refer to objects that are not divisive. Hence, dividing a cat into two parts will not yield a cat on both sides, but rather parts of cat which may or may not be any more recognizable as being parts of that cat.

(15) divisiveness

a. water = water + water

[2]Note that in Krifka's original definition he makes use of the index S to refer to individuals of a certain sort, i.e. objects as opposed to events, which I left out for reasons of simplification.

b. cat $\neq$ cat + cat

We can observe that this property is exactly the opposite of cumulative reference. Mass noun denotations remain the same in case of multiplying or dividing. Krifka (1989) formalizes divisive reference as a property of predicates for which it holds that for all x which are true of that predicate, a y which is a part of x is also true of that predicate, as presented in (16).

(16) $\forall P[DIV(P) \leftrightarrow \forall x \forall y[P(x) \wedge y \subseteq x \rightarrow P(y)]]$ (Krifka, 1989: 78)

These two characteristics - cumulativity and divisiveness - have often been referred to as the hallmark for mass nouns, and many authors tied them together when talking about ontological properties of mass nouns and referred to them as **homogeneous reference** (cf. Bunt, 1985).

The third ontological characteristic is a property of count nouns, i.e. **quantized reference**. While analyzing similarities between the verbal and nominal domain, Krifka (1989) noted that cumulativity and divisiveness are not the best distinctive criteria for count and mass nouns because plural count nouns (such as cats or apples) also have cumulative and divisive references. The problem can be exemplified through a bunch of apples being referred to as *apples*. Adding some more apples does not change the reference still being apples. apples + apples = apples. Therefore Krifka defines *quantized reference* which is the opposite of homogeneous reference and hence true of singular count predicates.

(17) $\forall P[QUA(P) \leftrightarrow \forall x \forall y[P(x) \wedge P(y) \rightarrow \neg y \subset x]]$ (Krifka, 1989: 78)

According to the definition above, a predicate has quantized reference only if no P-entity can be a proper part of a P-entity. This is true for example for a bike, because a proper part of bike can only be something which is not a bike itself, as for instance seat or wheel. Water, however, is not quantized since it fails the condition with proper parthood. A proper part of an entity which is denoted by water is itself water.

Quantized reference and the above described notions of cumulativity, divisiveness and homogeneity seem to generally characterize a sample of nouns. However, these assumptions are usually superficial, and mostly they describe the reference of count vs. mass nouns only on the surface. We will take a deeper look and report on the critique that has been made about these notions. I agree with Bunt (1985) in that these properties might as well be true, but nonetheless are possibly not distinctive enough:

> "Altogether, I think it is justified to conclude that both the cumulative reference condition and the distributive reference condition expresses a semantic aspect of the way mass terms refer to something, but that is doubtful whether any one of them captures the essence of non-individuating reference and can be the basis for defining a linguistically relevant no-

tion of mass terms." (Bunt, 1985: 20)

There are four major problematic aspects regarding the ontological properties of mass nouns: (i) minimal parts problem, (ii) vague boundaries of entities, (iii) cross-linguistic mismatches and (iv) homogeneous count nouns and aggregate nouns. I will briefly discuss these issues in the next section.

2.2.1 Ontological mismatches

The first problem we want to address concerns divisiveness. The key argument for this theory states that any proper part of a mass entity is to be characterized the same way as the entity itself. The proposed definition is certainly comprehensible when picturing a large amount of water being divided into two parts: each remaining part is still to be described as water. But when we go further and divide each of these parts of water more and more, we will end up having a drop of water only, and dividing this (if possible at all) might not reside in water any more but rather in single, tiny water molecules which are only visible through the microscope. The same process regarding the division of water holds also for other mass nouns such as *sand*, *mud*, *blood*, *wine* and so on, bringing us to the conclusion that divisiveness is limited to a certain point. This problem has been discussed in literature as the "minimal parts" problem (cf. Laycock, 1972; Cartwright, 1965, 1970; Pelletier and Schubert, 1989; Grimm, 2012b).

Another problem related to divisiveness is the problem of so-called vague boundaries of objects (cf. Chierchia, 2010). Referring to the divisiveness condition, according to which any part of a mass entity is the entity itself, it can be argued that there are certain objects which - when being torn apart- are still recognizable as these objects. We can drop or erase parts of an object which will leave the object unaffected. Consider as an illustration a teddy bear and a girl with scissors. The girl cuts off an arm of the teddy bear. The teddy bear has only one arm now, yet it still counts as a teddy bear. The one arm teddy bear is a actually a proper part of the conventional teddy bear which now makes this teddy bear non-quantized. Analogous to this, the object would be divisive by the definition "any part of the whole of the mass object which is w is w" (Cheng, 1973). Similarly, let c be a cat, and let's remove the tail of that cat, so that the tail-less cat will be c'. c' then will be a proper part of c and it will still be a cat. This contradicts the apparent non-divisive nature of count nouns. Of course, the process of removing parts is restricted to the non-salient parts of the object under considerations and limited in that there will be some point in which we will no longer be able to identify the object as a cat. In sum, vague boundaries of entities point directly to the limits of divisiveness and quantization.

Another very often discussed problem for ontological approaches are cross-linguistic mismatches. Ontologically similar entities can have different countability properties in different languages. One of the prominent examples for this phenomenon is *hair* which is mass in English vs. *cappeli* which is count in Italian. A similar problem arises actually

within one language, too. Compare the mass noun *rice* with the count noun *lentil* or *garlic/onions*. While their denotations look almost the same, and both are individuated objects, the main difference regards their ability to be counted: lentils and onions can be counted, while rice and garlic cannot.

The last problem I would like to discuss concerns two instances: certain mass nouns that do not have a homogeneous reference at all and certain count nouns that actually have a homogeneous reference. The former case is more prominent and has been discussed under the names *object-mass nouns, fake mass nouns, aggregate nouns, superordinates* or just *furniture*-nouns - the last name being given in accordance with the famous example for this phenomenon *furniture*. Alongside *furniture*, there are nouns like *silverware*, *lingerie*, or *jewellery* - all of which are mass nouns which do not pluralize, but also do not have a homogeneous reference. The denotation of these nouns is rather atomic and individuated, and not divisive as expected for ordinary mass nouns.

The other type of nouns are less prominent. They have been described in few papers such as Krifka (1989), Zucchi and White (1996), Rothstein (2010) and Sutton and Filip (2016). Sutton and Filip (2016) call these nouns *homogeneous object nouns* while other usually refer to them as *fence*-nouns - again, being named after the prominent example *fence*. Other examples in this class of nouns are *wall*, *sequence* and *bouquet* - all of which actually have a plural form but - unlike other count nouns - their reference is rather cumulative and divisive. This can best be understood through an example: when a wall is divided into two parts - both parts of the wall can still be called *wall*. This usually does not work with count nouns such as *cat* or *car* which makes *fence*-nouns exceptional. Rothstein pictures this issue with a fence that surrounds a house from all four sides. When asked about the number of fences there are, one could argue whether there are four or just one. However, the divisive property of these *fence*-nouns is not as strong as with denotations of ordinary mass nouns. Unlike the denotation of ordinary mass nouns like *water* - where the dividing process is unrestricted and any way or direction of dividing water would still yield water, the process of dividing a wall is somewhat restricted: if one were to divide a certain wall horizontally, the part below would still be wall, while the part above - being left hanging - would probably collapse and could not count as a wall any more.

Be that as it may, we have to note that divisiveness, cumulativity and quantization are properties of referents of nouns which are indeed distinctive for the countability differences of many nouns, at least for the celebrity nouns (11)-(12). However, the mismatches reported above show that these ontological criteria are either not exhaustive or restricted to only certain nouns. In addition to this imbalance, we face another issue of major relevance for the count/mass distinction which I will elaborate on in the next section, i.e. the variation of nouns regarding their countability.

2.3 Variation

In this section I want to present a phenomenon, a set of data and two different perspectives on this issue. The phenomenon I am referring to is the property of certain nouns to occur in both count and mass uses. This means that their classification into either count or mass nouns is not straightforward and requires additional explanation. The following set of data I am providing in (18)-(21) exemplifies this phenomenon:

(18) a. We served **a cake** after dinner. COUNT
b. We served **a piece of cake** after dinner. MASS

(19) a. As a kid she always wanted to have **a chicken**. COUNT
b. She adores KFC cause she only eats **chicken**. MASS

(20) a. I would like **some water**, please. MASS
b. We take two croissants and **a water**, please. COUNT
c. She has been allergic to **Ocean Waters** since she was six years old. COUNT

(21) She put **seven carrots** in the pressure cooker COUNT.
She just wanted to cook them a bit but since she never read the instructions for use, she didn't realize that five minutes would be enough. Long story short... the cooker exploded and all of a sudden there was **carrot** all over the kitchen, on the floor and on the ceilings MASS.

The examples above show that *cake*, *chicken*, *water* and *carrot* can appear in the same distribution, i.e. in count and mass use. Interestingly, the count and mass uses of *cake* and *chicken* both seem to be equally appropriate, while the understanding of the count use of *water* requires some additional consideration of the context. The consideration of the context is needed even more in the example (21) where *carrot* is used as a mass noun.

While the property of the nouns to occur in both count and mass contexts appears to be one phenomenon, it can actually be considered through the following two perspectives: (a) nouns are lexically either simultaneously both count and mass or underspecified with regard to countability[3] or (b) nouns have a clear countability assignment but depending on the context, the focus or the intention of the speaker they shift their countability feature. I will discuss the variation of nouns in the following, starting with the flexibility of nouns which appear equally appropriate in both count and mass uses, before discussing the countability and/or meaning shifts.

[3]The underspecified approach assumes that the locus of the countability feature is on a higher syntactic position, i.e. the NP or DP level (cf. Borer, 2005; Pelletier, 2012)

2.3.1 Dual-Life nouns

In literature we can find several terms referring to the set of nouns that can be used as both count and mass nouns. The term *dual life nouns* was first introduced by Pelletier and Schubert (1989) and it has been used by other linguists as well (cf. Payne and Huddleston, 2002; Kiss et al., 2017; Doetjes, 2017 among others). Other papers prefer the term *flexible nouns*, such as Chierchia (1998a); Rothstein (2010); Grimm (2012b) and Barner and Snedeker (2005) or *elastic nouns* Zamparelli (to appear). Some examples provided in (22) will be considered in analysing this kind of nouns.

(22) *rock, stone, brick, apple, cake*

What the nouns above have in common is that they can be used with numerals and indefinite articles as well as with classifier phrases or bare while not changing its meaning. As an illustration, consider the near-minimal pairs below with *cake*:

(23) Katrina didn't eat cake. BARE

(24) Katrina ate two pieces of cake. CLASSIFIER PHRASE

(25) Katrina ate a cake yesterday. INDEFINITE ARTICLE

(26) Katrina ate three cakes yesterday. NUMERALS

The fact that the meaning does not change significantly is the reason why I separate this case from other cases in which we also have count and mass uses of the same noun. *Cake* for example denotes a delicious sweet desert or as WordNet defines it *baked goods made from or based on a mixture of flour, sugar, eggs, and fat* (Miller, 1995), and the difference that emerges in the count and mass regards only the perspective of the speaker. Compare the examples in (27):

(27) Katrina ate more cake than Brian. MASS

(28) Katrina ate more cakes than Brian. COUNT

When using *cake* as a count noun (28), the comparison being drawn regards the number of pieces of a cake eaten by both Katrina and Brian. The example in (28) states therefore that Katrina ate more individuated, single cakes than Brian did. Figure 2.1[4] illustrates this comparison.

However, when *cake* is being used in a mass sense as in (27), it is being used more generally: the comparison between Katrina and Brian is now drawn on the volume of one cake, meaning that the one who ate more, ate a bigger part/piece of the cake. This state

[4]Unless marked otherwise, all the illustrations in this chapter are provided with kind permission of Amra Pilavdžić.

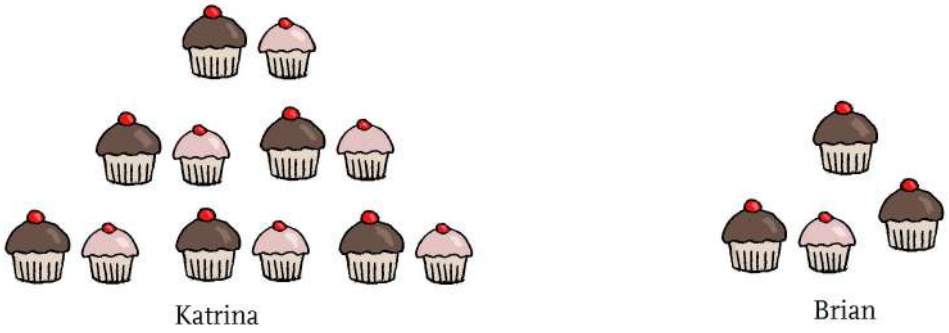


Figure 2.1: Comparison drawn on number of entities

can also be depicted with two cakes, one of which belongs to Katrina and the other to Brian. As can be seen in Figure 2.2, the part of the cake which is missing, i.e. it is eaten by the owner of the cake, is bigger in Katrina's cake than in Brian's.

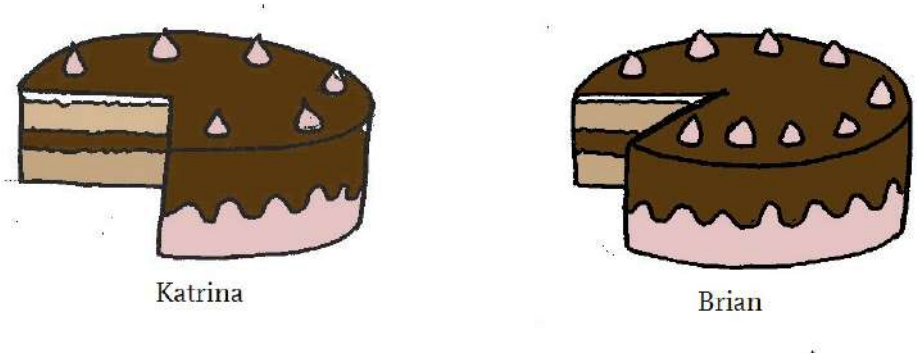


Figure 2.2: Comparison drawn on the volume/quantity of an entity

The mode of comparison and the differences in quantification of count and mass nouns have been studied and experimentally tested in Barner and Snedeker (2005). They show that in comparison constructions such as in (28) count nouns take the number of items as the unit for comparison. Comparing mass nouns, however, is based on the volume of the entity under discussion. The experimental research in Barner and Snedeker (2005) presents a model study for related issues. Their *Quantity Judgement Task* has been adopted in many other studies involving different languages such as Dutch, Korean, Mandarin Chinese and Yudja among others[5].

Finally, the most relevant characteristic of dual-life nouns is that the count and mass occurrences refer to the same entity with no additional change of meaning. Contrary to that is the issue of countability and/or meaning shifts, which on the surface appears to be identical to dual-life nouns.

[5]For an overview of experimental studies in the count/mass distinction see Lin et al. (2018).

2.3.2 Countability shifts

In this chapter we turn to the issue of countability shifts, an issue similar to the one already discussed while explaining count and mass uses of nouns, with a major distinction regarding the meanings of two expressions not being as alike as with dual-life nouns.

It has first been proposed by Pelletier (1975) that almost all count nouns can be used as mass. To make this happen, such count nouns have to go through a so-called thought machine, the Universal Grinder (Pelletier, 1975, 1979). The process of the Universal Grinder can be explained as follows: When considering an object that is a reference of a count noun, such as a carrot, one needs to imagine the object inserted into a machine (similar to a meat grinder) that grinds the object into some muddy stuff. Now, the result of the thought-machine would be the ground outcome of that particular input object. The process would result in referring to the stuff-like output with a mass expression.[6]

(29) a. There are carrots all over the floor. COUNT
b. There is carrot all over the floor. MASS

In (29) we have a minimal pair containing carrot in count and mass use. The first sentence refers to more than one carrot on the floor. In the second example, however, *carrot* is claimed to refer to carrot stuff. The Universal Grinder transfers an object to stuff as depicted in 2.3.

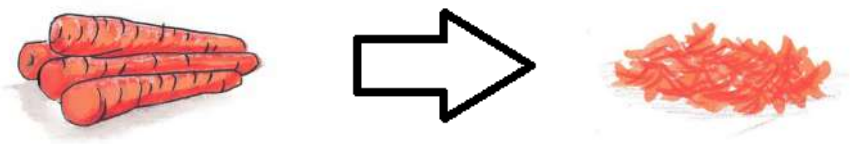


Figure 2.3: Input and output of the Universal Grinder: carrots and ground carrot

What is crucial to this thought machine is the presumption that every count noun denotes an object and every mass noun denotes some shapeless stuff. This way the machine actually transforms the entity from object to stuff. According to this process, natural language is presumed to refer to objects with count expressions and to stuff with mass expression. The Universal Grinder offers us actually a means to establish the change of the entity which should be followed in a change of countability. If an object is being transformed to shapeless stuff, then the noun referring to it should change from count to mass. The same presumption, however, presents the shortcomings of this machine, namely that it is limited to those count nouns which refer to objects exclusively. Hence, count nouns that

[6] Pelletier attributes the idea of the Universal Grinder to David Lewis who mentioned the possibility to use a count noun in construction like *There is X all over the floor* to him at a private occasion.

refer to collectives such as *committee* or abstract entities as for instance *virtue* are excluded from this process.

Analogous to the Universal Grinder other thought machines have been proposed to work in the opposite direction, i.e. to obtain count uses from mass nouns. These are the Universal Packager (Bach, 1986) and the Universal Sorter (Bunt, 1985). These machines are meant to derive count uses from mass nouns. As the names already suggest, packaging yields a use of mass nouns as packaged in standardized units (30) and sorting yields a specific sort or type of the entity denoted by that mass noun (31).

(30) We take two waters, please.
⇒ two glasses/ bottles of water PACKAGING

(31) We can offer you three wines.
⇒ three sorts of wine SORTING

Grinding, sorting and packaging are productive procedures for switching the countability of a given noun, but they are limited to a subset of nouns and are thus not universally applicable. Packaging and sorting presume ontological properties of count and mass nouns just as grinding does, and are therefore limited to such prototypical nouns, usually substances of some kind. Importantly, unlike dual-life nouns, the meaning of the outcome of thought machines differs in that we do no longer speak of the same denotation of nouns.

More recently, Falkum (2010) claims that count and mass uses of nouns are a product of regular polysemy in the sense of Apresjan (1974) who defines regular polysemy as follows:

> "Polysemy of the word A with the meanings a_i and a_j is called regular if, in the given language, there exists at least one other word B with the meanings b_i and b_j, which are semantically distinguished from each other in exactly the same way as a_i and a_j and if a_i and b_i, a_j and b_j are" are non-synonymous." (Apresjan, 1974: 16). [7]

Falkum adopts Apresjan's idea to the count-mass distinction and describes three regular ways in changing the meaning of a noun which goes hand in hand with a change in countability:

(32) a. from animal to meat, fur or animal stuff
b. from tree to wood
c. from fruit to fruit stuff or tree

These transformations assume the capability of a noun to switch or coerce its primary meaning - an animal, a tree or a fruit - to different entities such as meat, wood or fruit-stuff. Accordingly, a noun such as *rabbit* has three different meanings: one which is primary (an

[7] For experimental research on the acceptability of certain cases of regular polysemy see Rabagliatii et al. (2011)

animal) and two meanings resulting as cases of regular polysemy (meat and fur). Falkum presents the polysemous noun *rabbit* with following examples:

(33) from Falkum (2010: 16):

a. A rabbit jumped over the fence. COUNT
b. We're having rabbit for dinner. MASS
c. The model wore rabbit on the catwalk. MASS

The data in (33) shows that regular polysemy could be an alternate analysis to the flexibility of nouns to appear in count and mass use. However, it is also restricted to certain categories. Kiss et al. (to appear) propose a more general idea. They assume that the core notion underlying the countness of nouns is their ability to be individuated in units. Studying a set of nouns which varies in terms of countability but maintains almost the same meaning, they argue that this kind of ambiguity, T4 ambiguity, is special in that it affects only the count/mass distinction.

(34) "T4 ambiguity: If X is the mass interpretation, when used as a count noun, the interpretation becomes an individual X." (Kiss et al., to appear)

In a nutshell, we have seen several means for deriving count or mass uses. All of them are restricted to certain ontological categories. Only T4 ambiguity might actually be applicable to a wide range of mass nouns. Besides the two perspectives on variation, dual-life nouns and countability shifts, there is another attempt in determining countability which does not assume that nouns are underspecified with regard to countability or that nouns have a clear assignment and shift countability regularly. Instead, the polysemy of nouns is evidenced in the diversity of the senses of a noun which in turn are specified in terms of countability.

2.3.3 Sense approaches

In this section I will present a different approach to the flexibility of nouns, which considers countability as a feature of noun senses and not of noun lemmata. The locus of the countability assignment is not the lemma but a level deeper, i.e. the noun sense. Kiss et al. (2014, 2016) emphasize the need to investigate countability beyond the small sample of nouns found in the literature on count-mass (11)-(12). Instead, they look into countability as used in corpora such as OANC (Ide and Suderman, 2004) and COCA (Davies, 2010) and develop a lexicon of approx. 14,000 English noun senses with assigned countability classes, the Bochum English Countability Lexicon - BECL [8].

According to this lexicon a noun sense can have a countability class from a set of 18 different countability classes (or 4 major countability classes).

[8] A detailed elaboration of BECL will follow in section 4.1.

major class	countability class	noun	sense
regular count	235	publication	#1 a copy of a printed work offered for distribution
regular mass	528	publication	#3 the communication of something to the public;
regular mass	528	publication	#4 the business of issuing printed matter for sale or distribution
both mass and count	510	danger	#1 the condition of being susceptible to harm or injury
regular mass	235	danger	#2 a venture undertaken without regard to possible loss or injury
regular mass	531	mail	#1 the bags of letters and packages that are transported by the postal service
regular mass	528	mail	#4 any particular collection of letters or packages that is delivered
neither mass nor count	199	bitch	#1 an unpleasant difficulty
regular count	235	bitch	#2 a person (usually but not necessarily a woman) who is thoroughly disliked
regular mass	531	silver	#4 silverware eating utensils
both mass and count	510	silver	#1 a soft white precious univalent metallic element having the highest electrical and thermal conductivity of any metal; occurs in argentite and in free form; used in coins and jewelry and tableware and photography

Table 2.2: Extract from BECL 2.1 (Kiss et al., 2016)

In BECL, a noun such as *publication* has two countability classes relative to its senses: i) 235 - a *regular count* class for the sense *a copy of a printed work offered for distribution* and ii) 528 - a *regular mass* class for the sense *the communication of something to the public*. Many nouns in BECL have different countability classes for their senses, combining also different major classes. However, the great majority of the lexicon has unique countability assignments for all senses of a given noun, as for instance *appearance* which has all senses classified as *regular count*, as shown in (35).

(35) a. appearance #1 outward or visible aspect of a person or thing
b. appearance #2 the event of coming into sight
c. appearance #3 formal attendance (in court or at a hearing) of a party in an action
d. appearance #4 a mental representation

Unlike *publication*, *danger* or *mail*, *appearance* is a polysemous noun whose all different senses share the same countability properties. BECL presents the diversity of English nouns with regard to countability as a lexical feature of noun senses. One of the remaining open questions regarding BECL concerns the balance between the variation of nouns, i.e. the diversity of countability class for one noun on one side and straight assignment of countability on the other.

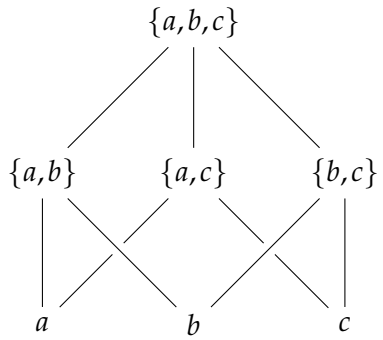
To sum up: As presented in section 2.2, it is obvious that there are many ontological commonalities regarding the division of nouns into count and mass. These features are however not sufficient for an explanation of the count-mass distinction. There is also a range of peculiar issues regarding this matter. These issues include polysemy, flexibility of nouns and shifts which aim to derive other count or mass uses/senses.

We will now turn to the field of formal semantics and examine the hitherto proposed ways of dealing with countability.

2.4 Semantics

In the next section I will elaborate on proposals which suggest a set-theoretic modelling of the extension of count and mass nouns. The main purpose of these papers is to replace the traditional universe of entities (individuals) with a more dynamic one which captures entities denoted by singulars, plurals, groups and mass terms. This desired model forms an algebra called **complete atomic join semilattice**. It is complete because it is closed under sum formation, atomic because all atomic parts of the sums in the domain are parts of the domain themselves and it is a semilattice due to the fact that only joins and not meets are involved. Such a lattice structure is depicted in (36) for the individuals a, b and c (cf. for instance Nouwen, 2016).

(36)



Within the sections that follow I will provide summaries of the most influential papers which provided us with theories that specify the semantics of singular, plural and mass nouns. In particular, I will zoom in on Link's Logic of Plurals and Mass Terms

(Link, 1983), Krifka's measuring functions (Krifka, 1989), Chierchia's Inherent Plurality Hypothesis and more recent works by him (Chierchia, 1998a, 2010, to appear), Rothstein's contextual framework (Rothstein, 2010) and Landmann's Iceberg Semantics (Landman, 2016). What these theories have in common is that they consider countability as a linguistic universal, incorporate the alleged ontological characteristics and attempt to capture the distributive differences between count and mass nouns using these characteristics.

2.4.1 Link, 1983

Link finds the motivation for his proposal in the distinction of collective and distributive predication which captures the application of a predicate to a whole set or group as well as to the members of the set or the group. When distributive predicates are assigned to plurals they refer to each individual in the plural sum. To clarify this proposal, Link exemplifies the comparison of *(to) die* and *(to) be on table* as distributive predicates with *(to) carry a piano* and *(to) gather* as cumulative predicates.

(37) distributive predicates

a. John's books are on the table.
b. John's family died.

(38) collective predication

a. John's friends gather every evening.
b. John's family carried the piano upstairs.

Distributive predicates apply to every member of a sum or of a group. *Books* is the plural sum consisting of several book individuals; *on the table* thus refers to every single book of John. For group nouns such as *family*, distributive predicates apply similarly: every member of John's family died. Collective predicates, on the other hand, function differently: they apply to groups or sets, but not to the individual members of that group or set. Accordingly, when John's friends gather, this cannot mean that every member of the group of John's friends gathers on its own. Instead, the group of them is the applicant of the predicate *gather*. The group of John's friends as a whole is what gathers every evening. *To carry the piano* is also a collective predicate, which means that in (38-b) it is not the case that every member of John's family carried the piano on its own, but that the whole group managed to carry the piano upstairs. Interestingly, in collective predication all the members of a group (family) or a plural sum (friends) do not necessarily have to be involved in the predication. So, if John's family, for instance, consists of his two brothers, father, mother, sister, wife and two sons, i.e. nine members including John himself, than the utterance in (38) is also true if only his two brothers carried the piano. The important difference, however, compared to distributive predicates, is that collective predicates apply to sums and groups while distributive predicates apply to members of the groups or sums

under consideration.

Link argues that plurals and mass terms are similar in two ways:

1. collective predication resembles predication involving mass nouns
   Link exemplifies this with *the water gathers in big pools* where the predicate *gather* also applies to the whole substance of water, and not distributively to each part of the water.

2. the cumulative reference condition of mass nouns can be imitated by plurals
   Just like adding water to water results in water, putting apples together with another sum of apples would result in apples.

Another important goal of Link is to show that linguistic expressions can vary but still refer to the same entities, or potions of matter as he calls them. *The cards* and *the deck of cards* can denote the same potion of matter, although they are different expressions. The crucial category for his set-theoretic logic of plurals and mass nouns is the individual which relates to both the expression and portion of matter as pictured in Figure 2.4.

Based on the observation that portions of matter can be denoted by multiple and differently structured expressions, he argues that collections have to be distinguished from ordinary plural nouns and that both represent individuals in his logic. If a and b are individuals then two additional individuals can be formed out of a and b, a + b and a $\oplus$ b. These become then four individuals, three of which are singular objects a, b, a + b and one is a plural object a $\oplus$ b.

(39) a. sums, plural objects
     a $\oplus$ b
     b. collections, material fusion
     a + b

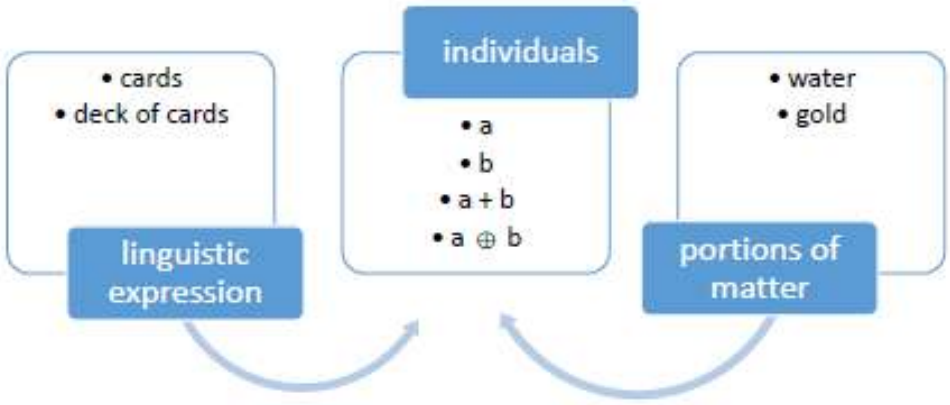


Figure 2.4: Relation of individuals and linguistic expression and portions of matter

Link exemplifies these circumstances with two rings (a and b) made of Egyptian gold. The gold out of which the rings are made is the *material fusion* of a and b, i.e. a + b. The plural object, the sum of a and b is a $\oplus$ b.[9]

In order to account for the similarities of plurals, collections and mass terms on one hand and the differences among them on the other, Link defines the logic of plurals and mass nouns - LPM - as a first order logical calculus with the usual logical constants. What is special in LPM is that the set of 1-place predicates consists of two subsets which are disjoint, MT and DT. MT stands for predicative mass terms and DT for distributive predicates. This way Link provides a binary classification of predicates into distributive and mass. In addition to that, he suggests three 2-place predicate constants and two operators on 1-place predicates.

(40) 2-place predicate constants

a. i-part $\sqcap$
   - denotes an intrinsic, partial ordering relation, called *i-part (individual part relation)* which functions on sums
   - satisfies the biconditional a$\sqcap$b $\leftrightarrow$ a$\oplus$b = b

b. m-part $\top$
   - denotes a partial ordering relation on portions of matter, called *m-part (material part relation)*
   - relates to i-part as a logical consequence: a$\sqcap$b $\rightarrow$ a$\top$b

c. constitution relation $\triangleright$
   - relates a portion of matter to another entity which is constituted from that portion, as e.g. ring from gold
   - a$\triangleright$b reads *a constitutes b*

(41) operators on 1-place predicates

a. plural operator *
   - introduced by the morphological change in pluralization
   - generates all the individual sums of members of the extension of P[10]

b. partake $\top$
   - $^\top$P reads *partakes in P*
   - used to distinguish NPs with the inference that all members of the extension of P are predicated as in *all children...* as opposed to definite NPs *the children*

The model-theoretic interpretation Link defines for LPM is an ordered pair $\mathcal{M} = <\mathcal{B}, \| \cdot \| >$

[9] Speaking of the material fusion of two gold rings, one has to note that the fusion a + b would imply that the rings consist completely out of gold, but usually gold rings (e.g. of the quality of 8 carats and sealing 333) consist of 33,3% of gold. The rest are other materials necessary for manufacturing the ring.

[10] Link distinguishes the proper plural predicate $^{\circledast}$P (which contains only the non-atomic sums) from ordinary plural predicates *P.

consisting of the Boolean model structure $\mathcal{B}$ and the first order assignment of denotations $\| \cdot \|$ to the primitive expressions of LPM[11].

The Boolean model is a quadruple $\mathcal{B} =< E,A,D,h >$ such that

(42) - E is the domain of individuals
- A is the domain of atoms
- D is the domain of portions of matter
- h is the materialization function

The domains in $\mathcal{B}$ serve different purposes and are interrelated. The super-domain is D, which stores the individuals in M. A is a subset of D and contains only the atoms of E, hence $A \subseteq E$. D hosts portions of matter and its purpose is to separate the denotations of mass nouns from count individuals. D relates to the other domains as a subset of A, i.e. $D \subseteq A$. In order to map the individuals of E on the portions of matter in D, Link proposes a semilattice homomorphism h from $E \backslash \{0\}$ to D such that h is an identity function on D. h is order preserving such that $x \leq y \Rightarrow h(x) \leq h(y)$. A count predicate P has its mass counterpart ${}^{m}P$ which Link defines as follows:

(43) $\|{}^{m} P \| := \{x \in D \mid x \leq suph[\| P \|]\}$

Link (1983) illustrates the above definition by means of an example with the predicate *apple* P, its mass counterpart ${}^{m}P$ and the predicate *in the salad* as Q. The following expressions and formalizations hold:

(44) a. There is an apple in the salad.
b. $\exists$x (Px $\wedge$ Qx)

(45) a. There is apple in the salad
b. $\exists$x (^{m}Px $\wedge$ Qx)

Furthermore, Link provides an application to Montague grammar to which I will not refer here since this is beyond the intended scope of this dissertation. In summary, Link divides the mass predicates from count predicates and sets them in different domains. In order to enable a mapping between portions of matter and individuals that are expressed by the same linguistic item he defines the homomorphism h by means of which he manages to account for the flexibility of nouns to appear as count or as mass. Link's proposal contributes very much to the implementation of plurals and mass terms in lexical semantics and with his Logic of Plurals and Mass Terms he sets the ground for many further theories on plurality and countability.

[11] For the full list of conditions on the denotational assignment see (Link, 1983: 137-140).

2.4.2 Krifka, 1989

Krifka (1989) studies the similarities of verbal and nominal references which can be observed in the correlation between (a)telicity and countability. He points out that the nominal reference is divided in cumulative and quantized predicates. This division however does not mirror the count/mass distinction. Naturally, Krifka admits that count nouns have a quantized reference while mass nouns refer cumulatively, but he argues - more specifically - that the comparison should be drawn on three levels: (1) between singular nouns (*book*) and plural nouns (*books*); (2) between bare plurals (*books*) and plurals modified by numerals (*five books*) as well as (3) between bare mass nouns (*beer*) and mass nouns accompanied by classifier or measure phrases (*a glass of beer*). If we take these constructions into consideration, we see that the division between quantized and cumulative reference is more complex than just simply between count and mass nouns.

cumulative	**quantized**
beer	book
books	book
books	five books
beer	glass of beer

The verbal counterpart to the nominal reference which can either be cumulative or quantized, is according to Krifka the temporal constitution. Temporal constitution is a concept that subsumes the differences between telic and atelic predicates. Telic predicates have denotations which include a terminal point, such as *draw a circle*, while the denotation of atelic predicates do not have such a terminal point (*to walk*).[12] The similarity between the nominal reference and temporal constitution is that quantized predicates (*five books, a chair*) also have denotations with precise limits just as telic predicates (*eat an apple, destroy something*) have.

Moreover, the nominal reference of the verbal argument controls the temporal constitution as can be exemplified in (46). The cumulative predicate *apples* yields an atelic verbal predicate while the quantized predicate *two apples* results in a telic predicate.[13]

[12] This distinction goes hand in hand with Vendler's categories of activities and accomplishments (cf. Vendler, 1957).

[13] Here I have to remark that although the nominal reference provides stronger influence on the telicity of the verbal phrase it does not have full control of it. Combining the quantized phrase *two apples* with the process *eat* does yield a telic predicate. However, combining cumulative predicates with accomplishments, i.e. with telic verbs which - unlike *eat* are not ambiguous between a telic and atelic reading - have the telicity expressed in the lexical meaning of the verb. For instance German *aufessen* (to eat up, finish sth. up) does not yield a cumulative predicate. Consider the following minimal pairs in which the atelic verb *schreiben* combines with a quantized nominal and yields a quantized VP (i) and the same verb combines with a cumulative nominal (ii) and results in an atelic predicate.

(i) ein Buch schreiben
'write a book'

(46) a. Katrina ate apples.
b. Katrina ate two apples.

Based on the analogy he finds in the verbal and nominal domain, Krifka proposes a semantics for noun phrases and for temporal constitution which makes use of similar notions, i.e. measure functions. In the following I will summarize Krifka's proposal of a semantics for count and mass nouns and present his way of dividing the two categories of nouns.

The basis of Krifka's analysis is Link's structural domain. In order to distinguish verbal from nominal predicates he proposes a sortal distinction of predicates, viz. objects vs. events. A nominal predicate would be P_O and a verbal predicates P_E. He assumes that cumulative reference is a signature property of mass nouns which is why they should always be translated as (47).

(47) CUM_O(gold)

Since mass nouns turn into quantized predicates once specified with a measure or classifier phrase, Krifka suggests the derivation of a quantized predicate by means of a certain construction, i.e. the *quantized modification* (48) which is inherent in measure phrases.

(48) $\forall$ P $\forall P[QMOD_S(\mathrm{P},P) \leftrightarrow \neq QUA(\mathrm{P}) \wedge QUA(P(\mathrm{P}))]]$

Accordingly, the derivation of (49) would be as in (50).

(49) five ounces of gold

(50) a. ounces
$\lambda n \lambda P \lambda x$ [P(x) $\wedge$ oz'(x) = n $\wedge$ $QMOD_O$(P, $\lambda P \lambda x$ [P(x) $\wedge$ oz'(x) = n]] @ 5
b. five ounces
$\lambda P \lambda x$ [P(x) $\wedge$ oz'(x) = 5 $\wedge$ $QMOD_O$(P, λP λ x [P(x) $\wedge$ oz'(x) = 5]] @ gold'
c. five ounces of gold
λ x [gold'(x) $\wedge$ oz'(x) = 5 $\wedge$ $QMOD_O$(gold', $\lambda P \lambda x$ [P(x) $\wedge$ oz'(x) = 5]]

(ii) Bücher schreiben
'write books'

(iii) ein Glass Wein austrinken
'finish the glass of wine'

(iv) # Wein austrinken
'finish the wine'

However, combining the accomplishment *aufessen* with cumulative (iv) and quantized (iii) nominals does not trigger the same inferences as with *schreiben*. While the combination with a quantized predicate is felicitous and yield a telic predicate, the combination with a cumulative predicate sounds marked and requires a meaning shift which is not uncommon with mass nouns. So, *finish the wine* means finish the wine (in this specific glass or bottle).

Such a modification is not needed for count nouns because they are generally assumed to be quantized. While mass nouns require a classifier or a measure function to combine with numerals, count nouns have a natural unit NU built in their lexicon entry. Krifka argues that count nouns are two-place relations between numerals and entities. He finds reason for such an analysis in Chinese languages where the counterpart of English count nouns combine with classifiers, too. According to such a presumption (51) would be derived as in (52).

(51) five cows

(52) a. cow
$\lambda n \lambda x[COW'(x) \wedge NU(COW')(x) = n]$ @ 5
b. five cows
$\lambda x[COW'(x) \wedge NU(COW')(x) = 5]$

Another remarkable observation in Krifka's account is his assumption that plural is only a matter of syntactic agreement and has no semantic contribution. He supports his claim with examples where the plural does not mean 2 or more as described below:

(53) a. Do you have children?
Yes, I have one. / $*$ No, I have one
b. Did you eat apples today?
Yes, I ate half an apple. / $*$ No, I ate half an apple. (Krifka, 1989: 85)

To sum up, Krifka assumes a structural domain of nominals as in Link (1983). He thus stores the count and mass predicates in different but related domains. However, he argues that mass predicates are 1-place predicates and count predicates are 2-place relations between a numeral and the entity. He incorporates the classifier notion inside the lexical entry of count nouns, presuming they provide a natural unit NU. He also argues that mass nouns are generally cumulative while count nouns are quantized. In order to combine count nouns with numerals, he introduces the quantizing modification carried by measure phrases and classifiers to turn the cumulative mass predicate into a quantized one.

2.4.3 Chierchia 1998, 2010

In this section I will summarize the contribution of Chierchia's research to the semantics of count and mass nouns through some of his most influential papers including Chierchia (1998a, 2010) and his most recent contribution in Chierchia (to appear).

There are three relevant arguments attributed to Chierchia's analysis, namely:

1. The cognitive contrast underlying the count/mass distinction of nouns is that of

objects (denoted by count nouns) vs. substances (denoted by mass nouns).

2. Mass nouns are inherently plural. They come out of the lexicon with plurality built in.

3. The minimal components necessary for counting are too vague in the denotation of mass nouns which is the reason why they cannot be counted. In order to be counted, the counting parts need to be accessible and individuated.

The cognitive notion Chierchia relies on is the denotational difference between count and mass nouns which he assumes is the essential principle that makes up the binary division of nouns, i.e. substances vs. objects. Substances tend to be referred to with mass expressions while objects are rather denoted by count nouns. Although natural language exposes many exceptions to this generalization as discussed in section 2.2.1, Chierchia adheres to the division between substances and objects in the realm of nouns denoting concrete entities. Despite the familiar ontological mismatches - as for instance in garlic vs. onions - Chierchia regards countabilty as a universal which is mirrored in the substance-object distinction because of empirical insights from cross-linguistic studies of the count mass distinction which confirm sensitivity to the substance-objects division.[14] As far as the ontological mismatches are concerned, he claims that for aggregate nouns languages choose individually whether to treat such nouns as count nouns or as fake mass nouns.

Cross-linguistic observations of countability leads Chierchia to a classification of languages according the numeral-noun combination into three types: Type I languages are number-marking languages where only count nouns can pluralize. Count nouns combine directly with the numeral while mass nouns require a classifier (English, German and other Indo-European languages); Type II languages are classifier-languages in which nouns do not combine directly with numerals - all nouns require a classifier construction (Mandarin, Japanese); Type III languages have nouns that can all be pluralized and combined directly with numerals and do not require classifier phrases (Yudja, Nez Perce). Since Type II and III languages do not provide an overt distributional division of nouns into count and mass, one could assume that these languages just do not establish a count/mass distinction. However, Chierchia argues against such a perspective. Instead, he claims that the grammatical criteria distinguishing count from mass nouns (as presented in section 2.1) are not universal, but countability indeed is. Even though the Type I-III languages differ massively, Chierchia assumes that the mass/count distinction is universal and manifests itself differently in languages. The cognitive distinction of count and mass nouns can be observed in Type II languages, too, but through the choice of the classifier or measure

[14] Chierchia (2010, to appear) develop the idea of the cognitive grounds of the count/mass distinction further, and argues that the notion of count and mass nouns correspond to 'Spelke objects' and 'Spelke substances'. Spelke objects have clear identity conditions which allow tracking across space without losing individuality while Spelke substances are made up of entities which are not so properly identified.

unit. And Type III languages also express the count/mass distinction of nouns, i.e. in the inferences of nouns which differ in that the numeral-noun constructions for cognitively count nouns have an analogous meaning as English count nouns, while for cognitively mass nouns the direct combination with numerals infer a container or quantity reading.

One of Chierchia's most relevant arguments stemming from the early work in Chierchia (1998a) is the claim that mass nouns are lexically plural[15]. Unlike count nouns which provide a singular-plural alternation, mass nouns have only one form. They do not pluralize, because they are inherently plural (Inherent Plurality Hypothesis). Mass nouns - as Chierchia argues- are either interpreted as a mereological whole of some kind or as a substance whose minimal components are elusive and therefore block counting.

In order to incorporate his thesis regarding the inherent plurality of mass nouns, Chierchia interprets the predicates in a structured domain as proposed by Link (1983). Unlike Link (1983), he stores count and mass predicates inside the same domain and unlike Krifka (1989), Chierchia assumes that count and mass predicates are of the same type. The differences between the denotation of singular, plural and mass predicates Chierchia presumes are depicted in Figure 2.5.

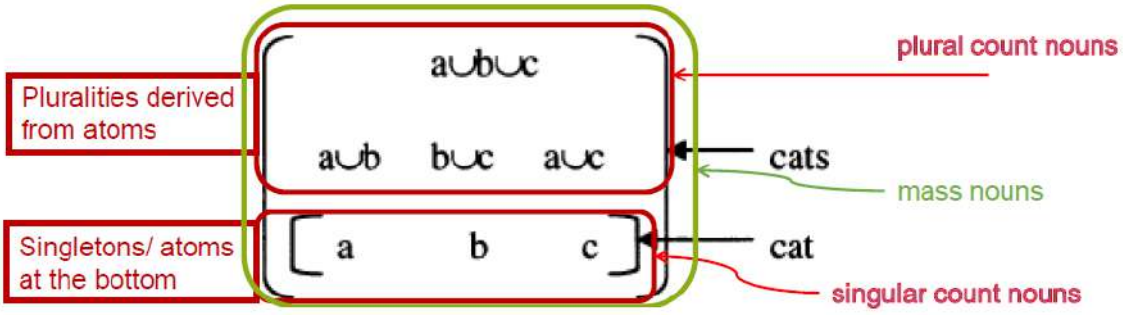


Figure 2.5: Singulars, plurals and mass terms in a structured domain (cf. Chierchia, 1998a)

As can be observed from the lattice above, singular count nouns denote the atoms at the bottom of the lattice structure. The plural denotation is generated by the sum-operation on atoms, which is why plural count nouns denote the set containing all pluralities. On the other hand, mass nouns denote the whole lattice, the atoms and the pluralities. Unlike the plural's denotation which is derived from the atoms of the extension of the singular counterpart, mass nouns denote the whole lattice. They come out of the lexicon as denoting sums. Importantly, the set of atoms that generates the extension of mass nouns is not linguistically accessible, which should map into the cognitive property of mass nouns that their minimal components are vaguely specified. In his later analyses, Chierchia (2010, to appear) adjusts the extension of plural predicates as such to also include the singletons, mainly motivated by plural negative quantified Determiner Phrases (DPs), such as

[15]Note that this term is not to be confused with *lexical plurals* in the sense of Acquaviva (2008).

no cats. Excluding the singletons from the plural extension – as has been proposed earlier by Chierchia (1998a) - would imply that the negation of the plural form as in *no cats* is actually true of a single cat, and that is not the inference expressed by the phrase *no cats*. Rather, *no cats* means zero cats.

Due to the fact that mass nouns do not pluralize, the plural formation must be analysed in such a way that it generates the plural sets from the atoms, but simultaneously blocks a generation with mass nouns. Therefore, the plural formation cannot remain the same as in Chierchia (1998a), but has to be adopted too, as shown in (54)[16].

(54) $^{*}P = \lambda x\ \exists Q[\ Q \subseteq P \wedge x = \cup Q\ ]$

The core difference between count and mass predicates which determines their (un)countability is, according to Chierchia, the property of minimal components of the nouns denotation to be either specified and therefore lexically accessible (as with count nouns) or vague. The notion of vagueness is further developed in Chierchia (2010) where it is claimed that all natural concepts are vague. Every predicate has vague boundaries, and modifying it or cutting off any parts or pieces would not change it. A cat would remain a cat even if it has one or both legs cut off, or if there was some additional pieces attached to it. Until a certain degree this "modifying" does not affect the entity to be true of the predicate cat, but "it will come a point where you will become uncertain as to whether it still is a cat" (Chierchia, 2010:117).

As illustrated below, Figure 2.6 portrays a cat without any doubt. The objects in Figure 2.7 also depict cats, each of them rather modified in certain aspects still being a cat, whereas the objects portrayed in Figure 2.8 cannot be described as cats[17].

Figure 2.6: An ordinary cat

[16]Chierchia (1998a) uses the same plural operator as Link and suggests that the plural noun denotes all the sets of pluralities except the singletons. Hence, his plural function (i) resembles Links proper plural $^{\circledast}P$:

(i) $PL(A) = {}^{*}A - A$

If we were to apply this function to a mass noun, the result would be the empty set $\oslash$ because for mass nouns A is already closed under sum formation, hence $^{*}A$ equals A and subtracting $^{*}A$ yields the empty set $\oslash$.

[17]There is, of course, no strict division between what counts as a cat and what does not, and the human perception can vary. Under certain circumstances or contexts, the depiction of the cats face only can also be counted as a cat - as is the case with the Cheshire Cat from Alice in Wonderland.

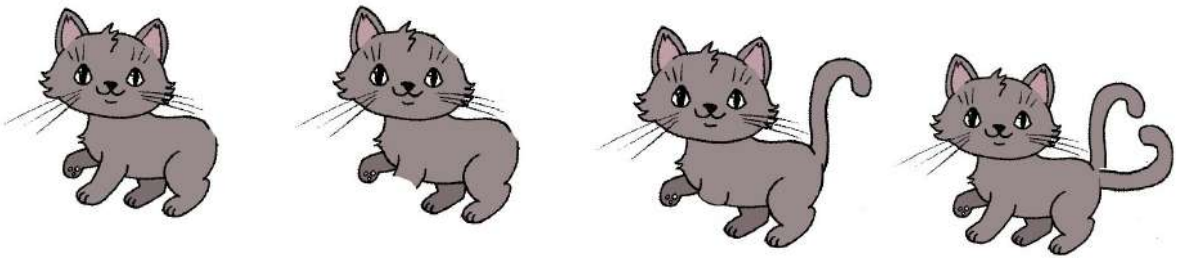


Figure 2.7: Some (perhaps incomplete) cats

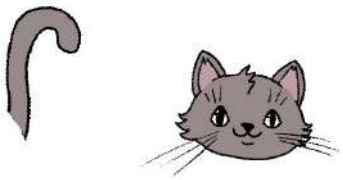


Figure 2.8: Parts of cats

Chierchia argues that all predicates are vague taking a supervaluation approach to vagueness[18]. Such vague predicates are interpreted by partial functions from individuals to truth values. He incorporates vagueness in his model by suggesting that each predicate P is assigned a positive (P+) and a negative (P−) extension which is context dependent, i.e. the more context we have, the sharper is the division between P+ and P−.

- P+ : the set of all x, for which P(x) = 1
- P− : the set of all x, for which P(x) = 0

Things for which P is undefined are said to fall into P's truth value gap, which represents the vagueness band. Since the context provides additional information and specification of the things that are true of P, Chierchia proposes that the contexts are also partially ordered.

(55) $c \alpha c'$ (to be read as "c' is a precisification of c") iff
for every P and every world w, P_w's vagueness band relative to c' is smaller or equal to P_w's vagueness band relative to c. (Chierchia, 2010: 119)

Accordingly, "atom" is a vague and context dependent notion. The set of individuals (U) is relative to a context c divided in three: (i) a set of things that are certainly atoms – $AT_c(U)$, (ii) things that are certainly sums – $\Sigma_c(U)$, and (iii) the complement of (i) and (ii), unclear if sums or atoms, represents the unstable entities. Sums of unstable entities are

[18] In particular, Chierchia adopts the supervaluation approach from Veltman (1985).

called "partial sums" – $P\Sigma_c(U)$ – and reflect the nature of mass nouns in being aggregates of unclear components. Crucially, the set of unstable entities is identified through the complement of stable entities.

Mass nouns cannot be counted due to the lack of identification of minimal elements. The minimal elements, atoms, are defined as the smallest P-members:

(56) $AT_c(P)(u) = x \in P^+ : \forall\, y \in P^+ \, [y \leq x \rightarrow x = y]$

Since mass nouns consist of unstable entities, for which we do not know whether they are atoms or sums, counting cannot work. Applying AT to mass predicate leads to $\oslash$.

Vagueness can affect nouns in many ways. Count nouns are affected horizontally via the vagueness band that relates to a given context in which there might be a set of entities that are not clearly determined as being in a certain predicate's positive or negative extension, such as the objects in Figure 2.8. Mass nouns, on the other hand, are both horizontally and vertically affected by vagueness. Horizontally - the same way as count nouns, and vertically by means of identifying the minimal counting elements, which are unstable, i.e. unclear whether they are atoms or sums. There is, therefore, more than one way of splitting the nouns denotation into components.

Furthermore, Chierchia investigates the notion of kinds in relation to the count/mass distinction. The NPs can denote either properties or kinds, depending on the overall syntax. Properties are denoted by NPs in predicate position while kinds are denoted by NPs in argument position.[19] Properties can either be number neutral, meaning they are plurals or they can be an atomic property applied to singular nouns. These three types are related, but still different. In his semantic triad, Chierchia (2010) presents these three types and how they relate to each other:

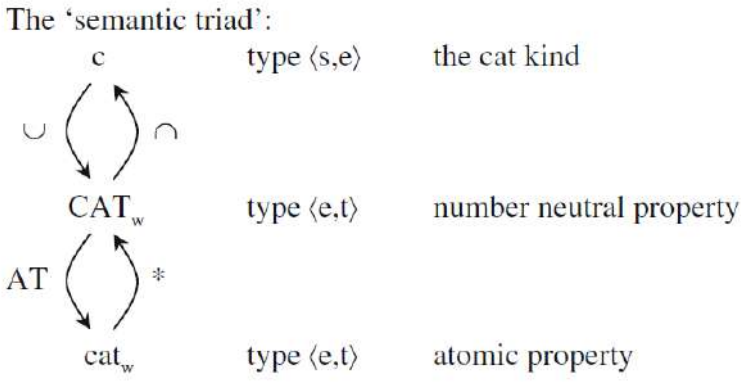


Figure 2.9: Semantic Triad (Chierchia, 2010: 116)

[19]Kinds have often been discussed under the term *generics*. For challenging issues regarding generics see Schubert and Pelletier (1987), for an overview of issues related to generic terms I refer to Carlson and Pelletier (1995).

- singularities at the bottom of the semi-lattice constitute the atomic property, i.e. cat
- all the sums generated by ∪ and the singularities comprise the number neutral property, i.e. cats
- the maximum element constitutes the homogeneous plural, i.e. the cat kind

As illustrated in Figure 2.9, kinds are in a one-to-one relation to sum-closed properties, but not to atomic properties. In his latest proposal, Chierchia (to appear) develops the idea of the semantic triad further to arrive at a base line framework, a logic that includes not only the relation between atomic property, sum-closed properties and kinds for count nouns as in 2.9, but also the analogous derivations for mass predicates as well as the derivations of countability shifts.

Regarding the flexibility of nouns occurring both as count and as mass nouns (e.g. *rope* or *stone*), Chierchia argues that this flexibility can be accounted for with two functions stemming from grinding and packaging:

(57)

a. Σ applied to a mass property P_m will yield a count property $\Sigma(P_m)$ corresponding to the mass property.
b. G applied to a count predicate P_c will yield the appropriate mass predicate $G(P_c)$ which corresponds to the original count property.

The functions in (57) are symmetric, such that $\Sigma(G(P_c)) = P_c$ and vice versa. This implies that after grinding one can apply packaging and the result should be equal to the original count predicate. This is a somewhat counter-intuitive axiom, because if we consider lamb meat to be ground lamb and then package this ground lamb we would intuitively conclude to have standard packages of ground lamb stuff and not the animal lamb.

Since the count or mass derivations can differ vastly, the Σ and G operation will be defined as purpose and context driven. It is not the case that for one mass predicate P_m will be only one option for packaging. Instead, there are different variants of G, G′, G" or $\Sigma, \Sigma', \Sigma''$. As an illustration, imagine to derive the count uses of the mass noun *water* via Σ. For water packaged in little bottles one could possibly use Σ, but for packaging in huge bowls Σ′ could be used.

Chierchia discusses the application of his proposed thesis regarding the semantics of numerals and classifiers to other languages, such as Type II or Type III. He argues that for each language, which establishes the count/mass distinction differently, some additional technical manoeuvring may be necessary. The differences that arise in countability in e.g. Type II languages can be solved with type theoretical modifications.

2.4.4 Rothstein, 2010

Rothstein (2010) proposes a semantic account of the mass/count distinction which differs from other semantic approaches such as Link (1983); Krifka (1989) and Chierchia (1998a) in that she gives the context the major role in providing counting atoms. While she understands that ontology plays an important factor in the count/mass distinction because it seems to reflect the ontological distinction between objects and substances (or rather things and stuff), she argues that grammatical features cannot be learned from purely ontological factors due to many mismatches between grammatical forms and properties of denotation. This means that she does not deny the presence of an ontological contrast between count and mass nouns, but believes that ontology alone does not determine the countability of a noun.

For the grammatical differences between mass and count nouns she lists three relevant factors: (i) determiner selection, (ii) distribution of nouns with regard to numeral modifiers and classifiers and (iii) plural morphology. She also emphasizes the fact that not all of theses features hold in every language. The classifier languages are the ones with countability distinction provided in the classifier choice. Besides grammatical differences such as plural marking and combination with determiner - which are usually mentioned in standard works on the count/mass distinction - Rothstein elaborates on further grammatical operations like partitive constructions and reciprocal resolutions, which, too, are sensitive to the count/mass distinction. The examples below present this sensitivity. (58) is an example taken from (Rothstein, 2010: 344) which shows the restrictions regarding numerical partitives. For the case with reciprocal resolution Rothstein takes some examples from Gillon (1992) as shown in (59). [20]

(58) numerical partitives

a. Three of the books were damaged in transit.
b. # Three of the furniture were damaged in transit.
c. Three of the pieces of furniture were damaged in transit.

(59) reciprocal resolution

a. The curtains and the carpets resemble each other.
b. The curtaining and the carpeting resemble each other.

(58) shows that numerical partitives are ungrammatical with mass nouns, even with object-

[20] In his approach to the semantics of English count and mass nouns, Gillon (1992) focuses on the different readings of aggregates, distributive and collective. He suggests that the denotation of plural nouns is structured in a join semi-lattice with a unit and without a zero. Accordingly, in such a lattice, illustrated in (i), the collective reading of a plural noun phrase with a denotation $\{a,b,c\}$ corresponds to the aggregation $\{abc\}$ and its distributive reading to $\{a,b,c\}$.

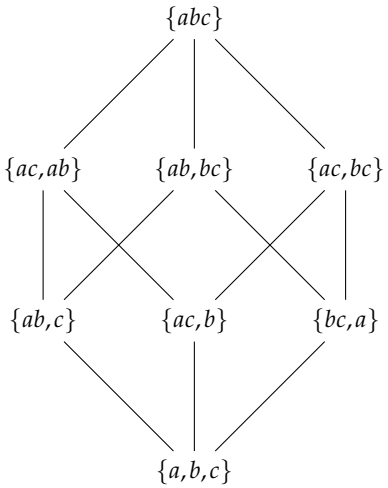
(i) from (Gillon, 1992: 619)

mass nouns which denote individuated entities. And the difference with regard to reciprocals (59) is that with mass nouns only a collective reading is possible while count plurals, *carpets* and *curtains*, allow both the collective and the distributive interpretation.

Following Chierchia, Rothstein argues that the count/mass distinction is independent of the "structure of matter", even though it is influenced by it. The ontological approach to the count/mass distinction treats mass nouns as cumulative and homogeneous because their denotations are upwardly and downwardly closed. She discusses the relation between quantization and homogeneity and argues that the difference between the two can be captured in the noun *jacket* which denotes a jacket with detachable sleeves. One could say that it has a proper part which is itself a jacket, i.e. the jacket without sleeves which makes, the noun *jacket* a non-quantized predicate. However, the jacket is still neither cumulative nor divisive and therefore not homogeneous.

Even though the classification of mass nouns as cumulative and homogeneous makes sense, it neither holds for every mass noun nor is it the case that every count noun lacks such properties. On one side there are mass nouns like *rice* and *salt* which seem to be homogeneous but a proper look at them shows that they in fact consist of smaller parts which are not rice or salt. In addition to that, mass nouns such as *furniture, silverware* or *lingerie*, which Rothstein calls "superordinates" are also not homogeneous. On the other hand, count nouns such as *fence* or *wall* provide a homogeneous structure.

While ontology forms some of the basis of the mass/count distinctions - despite the mismatches between the grammatical form and denotation - Rothstein tries to adapt the core ontological criteria in her own way by distinguishing atomicity in a formal, natural and semantic way which is the foundation of her proposal. Formal atomicity is atomicity relative to a lattice structure in model-theoretic terms while natural atomicity mirrors our knowledge of the world in which furniture as well as chairs have natural atomic parts. Finally, semantic atomicity - Rothstein's crucial divider of count and mass nouns - is atomicity relative to a counting context. This type of atomicity is context dependent and the



context itself first needs to be defined together with entities in this context. The number of such possible contexts can vary and is neither determined nor limited.

Rothstein argues that homogeneity and cumulativity are not sufficient enough to define the count/ mass distinction: homogeneity due to the fact that some mass nouns can be atomic (*furniture*) and some count nouns lack atomicity (*fence*), and cumulativity is as bad since it may not work with count nouns such as *fence*, because it is possible to keep "fence plus fence" in the denotation of fence. She concludes that natural atomicity cannot form the ground on which the count/mass distinction is established. For this reason, it is necessary to define a theory of atomicity which explains why fence is - but furniture is not - atomic. She finds further motivation for her claims in the results of psycholinguistic experiments made by Barner and Snedeker (2005) according to which some mass nouns denote sets of individuals (object mass or superordinates, *furniture*). Such mass nouns tend to denote heterogeneous classes of objects which is why Barner and Snedeker (2005) suggest to add [+individual] feature to the lexicon. Rothstein points out that even though such mass terms allow quantity judgements in terms of implicit counting which is providing a way of individuating items, grammatical counting - as in numeral-noun constructions - is still not possible, e.g **five furnitures*. What might be important to quantity judgements is not important for linguistic expressions of counting. She concludes that the grammar of count nouns is not dependent on the cognitive or perceptual salience of individuals.

In order to maintain the ontological criteria of homogeneity in the mass/count distinction, she proposes not to treat all mass nouns as homogeneous. Instead, she defines all count nouns to be necessarily atomic. Hence, count nouns should provide an atomic structure. Following Chierchia (1998a) and Gillon (1992), she states that mass nouns as well as count nouns should have their denotations in an atomic domain. A singular count noun, *cat*, denotes a set of atoms; a plural count noun, *cats*, denotes the same set but closed under the sum operation; and a singular mass noun, e.g. *water*, denotes the closure under sum of a set of atoms. The only difference between the denotation of plural count and mass is that the set of atoms of count nouns is grammatically and lexically accessible.

Rothstein's theory results in a typal distinction between count and mass nouns which is projected up to the DP. Her approach is similar to Krifka's in the way that mass and count nouns are different in type and that count nouns are derived from mass nouns. Mass nouns are root nouns of type <d,t> and count nouns, which are derived lexically from mass or root nouns, are of type <<d×k>,t>. For a proper development of her account of the count nouns's semantics Rothstein emphasizes two major claims:

1. implicit counting does not make grammatical counting possible
2. grammatical counting does not presuppose that the counted entities are individuated and atomic

Following these assumptions, she concludes that (i) the mass/count distinction cannot

be defined in terms of the properties of their denotation, (ii) the property of being naturally atomic is not a sufficient condition for being a count noun and (iii) the count/mass distinction cannot be explained in terms of the things they refer to but how they refer to those things. The distinction is therefore grammatical and not ontological. Her analysis shows that count nouns represent a mechanism of counting and the reason they allow counting is because they keep track of their members.

Rotshtein's contextual model is inspired by previous work on the semantics of nouns by Link (1983); Krifka (1989); Chierchia (1998a). She, too, assumes that entities are stored in a structural model M which is a complete Boolean atomic algebra, the set of atoms of which are comprised in A. These are, however, not fully specified but vague. All nouns are originally root nouns N_{root} - a Boolean algebra generated under $\cup_M$ from a set of atoms $A_N \subseteq A$. Mass nouns, N_{mass}, are exactly of the same type as root nouns, <d,t>. For the derivation of a count noun, a context which provides the counting atoms is necessary. Context k is, therefore, a set of objects of M, and K the set of all contexts. A common example discussed with regard to context in the sense of Rothstein's ultimate determinant of counting units is the noun *fence*.

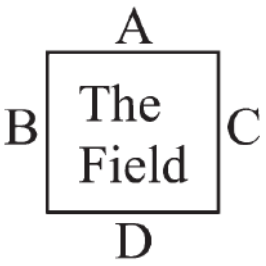


Figure 2.10: Illustration of the context dependent noun *fence* (cf. Rothstein, 2010: 355)

The variety that emerges from the situation depicted in Figure 2.10 can be explained on the basis of several contexts each of which allow different presumptions regarding what counts as one fence. To exemplify: In one context k_1, A B C and D could be counted as four different fences. Given another context k_2, one could assume the presence of only one big fence around the field. In a different possible context k_3, the empty space on the corners between A and B as well as between C and D could lead to identifying a total of two fences: the one on the sides of A and C, and the one joining the sides B and D. This way the context defines what counts as one. A_k would be the set of count atoms, determined by context k. B_k is a unique complete atomic Boolean algebra generated by the set of atoms A_k. In order to derive count predicates from mass or root predicates, the operation COUNT_k applies to root nouns and derives count nouns meanings. It follows that N_k is the interpretation of N_{count} in k.

(60) $N_k = \{< d,k >\in N \cap k\}$

(60) presents the denotation of a singular count noun in context k, which is an ordered pair whose 1st projection is a set of entities $N_{root} \cap k$ and 2nd projection is the context k. What counts as an atom for Rothstein is semantically encoded by the specification of a context. The plural formation is restricted to count nouns and yields the closure of $N_{root,k}$.

By means of such a context-dependent modelling of atoms, Rothstein solves two problems she mentions earlier in the paper. One is the atomic structure of object mass nouns such as furniture, which enables implicit counting of entities. However, grammatical counting is as bad as with subject mass nouns. She does not say that mass nouns do not have an atomic structure. Instead, she argues that N_{root}, which basically is N_{mass}, denotes a set of not specified and vague atoms. Why that? Concerning the apparent homogeneous structure of water, mud and sand we are now not forced to say that they do not possess an atomic structure, according to Rothstein's theory, because when it comes to the smallest parts of water, one needs to admit that water is actually not homogeneous. The second problem regards count nouns which seem to have a homogeneous structure but allow counting anyway, e.g. *fence, wall, sequence*. These cases are precisely the motivation behind a contextual atomicity approach which is extendable to other nouns as well.

2.4.5 Landman, 2016

Landman (2016) presents a theory of the semantics of count and mass nouns which does not ground the difference between count and mass in atomicity but rather in the properties of the generator set making up the noun's denotation: overlap and disjointness These are two salient properties of his theory: (i) not taking atomicity into account and (ii) disjointness of the base of a noun's denotation.

He calls his theory 'Iceberg Semantics' which is a modification of Link's logic which Landman calls 'Mountain Semantics'. The main difference is that one and the same noun in Iceberg Semantics can have different generator sets, a) which can be in a mass like shape, where the minimal elements overlap, and b) which is a count base where the minimal parts do not overlap, i.e. the base has disjoint parts.

Landman finds motivation for his theory in two issues: (i) Link's logic which separates the count and mass domain and which is unable to account for proper part hood, as for instance in counting the legs of a cat as their atomic parts, and in (ii) the difficulties that arise in counting portions of mass, as illustrated in (61).

(61) The coffee in the pot and the coffee in the cup were each spiked with strychnine.
(Landman, 2016: 5)

Previously, Landman (1991) suggested analysing the counting portions of mass by means of a shift operation that turns mass objects to atoms in the count domain. This is, however, only a mechanism for the sole purpose of including portions into sorted structures only

for the sake of atomicity - as Landman points out. He argues that if one were able to distance oneself from atomicity, such problems would not arise, and this is precisely what he aims to do with 'Iceberg Semantics'

The first overt difference we can see in the pictures below is that the mass domain is separated in Mountain Semantics, i.e. mass nouns have their denotation in a different domain. In Iceberg Semantics, a noun is interpreted as an iceberg having a body and a base, the body being grounded in the base. Plural count nouns would have the same interpretation as in Link (1983), i.e. the body of the Iceberg is the closure under sum, *CAT. Hence, the plural nouns are mountains that arise from the base. The base would not consist of atoms as in Link (1983); instead it would have parts within the Boolean domain. Such a mountain is lifted from the bottom and - as Landman argues - it floats just as an iceberg.

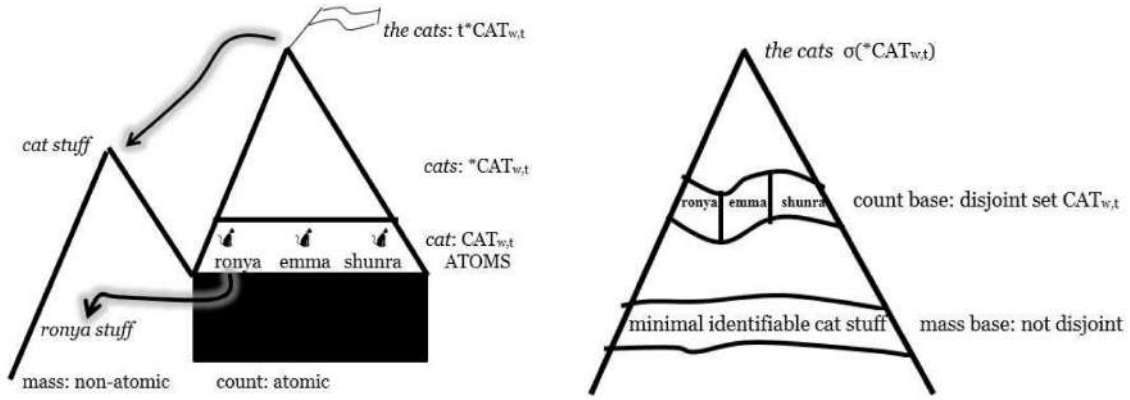


Figure 2.11: Mountains vs. Icebergs in Landman (2016)

Atomicity is therefore no longer a core criterion of counthood. The count/mass distinction of icebergs is defined in relation to the base. The same body of one iceberg will be either mass or count depending on the bases of the body. If the base has disjoint parts, the body will be count. If it has overlapping parts, the body will be mass. Since the denotation of nouns is lifted from the atomic bottom, something else has to be responsible for the count or mass property of these icebergs, i.e. the disjointness of the base.

Formally, a noun phrase is interpreted as an i-set (iceberg set) which is a pair of a body set and a base set with the body generated by the base under $\sqcup$:

(62) i-sets
$X = \langle body(X), base(X) \rangle$
$base(X) \subseteq B$
$body(X) \subseteq *base(X)$

The difference between count and mass nouns arises in the form of the base which is

disjoint for count nouns and overlapping for mass nouns according to the definition of overlap below (Landman, 2016: 3).

(63) overlap and disjointness on individuals
x and y *overlap* iff $x \sqcup y \neq o$, otherwise x and y are disjoint. x and y overlap if they have a non-null part

(64) overlap and disjointness on predicates
X *overlaps* iff for some $x,y \in X$: x and y overlap, otherwise X is disjoint. X overlaps if some of its elements overlap

This way, one and the same noun can count as mass or as count relative to the count or mass bases. Such an approach does not need to incorporate any shifts that will turn a mass noun into a count noun or vice versa. What remains yet unclear is how abstract nouns would be incorporated into this idea. Landman does not mention a relation of the countability of nouns to the ontological properties of their denotations, which offers a ground to not exclude abstract noun from his theory. However, the examples he uses consist of concrete nouns only and whether an inclusion of abstract nouns is possible remains to be tested.

2.5 Gaps and limits

Based on this brief summary of works in the field of semantics of count and mass nouns, we can observe that the theory has developed very much from a static position to a dynamic interpretation domain.

The controversially discussed issues circle around (i) atomicity as the discriminating property of count nouns, (ii) inclusion of object mass nouns such as *furniture* as well as homogeneous object nouns as *fence* or *bouquet*, (iii) cross-linguistics mismatches that apparently contradict the universal category of countability, (iv) the influence of the context which Rotshtein (2010) takes as the ultimate determinant while other papers ascribe only a minor factor to it and (v) ambiguity of nouns or the productivity of countability shifts.

The biggest challenge, in my opinion, lies in finding a balance between these different issues of controversy and properly weighing those factors which produce this discrepancy. In Figure 2.12, I gather the most relevant issues in the discussion of countability and coloured certain points differently. Black stands for the overt differences among count and mass nouns in English. Those include numerals, plurals, indefinite articles, classifier phrases as well as determiner selection and modifiers such as *much* or *many*. This is what is provided by natural language. Green represents those issues that regard the denotation

of count or mass nouns. While some cases are straightforwardly clear, as for illustration the difference between cat and blood one being an object and the other a substance - some issues arise when we go into detail of the property of these entities, like the minimal parts problem. This is where we developed the idea of atomicity along with the criterion of homogeneity in reference. The green issues are a result of theories that are coloured by the presumption that the count/mass distinction is mirrored in the division of entities in substances vs. objects, or stuff vs. things. Finally, the red coloured issues represent the varieties of nouns. Countability does not affect only celebrity nouns (11)-(12) but also nouns with a kind of denotation which does not follow the ontological criteria coloured in green, as for instance object-mass nouns (*furniture, cutlery*) and homogeneous objects (*fence, wall*).

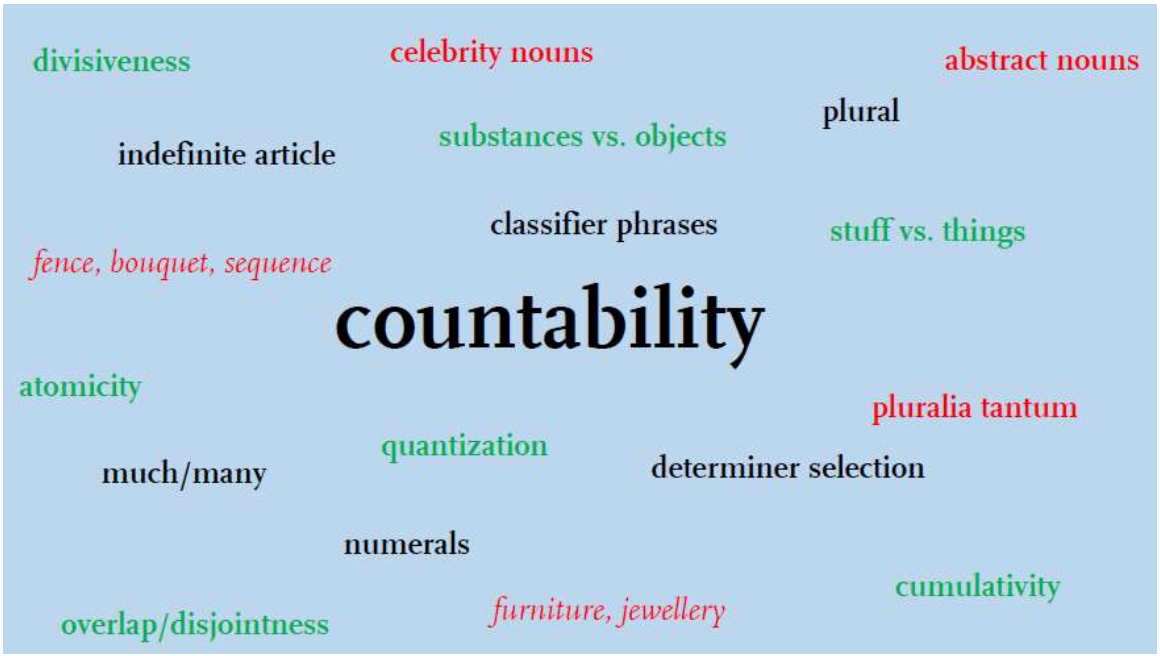


Figure 2.12: The countability puzzle

One issue that has not gained much attention in the previous work is the set of abstract nouns which, as the name suggests, pose a challenge for all ontological approaches since they neither denote objects nor substances. Abstract nouns are the focus of this dissertation and in the next chapter I will elaborate more on the question of why abstract nouns actually present a challenge for theories of countability.

3 The challenge of abstract nouns

In the previously presented analyses of the semantics of count and mass nouns, abstract nouns have barely been addressed. Most papers do not mention abstract nouns at all. An exception to this is Chierchia (2010) who explicitly states that his proposal is limited to concrete nouns:

> "There are many mass nouns in English that are not canonical in this sense. They include concrete 'superordinate' nouns (like *furniture* or *footwear* as opposed to *table* or *shoe*), abstract nouns (like *beauty* or *knowledge* as opposed to *virtue* or *belief*) and eventuality denoting nominals (like *jumping* as opposed to *jump*). According to some, the mass/count contrast also invests the aspectual/Aktionsarten system as pervasively as the nominal one. In the present work, I'll consider the mass/count distinction only limitedly to concrete nouns." (Chierchia, 2010: 101)

We can think of many possible reasons why abstract nouns have been neglected so far. One possible explanation is that abstract nouns are presumed to be a slippery category. Being unable to determine and analyse the nouns that fall into this category offers the excuse to regard this category as a special case or an outlier. Due to this circumstance, researchers have postponed this issue to a later point in the future when more clarity will be granted based on the outcomes of extensive research on so-called standard or prototype cases, as for instance with nouns such as *car*, *house*, *table*, *cat*, *blood*, *water* or *wine*. However, abstract nouns are too frequent to be dismissed as exceptional. Among the nouns in the Bochum English Countability Lexicon (Kiss et al., 2016) it has been verified that abstract nouns constitute one third of the whole lexicon[1]. In addition to that, abstract nouns can be as count as concrete count nouns and as mass as concrete mass nouns. This can be exemplified in the following set of data, in which *much* and *many* are used to discriminate

[1]This verification is the outcome of enriching BECL with annotations of the features "abstract" and "concrete" (cf. Iakubchik, 2018) based on the definition of abstract nouns in Duden (2005). The following table illustrates the distribution of abstract and concrete noun senses in BECL: .

abstract	concrete	number of nouns	percentage
yes	no	2044	28,9%
no	yes	4581	64,9%
yes	yes	424	6,1%

Table 3.1: Distribution of abstract and concrete nouns in BECL

between count and mass uses.

(1) a. Have you noticed how **much beauty** goes into dying?[2]
b. #Have you noticed how **many beauties** go into dying?

(2) a. One of the **many virtues** of pumpkins is the ability to combine equally well with sugar and spices or salt and cheeses, making them perfect for pies, cookies and cakes, as well as for soups, side dishes and stews.
b. *Pumpkins show **much virtue**.[3]

As it is obvious from the examples above, abstract count nouns - just as concrete count nouns - appear in count contexts; abstract mass nouns - just as concrete mass nouns - appear in mass contexts. In (1) and (2) *much* and *many* induce mass and count uses respectively. *Virtue* is a countable noun and its occurring with *much* is not felicitous; *beauty* - on the other hand - is a mass noun and combines with *much*. However, the mass noun *beauty* seems to be easier processed with *many* than the count noun *virtue* seems to be with *much*. With *many beauties* it seems that the meaning of *beauty* is shifted to "a person who is very beautiful, or prominent for his/her beauty", and in this particular sense the occurrence with *many* does not seem to be infelicitous. But, when it occurs in the mass sense as "qualities that give pleasure to the senses" (WordNet, Miller, 1995), the occurrence with *many* is odd, at least.

Beside *much* and *many*, abstract count and mass nouns can also occur in other characteristic contexts, as for instance bare (3) or in plural form (4).

(3) Roses are also identified with love, **beauty**, purity, and passion.

(4) "History teaches the **virtues** of caution and skepticism when weighing the validity of vast, unprecedented exclusionary measures that target disfavored classes in the name of national security", the Japanese American Citizens League said.

Another possible explanation for the lack of abstract nouns in these influential papers is that they are an obstacle for every theory that presumes a mapping between entities in the real word and language. If it were so that all substances are mass nouns and all objects are count - as predicted by Chierchia (1998a), then abstract nouns would indeed pose a challenge because they neither denote substances nor objects. To reach a better understanding of the nature of abstract nouns I will reflect on the hitherto proposed definitions and criteria for the notions *abstract* and *concrete* in the following section.

[2]Unless marked otherwise, all examples come from the Contemporary Corpus of American English - COCA (Davies, 2010).

[3]I use * for ungrammatical/infelicitous phrases, and # for cases which are only ungrammatical in the very specific contexts, but allow a marked interpretation.

3.1 Definitions and criteria

The category of *abstract* vs. *concrete* is linked to abstract and concrete objects which have long been discussed in philosophical works dating back to Plato and Aristotle. A discussion often referred to in terms of the *problem of universals* studies the question whether abstract objects exist or not. In this discussion, universals - together with numbers, propositions and sets - are claimed to be abstract objects (cf. Thiel, 2014).

When referring to these objects by terms such as *abstract nouns* or *concrete nouns* we shift the field to philosophy of language. In this discipline, the term *abstract* has been most prominently discussed in the works of Quine. Porzig (1930) emphasizes the needs to determine abstract nouns grammatically but he does not follow through with it. The grammatical notion of *abstractness* or *abstract nouns* has only been occasionally investigated, usually as part of a wider linguistic issue, as for example determiner selection, conceptual shells or nominalizations.

Abstract vs. *concrete* also has a cognitive notion which has been investigated in many psycholinguistics works. Thiel (2014) reports on studies that analyse the degree of abstractness on the level of texts (Flesch, 1950; Gilie 1957) and on the level of the noun lemma (Schierholz, 1991; Martin, 1974). The latter study uses hyponymy for identifying abstractness although it results in a slightly different contrast, namely *concrete* vs. *general*. More recently, a psycholinguistic attempt by Troche et al. (2014) investigates word meaning as distributed in multi-dimensional space by means of hierarchical cluster analysis and conclude that abstract and concrete words show overlap in their topography but differentiate themselves in semantic space.[4]

Another term linked to abstract and concrete objects is *trope* (Williams, 1953; Campbell, 1990; Moltmann, 2013 and others). *Tropes* enable abstract nouns to lose their abstractness by way of referring to a specific instance of the abstract term. *Tropes* or *abstract particulars* are noun phrases that are headed by an abstract noun, but due to other modifications within the NP, the noun becomes specified and bounded in time or space. For example *John's bravery* is bounded in space and time because it is linked to John. Thiel (2014) argues that tropes are of major relevance for the discussion of abstract nouns in linguistics, because they can explain why many terms are simultaneously abstract as well as concrete. For Moltmann (2013) tropes are concrete as long as the bearer of the apparent abstract noun is concrete as is *John* in *John's bravery*.

In order to investigate abstract nouns, one tends to think that a proper definition would be necessary for delimiting the object of study. Zamparelli (to appear) presents four different criteria that have been used to distinguish abstract nouns from concrete nouns:

[4]Here I briefly summarize the contributions to abstract nouns from the perspective of philosophy (of language) and psycholinguistics. The focus of my research is, however, on theoretical linguistics which is why related work from different fields will not be explored here.

(5)
- **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.
- **imageability**
  This way of distinguishing concrete from abstract nouns implies that concrete nouns denote entities which are imaginable. The denotation of abstract nouns - on the contrary - cannot be visualized.
- **morphological derivation**
  In this case, abstract nouns are often derived nominals. In English, nouns ending in *-ness*, *-ity*, *-tion* or *-hood*, *- itude*, *-cy*, *-ment*, *-ship* are abstract.
- **spatiotemporal collocation**
  This criterion implies that abstract nouns denote entities that do not have a location in space or time.[5].

Each of these criteria can only account for a subset of abstract nouns, but cannot cover all of them. There are many cases in grey areas. One example to be considered as an illustration is a unicorn - a fictive object. It is imaginable, but cannot precisely be impinged on the senses. It is fictional just like hobbits are. Another example as a a matter of controversy are events. For many theorists, this makes them be abstract because they cannot be impinged on the senses. They can be, however, determined in space and time. Besides these cases, three of the above mentioned criteria regard the denotations of nouns, and only one, the morphological derivation, targets the noun itself. It is also worth noting that many derived nominals are actually ambiguous, often between a concrete and an abstract meaning. For example, a nominal like *collection* can denote an event of collecting something and could therefore be thought of as an abstract noun in this particular sense. But in an example such as *He hid his collection of stamps in the last drawer* - in which the sense of *collection* refers to an object which comprises all collected items (in this case stamps) - the nominal *collection* denotes without any doubt a concrete object.

Finally, I would like to conclude by stating that the term *abstract nouns* is misleading in and of itself: the nouns are not abstract, but the denotations are. Regarding the controversy of definitions I argue that the matter of a precise identification of abstract nouns will not be relevant for the purpose of my thesis. The count-mass distinction is still understudied for all kinds of abstract nouns, in a broader or a narrower sense. It does not matter therefore which definition I rely on as long as my investigation brings us any closer to a better understanding of the countability of abstract nouns.

[5]For a detailed discussion of the mentioned criteria see (Zamparelli, to appear).

3.2 The nature of abstract nouns

In this section I aim to tackle the question of why abstract nouns have been an obstacle in the research on the count-mass distinction. It is in my belief that there are three major issues that are important for better understanding of abstract nouns and countability. These are:

1. The heterogeneous set of abstract nouns
2. Polysemy of abstract nouns
3. The plural function in abstract nouns

The set of abstract nouns is (i) heterogeneous in many ways and the members of this set are (ii) in most cases highly polysemous. In addition to that (iii) the ability to pluralize such nouns requires an explanation for the plural function applying in this way, which is different from its application in the case of concrete nouns. If it really is a function of sum as commonly assumed, then we require an explanation for the functionality of this operation with abstract nouns. If the denotation of abstract nouns is, roughly, indeterminate and shapeless, we need to ask the question of how it is possible to combine the denotation of such nouns with the plural operation which presumes a specification of each summand.

Since these issues have been an obstacle for dealing with abstract nouns, at least in theories of the count-mass distinction, I will briefly elaborate on them in turn.

3.2.1 The heterogeneous set

One of the first obstacles when dealing with abstract nouns is the heterogeneous character of the set that these nouns constitute. The diversity of members of the set of abstract nouns is leading us to question the possibility of a uniform semantics for all these different nouns.

The class of abstract nouns is heterogeneous in that it comprises different types of nouns: derived nominals (from adjectives and verbs), Psych nouns, property- or quality denoting nouns, factual nouns, nouns of communication, as well as nouns that denote relations, measure and time terms, sciences and arts (cf. Duden, 2005; Schmid, 2000).

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, philosphy, linguistics*

Table 3.2: Diversity of abstract nouns

The table above shows different types of nouns which all share the characteristic that they denote abstract entities. However, the nouns in this group differ in many regards. From a morphological perspective, one finds primary nouns as e.g. *faith* but also derived nominals as *stupidity* or *opposition*. They also differ in their semantics since they denote different things, for instance *honor*, *humiliation* or *justice* denote qualities while *opposition* and *proportion* refer to relations. The fact that we can identify and name different subsets of abstract nouns explains why most of the research is done exactly on the topic of these subsets of nouns. For our search of related work on abstract nouns, this means that it is necessary to look into literature that studies these subsets: relational nouns, derived nominals, nominalizations, psych nouns and other.

From this perspective it may seem doubtful whether one can find a semantic analysis that would unify all the different types of these words. On the other hand, there may be a possibility that the morphological base, verb or adjective, exerts some influence on the resulting nominal. Besides, it has been proposed that nominalizing suffixes (Brinton, 1998) and the Aktionsart of the underlying verb may influence the countability of the resulting nominal (Mourelatos, 1978; Krifka, 1989)[6]. Semantically speaking, despite the commonality that abstract nouns denote some abstract entities, they differ with regard to the kind of abstract entity they denote. *Examination*, *transportation* and *approval* denote events, which are certainly different than *hope*, *joy*, *mercy* and *faith* which refer to qualities and these in turn have to be distinguished from relation denoting nouns and other types mentioned in the table above.

3.2.2 Polysemy

The second major problem regarding abstract nouns is polysemy. Polysemy is a natural concept which applies to different types of words: adjectives, verbs, preposition and nouns

[6]These hypotheses have been proven as not exhaustive in an empirical examination conducted by Grimm (2012a).

as well (Heger, 1963; Lehrer, 1990; Wherrity, 2016). Polysemy is a type of lexical ambiguity which differs from homonymy in that the different meanings are related. This is one of the widely accepted definitions of polysemy (Cruse, 1992; Croft, 1998; Lyons, 1977; Ruhl, 1989; Cruse, 2011; Geeraerts, 1993; Saeed, 2003; Tuggy, 1993; Gries, 2015; Taylor, 2003; Blank, 1991: among others).

Consider as a comparison the following sets of meanings:

(6) Homonymy

a. This is the *kind* of handbook every student needs.

b. She has been very *kind* to me.
⇒ kind in the sense of the noun *type* and the adjective *caring*

(7) Polysemy

a. The *collection* of stamps took him 14 years.

b. You should care more about your *collection* of stamps, it contains more than 700 stamps.
⇒ collections as an event and an object.

Homonymy is not restricted to one part of speech, instead it ranges over different word classes, as exemplified with *kind*. Differences among the definitions of homonymy and polysemy arise in the terms used for the different meanings, as for instance *sense*, *use*, *meaning* and *word* (Gries, 2015). I will continue to refer to polysemous cases as senses of nouns.

The term polysemy is, however, sometimes confused with the notion vagueness[7]. I follow Tuggy's definition of vagueness according to which vague meanings have so much in common that it is difficult to separate them (cf. Tuggy, 1993).

(8) Vagueness

a. We spent our holidays with aunt Maggie.
⇒ aunt as father's or mother's sister

As an example, Tuggy mentions the diverse uses of the verb *paint* to illustrate the vague character of this verb: "(i) painting a portrait in oils on canvas, (ii) painting a landscape with watercolors on paper, (iii) painting *trompel'oeil* on the interior wall and floor of a house, (iv) painting a mural on the exterior wall of a public building, (v) painting a decorative border on an interior wall, (vi) painting the walls of a room with a single color of paint for decorative purposes but also to preserve them, (vii) painting the exterior of a house primarily to preserve it, (viii) painting furniture, (ix) painting a car with an air gun,

[7]Generality and indeterminacy relate to vagueness and ambiguity. These notions are not always easy to differentiate. For a detailed study of these notions and tests for identifying the appropriate cases see Gillon (1990).

(x) painting stripes on a parking lot or roadway by driving a paint-spraying machine, (xi) applying makeup to the face, or (xii) applying iodine or some other colored disinfectant to the body after or prior to an incision, with a swabbing motion." (Tuggy, 1993: 275) [8]

3.2.2.1 Polysemous abstract nouns

Polysemy does not leave abstract nouns unaffected. Indeed, abstract nouns have been claimed to be even more polysemous than concrete nouns (cf. Levickij, 2005). Here are some examples of the polysemy of abstract nouns:

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

(10) 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 MASS
d. license#3 excessive freedom; lack of due restraint MASS

(11) 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

The polysemous nature of abstract nouns can be witnessed in dictionaries that offer a distinction of individual senses of nouns, as it is the case with WordNet (Miller, 1995). That these senses can moreover be distinct with regard to the countability is evidenced in BECL 2.1. (Kiss et. al, 2016). As can be seen in the data above *license* is a convenient example since it provides two count and two mass meanings (10). Moreover *license* is ambiguous between a concrete and abstract meaning: license#1 refers to an object unlike *license*#2, #3 and #4. Similar to this is the noun *life* with three different senses, two of which are mass while only one is regarded as countable. In sum, the study of any property of abstract nouns cannot be approached without taking into account their polysemous nature and the flexibility of countability assignments.

When it comes to ambiguity of nouns, event nominalizations are considered to be one of the most researched subsets of abstract nouns. They are also polysemous in that they always refer to an event but also to a resulting object of that event (Grimshaw, 1990; Alexiadou et al., 2010; Melloni, 2007 among others). For instance *collection* can refer to the event

[8] There are a number of tests proposed for differentiating ambiguity and vagueness, as for instance "the contradiction test" according to which a sentence containing an ambiguous expression can at the same time be affirmed and denied depending on the chosen meaning of the ambiguous expression. For a discussion of different tests see Zwicky and Sadock (1975).

of collecting as well as to the resulting *collection* of the collected items. In the sense as an event, the noun denotes an abstract entity, and in case of the result it is ambiguous between a concrete and abstract interpretation. Speaking of the event referred to by nominalizations, Grimshaw (1990) argues that they are just like mass nouns because they do not pluralize. It follows that this case of polysemy goes in hand with a change in countability as well. For the purpose of illustration, consider the following four examples from BECL with polysemous event denoting nouns:

(12) a. classification#2 a group of people or things arranged by class or category COUNT

b. classification#3 the basic cognitive process of arranging into classes or categories MASS

(13) a. disappearance #2 the event of passing out of sight COUNT

b. disappearance #3 gradually ceasing to be visible MASS

(14) 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

(15) a. consequence#1 a phenomenon that follows and is caused by some previous phenomenon COUNT

b. consequence#2 the outcome of an event especially as relative to an individual COUNT

c. consequence#3 having important effects or influence MASS

Unlike the mentioned polysemy of event nominals in which nouns can refer to the event and the result of that event, *disappearance* has two senses that differ only slightly. The mass sense focuses on the atelic process of disappearing while the count sense refers to the whole event, completed and bounded. Similarly, *humiliation* (14) while derived from a transitive verb *(to) humiliate*, does not obey this general pattern of polysemy. Instead, *humiliation* in the mass sense corresponds to the feeling while the count sense focuses on single instances that caused such feelings.

Having in mind the cases of ambiguity often followed by a change in countability, it is questionable whether countability is a lexical feature assigned to nouns at all. If nouns are generally as ambiguous and flexible as presented in the sample above, then it may be the case that the nouns are underspecified (or overspecified) with regard to countability. This would mean that countability may indeed only be a syntactic feature that is assigned to noun phrases. On the other hand, speakers do have strong intuitions about their perception of these ambiguous nouns (and their countability assignment) even though they might not be able to list all the related senses of these nouns.

3.2.3 Plural formation

Another peculiarity concerning the countability of abstract nouns is the question of what is being counted in case of countable abstract nouns. While it is easy to understand that pluralized concrete nouns - such as *cats* - are the result of a sum formation applied to individual cats, it is not clear how this principle can be applied to nouns which denote something abstract, as for instance *hope*, *life*, *need* or *luxury* - as is the case in the following examples:

(16) a. Your picture and the subsequent history of its subject are a poignant reminder to me of the joys and **hopes** of our youth and of the great sacrifices many of our families make for our nation.

b. For immigrants who lack authorization to be in the United States but who have spent many years establishing **lives** there, the possibility of what Immigration and Customs Enforcement (ICE), a division of the Department of Homeland Security (DHS), calls "removal" is ever-present in their daily consciousness (Kanstroom 2007).

c. The argument that local autonomy provides for efficient governance is instead linked to the public choice economic analysis of Charles Tiebout, who argued that multiple empowered small municipalities would allow for mobile "consumer-voters" to choose the local community that best fit their **needs** for municipal services.

d. He said it was a warning about the way the world was going. Not where it was heading, but the way it was going, and that schools and hospitals were **luxuries**.

The examples in (16) are all plural occurrences of nouns that do not denote concrete entities. We can observe that when such a noun is pluralized, it often corresponds to individuals who bear this property. This is the case in the examples with *hopes* or *lives*, where the noun relates to individuals who possess life or hope. A similar idea was proposed by Grimm (2012a) who argues that the plural instances represent anchors in participants or events. While this is true for many nouns and many plural occurrences of these nouns, the argument is insufficient when it comes to cases in which instead of the individuals, the things being counted are rather some objects that possess the properties named by the abstract noun under consideration. This becomes clear in the examples of *luxury* and *need*, where it seems more likely that the counting pieces are some objects which hold the property of need or luxury.

The phenomena in the data I presented must not be understood as a matter of regularity. These cases are just random samples taken from corpora. For a clear description of these phenomena we need a complete study of all different count occurrences of abstract

nouns. The problem this poses for formal semantics is that the counting individuals are not compatible with the notion of atom since the counting units in abstract nouns are rather unspecified and diverse entities.

3.3 Related work

There are some papers that have put the issue of certain abstract nouns and countability into focus. Most of them are 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 are of major relevance and need to be considered. (e.g. Mourelatos, 1978; Alexiadou et al., 2010; Grimshaw, 1990 among others). Mourelatos (1978), for instance, studies the relation between the Aktionsart of a verb and the countability of the resulting nominalization to find certain regularities. Other related research include Nicolas (2003, 2010)) who focuses on nouns derived from gradable adjectives, Grimm (2012a, 2016) who investigates deverbal nominalizations and proposes noun profiling for specific abstract nouns, Zamparelli (to appear) who studies the polysemy of abstract nouns and meaning or countability shifts within these polysemous nouns, Tovena (2001) who points out that some abstract nouns -although being mass nouns - combine with singular determiners that require an atomic domain, and Thiel (2014) who surveys the determiner selection of German abstract nouns. In the sections that follow I will first reflect on the discussion of deverbal nominalizations and then give a brief summary of the other relevant topics related to the count/mass distinction of abstract nouns.

3.3.1 Derived nominals

It is commonly acknowledged that deverbal nominalizations are ambiguous between an event and a result reading. The most influential approach to this distinction and their syntactic and semantic consequences is Grimshaw (1990) labelling the corresponding meanings as follows: Complex Event Nominals, Simple Event Nominals and Result Nominals.[9] The following examples taken from (Grimm, 2014: 190) present near-minimal pairs of this typology.

(17) a. The examination of the patients took a long time. CEN
b. The examination took a long time. SEN
c. The examination was on the table. RN

[9]In more recent approaches (Alexiadou, 2001; Alexiadou et al., 2010) the notation of Argument Supporting Nominals (ASN) opposed to Result Nominals (RN) is adopted. In typological studies the terms action nominals (*nomina actionis*) and manner nominals (*nomina modi*) are used (cf. Koptjevskaja-Tamm, 2006).

Although the base verb and its nominal counterpart are similar in meaning, they behave differently on the surface. The ability of nominalizations to take arguments appears to be a peculiarity of such nouns since they generally do not take arguments.[10] This peculiarity of nominalizations made Grimshaw distinguish between the nominalizations in (17). Argument-taking nominalizations are often interpreted as denoting events while non argument-taking nominalizations refer to entities. The former are named complex event nominals CENs and the latter result nominals RNs.

Simple Event Nominals are in-between: they are among those nominalizations which denote events but do not take arguments obligatorily, such as underived nouns e.g. *race, trip* or *event* but also derived nominalizations like *celebration, competition, meeting* which can appear with arguments but do not necessarily have to (cf. Melloni, 2007). In contrast to CENs, simple event nominals - according to Grimshaw - do not have an event structure and are therefore similar to result nominals. Complex Event Nominals, as the name suggests, are derived from verbs which denote a complex event structure. Grimshaw argues that CENs preserve the event structure of the verb which facilitates the nominal to take arguments and assign thematic roles. Besides the event interpretation, Grimshaw observes that nominals can also convey a more concrete interpretation in that they denote a result or outcome of the underlying event.

To disambiguate these three types of nominalizations, Grimshaw proposes many distributional features in relation to the event structure: the capacity of argument taking, determiner systems, modifiers and aspectual differences. She claims that the main difference between CENs and RNs is that CENs have an event reading and can therefore be located in time while RNs have a referential reading and denote entities, which do not have any specific temporal location. She also argues that while CENs assign theta-roles and have obligatory arguments, RNs do not assign theta-roles and do not have obligatory arguments.

When it comes to question of combining with modifiers such as *frequent* and *constant*, CENs allow such constructions altogether, while RNs allow them only when being pluralized, as is observable in (18). The agent-oriented modifiers such as *intentional* or *deliberate* can be taken by CENs but are infelicitous with RNs (19).

(18) a. The constant assignment of unsolvable problems is to be avoided.
b. *The constant assignment is to be avoided.
c. The constant assignments were avoided by students. (Grimshaw, 1990: 50-51)

(19) a. *The instructor's intentional/deliberate examination took a long time.
b. The instructor's intentional/deliberate examination of the papers took a long time. (Grimshaw, 1990: 51-52)

[10] An exception to this are relational nouns, such as *brother, father, son* etc. The valency of nouns is controversially discussed in the literature. Beside nominalizations and relational nouns, some approaches assume that other types of nouns also exhibit valency (cf. Hölzner, 2005).

Grimshaw argues further that CEN's can only appear with the definite determiner when associated with a grammatical argument structure (20).

(20) a. They observed the / *an / *one/ that assignment of the problem.
(Grimshaw, 1990: 54)

Moreover, CENs can also appear without any determiner although this is generally unusual for singular nouns (21). CENs are - in Grimshaw's terminology - non-count nouns since they do not pluralize while RNs can pluralize and are therefore count nouns (22).

(21) Assignment of difficult problems always causes problems.

(22) a. The assignments were long.
b. *The assignments of the problems took a long time. (Grimshaw, 1990: 54)

Furthermore, CENs and RNs behave differently with regard to possessive constructions. The former permit only subject-like possessives while the latter permit non-thematic possessives.

(23) a. The examination *(of the papers) by the instructor.
b. The examination by a competent instructor will reveal... (Grimshaw, 1990: 52-53)

Another distributional difference is that CENs do not occur predicatively, but RNs do.

(24) a. That was the/an assignment.
b. *That was the/an assignment of the problem. (Grimshaw, 1990: 55)

When it comes to the countability of nominals, it is worth noticing that one criterion for disambiguating CENs and RNs is the fact that CENs never occur in plural and are accordingly classified as non-count nouns. RNs, however, can pluralize and because of that they are consequently treated as count nouns. In cases where an event nominal appears in plural anyway, it ceases to be interpreted eventively and carries a result interpretation instead (cf. San Martin, 2009).

3.3.1.1 Empirical observations

Besides Grimshaw's theory, several other proposals have been made in trying to explain the links between deverbal nominalizations and their number marking as the main indication of countness. In his comparative analysis Grimm (2014) reports on following three approaches regarding this issue:

1. The aktionsart of the base verb influences the countability of the nominalization (Mourelatos, 1978; Bach, 1986; Krifka, 1989; Brinton, 1998).

2. Nominalizing suffixes affect the countability of the derived nominal (Brinton, 1998).

3. Different interpretations of nominalizations reach different countability features (Grimshaw, 1990).

Grimm's aim is to test all three hypotheses empirically. I will elaborate on his results briefly and refer to the above mentioned approaches as first, second and third hypothesis respectively. The first hypothesis states that the nominalizations of verbs designating states and activities are non-countable, while verbs designating accomplishments and achievements derive countable nominals as exemplified below:

(25) state: live ⇒ living

a. a quantity of/*one living

(26) activity: run ⇒ running

a. x much/*a running

(27) accomplishment: perform ⇒ performance

a. *a good deal of/one performance

(28) achievement: arrive ⇒ arrival

a. *much/an arrival

These examples show the derivation of nominals of four aspectual categories - namely states, activity, accomplishment and achievement - as well as their countability which is illustrated by the (un)grammatical use with mass quantifiers and the indefinite determiner.

In order to evaluate the first hypothesis, according to which the aktionsart of the verb influences the countability of the derived nominal, Grimm conducts an empirical study using CELEX (Baayen et al., 1993)[11] to extract all deverbal nominals with their derivational source and the countability feature of the nominal, which he then compares to the aktionsart of the base verbs taken from the LCS database (Dorr, 2001)[12]. In order to avoid any discrepancies Grimm leaves out ambiguous cases, in particular ambiguity in count/mass, or multiple assignments of aspectual categories.

He first extracted derived nominalizations, their countability feature and the base verb from CELEX, which he then hand-corrected. He extracted aspectual information for each verb from the LCS database and evaluated the final outcome. The result shows (i) that countable interpretations dominate regardless of the aspectual category of the verb; (ii)

[11] CELEX is a lexical database which provides derivational and compositional structures of words in English, German and Dutch. It also provides a classification of nouns into countable, uncountable, pluralia and singularia tantum, collectives etc.

[12] This database contains Lexical-Conceptual Structures which are grouped into semantic classes. It also provides a classification of verbs in terms of aspectual categories.

nominals derived from all four verb types reached a very similar distribution of countable and uncountable nominals; (iii) all categories were clearly dominated by countable nominals and the tendency of states and activities to derive uncountable nominals was disproved, and (iv) Grimm's findings do not show any connection between the aktionsart of the verb and the the countability of the deverbal nominal.

The second hypothesis assumes that some suffixes (*-age*, *-ment*, *-ion*) preserve the aktionsart of the verbal source. As in the above mentioned constraints, states and activities are supposed to be mass, while accomplishments and achievement can be counted. Furthermore, zero-derived nominals are presumed to convert the situation into an event (accomplishment or achievement) by adding the feature of telicity, which is supposed to result in a shift from mass to count.

Grimm could not find any proof of this hypothesis either. He uses *resent* and *require* as counter examples, both of which are states, with an important distinction of *resentment* being a mass and *requirement* being a count noun. In addition to that, Grimm presents a classification of nominalizing suffixes and the countability of the derived nominals indicating only that the suffixes *-ant*, *-er* and *-or* tend to derive countable nominalizations while other suffixes fail to show any significant pattern. Grimm's findings also do not support an association of zero-derived nominals and counthood since such nominals appear to be equally distributed in countable and uncountable nouns. Furthermore, he argues that many zero-derived nouns - unlike the prediction of the second hypothesis - do not exhibit telicity at all and are uncountable nouns, e.g. *blame, chatter, dissent* or *swagger*.

Finally, Grimm tests the theory of Grimshaw's complex event nominals that do not permit pluralization contrasted with result nominals which can pluralize. He refers to a corpus study of Grimm and McNally (2013) where they collected samples of 1000 instances of 150 different CENs from COCA (Davies, 2010). Their results show that 20% of CENs occur at least once in plural form, and concluded from this that the correspondence of argument taking nominals and the ability to pluralize is not empirically accurate.

Grimm uses this survey of nominalizations to determine the countability preference of abstract nouns. In contrast to the previous proposals, he claims that different *semantic* domains have the most influence on the countability of abstract nouns. Therefore he examines countability distinctions in four semantic domains: (i) bodily states and mental states, (ii) mental properties, (ii) behavioural properties and (iv) psych-nouns. For bodily and mental states he argues that the ontological distinction between states and events determine the (un-)countable use. As for mental and behavioural properties he says that they have a non-countable use designating the property in question. However, both of these properties, mental and behavioural alike, allow anchoring in either participants (mental properties) or events (behavioural properties) and therefore provide a countable use. Psych-nouns can be either countable or non-countable depending on the reference of the underlying noun. Stimuli-denoting nouns tend to be countable thus contrasting with nouns that designate

experiencer-state which are uncountable.

In summary, various circumstances influence the ability of nominals to pluralize. The factors mentioned here are (i) aspectual properties of the base verb, including aktionsart, telicity and boundedness, (ii) nominalizing suffixes, (iii) argument structure, (iv) ontological distinction, (v) properties of the reference and (vi) nominal properties, including genus, nominalizer, occurrence with adjectives and certain quantifiers.

In the mentioned theories we can identify two different approaches to this topic: one of which is occurrence based, assuming that different interpretations (also called uses or senses) lead to different characteristics regarding the count/mass distinction and here it seems that countability is assigned for each token. A different approach is identifying distinctive properties on the lemma level - often combined with the ontological characteristics of these nouns - which are responsible for their possibility to pluralize.

I shall note at this point that all the above mentioned theories reduce countability to the possibility of nominals to pluralize. Other distinctive features, as for instance the indefinite determiner, combination with numerals and bare occurrences are left aside and have not been considered. What is also missing in all the approaches is more corpus evidence. Grimshaw provides only self constructed examples to prove her hypothesis. To establish such an analysis, constructed examples are unsatisfactory; instead we are in need of empirically valid data. For example, large corpus studies out of which we will be able to gain facts about the usage of nominals in written or spoken language should be conducted. Grimm's approach, actually, uses the COCA corpus and benefits from lexical resources such as CELEX and the LCS database, but it faces other shortcomings. Regarding COCA, it is important to gain more examples of the plural forms of CEN, because the fact that only 20% of CENs appear at least once in plural can naturally mean that CENs do not tend to pluralize and the few plural occurrences could be exceptions due to some other syntactic circumstances. But the lack of some data does not prove the absence of the feature under consideration. That the remaining 80% CENs do not occur once in COCA might also be due to the fact that CENs are not frequent in general. At this point it seems that we need a more detailed observation of the plural occurrences of such nominals on a larger scale. When it comes to the classification of nouns into countable and uncountable made by CELEX and the verbal aspect categories provided by LSC, it has to be emphasized that these are indeed human-made classifications. Naturally, we do not assume technical errors to occur here, but the complexity and the vague specification of the categories involved, i.e. countability and aspectual classes, implicate that the entries in these resources may not be stable. By this I mean that countability obviously does not have clear differentiating features and CELEX does not distinguish different senses of nouns. Also, the verbal aspect has vague boundaries between the classes[13] which is why

[13]Here, I mean examples like *(to) eat* which is an activity verb but in combination with a direct object like *(to) eat an apple* it appears as an accomplishment which nevertheless has to be distinguished from verbs which

we cannot rely on these classifications without investigating them in-depth and explicitly describing how the particular classes are defined, i.e. how CELEX defines counthood vs. masshood and similarly the aspectual classes of LCS.

3.3.2 Counting of abstract nouns

This section deals with another issue of abstract nouns discussed in linguistics. Grimm (2012a) studies abstract nouns from different lexical domains and examines plural occurrences of such nouns. He finds the need to investigate abstract nouns in the fact that theories dealing with the count/mass distinction only analyse a small subset of - usually concrete - nouns which he calls *celebrity nouns*. Abstract nouns - on the opposite hand - are neglected in the literature.

Grimm studies deverbal nouns that are frequently abstract and aims to identify what is being counted when an abstract noun is countable. In order to find abstract nouns he conducts a search in WordNet and chooses 50 nouns that fall in the WordNet categories of *cognition*, *attribute*, *event*, *feeling* and *state* for his survey.[14] He targets plural occurrences of these nouns in corpora and investigates the resulting readings of that plural formation. His investigation reveals that countable nouns permit interpretations as anchoring in participants or events, where the type of anchoring provided by the abstract noun depends on the lexical meaning of the noun and the given context. Grimm argues that nouns describing qualities of social acts, as e.g. *kindness*, permit only anchoring in events; nouns referring to mental properties such as *intelligence* allow only participant anchoring, as illustrated below with examples taken from Grimm (2012a).

(29) Anchoring in events

a. Around **the sleeps of a five week old baby**, the delicate and dusty songs were recorded anywhere that was far away enough as not to wake her. (many sleeping events)

b. And this in turn permitted **some alarming honesties** to be committed in public.

(30) Anchoring in participants

a. This disease has ruined **the sleeps of many people**. (many individuals)

b. Please, let's not insult **both our intelligences** by pretending this is open to question.

The interpretation of plural occurrences as anchoring presents progress in this field since it offers the minimal elements needed for the sum operation of plural. The minimal element

are accomplishments based on its core lemma.

[14] As we will see in chapter 5, WordNet categories are not sufficient to differentiate between count and mass senses of one noun, and hence are not conclusive for an analysis of the count/mass distinction.

would be defined as the anchors located in events or participants. However, it is yet unspecified when either kind of anchoring happens since many nouns provide both types.

In a more recent investigation, Grimm (2016) conducts a survey which could at best be described as profiling. He chooses the noun *crime* and studies its countable and uncountable uses by means of a corpus investigation. Surveying the meaning in count and mass uses of *crime*, Grimm observes that in contrast to the expectations gained from the literature on countability, the countable *crime* turns out not being grounded in atomic acts (15a), since a single crime can consist of many small crimes, as e.g. the crime of a robbery (possibly) includes a crime of breaking the door and a crime of hurting people. Similarly, the uncountable *crime* is also not equivalent to mass nouns, in that it is composed of "vague" individual crime events, because (31-b) would also be true if only one crime happened.

(31) a. There was a crime in the parking lot.
b. There has been crime on this street. (Grimm, 2016: 7-8)

Grimm concludes that his profiling of *crime* is only a small case study and argues that a wide range of lexical semantic work is needed to learn more about how countability may be established across different semantic domains. This specific case of *crime* is to be compared to other abstract nouns in order to observe whether such implications hold for other abstract nouns. But it also suggests - at least for *crime* - that the interpretation is context dependent and the context is the factor that permits implications for the countability preference of these nouns.

3.3.3 Determiner selection

Another piece of research that questions the countability of a subset of abstract nouns is Tovena (2001). She studies the combination of count determiners with uncountable nouns. Before we turn to Tovena's research, I will briefly summarize general assumptions regarding the combination of determines and count and mass nouns.

Among the morpho-syntactic characteristics of English count and mass nouns is their ability to occur with certain determiners which can also be used to distinguish count nouns from mass nouns. A list of such determiners as presented in grammar books and the literature on the count/mass distinction - as e.g. in Rothstein (2010) - is given in the Table 3.3.

	count nouns	**mass nouns**
each/ every/ a few/ several/ many	each/ every/ a book, several/ a few books	*each/ *few water
a little/ much	*little/ *much car(s), pencil(s), book(s)	little/ much water, sand, blood
a lot/ plenty of	a lot/ plenty of cars, books, *a plenty of car, book	a lot/ plenty of water, blood
some/ the	the/ some car(s), book(s)	the/ some water, blood
a/ an	a car, a book, *a cars, *a books	*a water, *a blood

Table 3.3: Count and mass determiners

The indefinite article, for example, can only occur with singular count nouns, but not with plural count nouns or mass nouns. *A little* or *much* are felicitous with mass nouns only, while *a lot of* or *plenty of* occur with mass nouns and plural count nouns; singular count nouns are not felicitous in such constructions. The definite article *the* can be combined with all nouns, and the same holds for *some*. Similar observations are made in other languages whereby several determiners choose only count or mass nouns and other determiners can occur with both count and mass nouns, as e.g. the definite article in English. In Chierchia (1998) we find several diagnostics regarding Italian count and mass nouns. According to him the negative determiner *nessuno* occurs only with count nouns and hence requires an atomic domain. However, Tovena (2001) observes that a set of mass nouns is actually felicitous in combination with *nessuno*.

(32) a. #nessun vino
"no wine"
b. Non ha mostrato nessun couragio.
"She didn't show any courage." (Tovena, 2001:567)

Tovena finds many other examples that contradict Chierchia's claim and concludes that the set of mass nouns enabling a combination with *nessuno* consists of abstract nouns, such as *courage* or *talent*.

While surveying this particular class of nouns she realizes that these nouns show a common property, namely their allowing continuous increase or contraction. She suggests that the relevant subclass can be characterized via the notion of Intensive Quantity taken from Van de Velde (1996). "The main characteristic of these entities is their possibility of undergoing continuous increase or contraction without a corresponding extension in space or time" (Tovena, 2001:570). Therefore, *a lot of courage* would be a bigger intensive quantity or a higher degree of intensity of courage and not simply a bigger quantity of courage.

Tovena continues with a proposal which presumes a third type of domain (other than atomic and non-atomic) made of weakly discrete units. The so-called Intensive Quantities would accordingly have such a domain that consists of weakly discrete units allowing quantification in particular contexts, as for instance with *nessuno*.

3.3.4 Elastic nouns

In a recent paper by Zamparelli (to appear) abstract nouns are surveyed with regard to their different countability assignments. Zamparelli presents a survey of polysemous nouns for which at least one sense is abstract. He determines the relation between the senses and concludes that in many cases the shifted meanings cannot be derived through the common meaning shifts that are well-known in literature on the count/mass distinction:

(33) **Mass to Count**

a. Kind-formation (*three wines* ⇒ three types of wines)
b. Container-reading(*three beers* ⇒ three standard doses of beer)

(34) **Count to Mass**

a. Food-stuff reading (*We ate lamb for supper.* ⇒ kangaroo meat)
b. Pelletier/Lewis Grinding (*There was carrot all over the floor.* ⇒ carrot-grinded stuff)

Starting with the fact that abstract nouns are very frequent and that a great amount of dual-life nouns (*elastic nouns* in Zamaprelli's terminology) are abstract as well, Zamparelli investigates the senses of nouns whereby he consults BECL (Kiss et al, 2014, 2016). Besides the above-mentioned types, he establishes four additional meaning shifts. These shifts do not have to be directional shifts necessarily, i.e. deriving a count sense from a mass sense or vice versa. Lexical polysemy would be an alternate analysis.

Zamparelli (to appear) introduces the following shifts:

(35) **Shifts in Sequence**
animal ⇒ food ⇒ type of food

a. Cook apprentices at this school must be able to prepare at least two lambs, e.g. kofta and biryani, without looking at the recipes.
bird ⇒ type of bird ⇒ type of food
b. In the hunting Season Celebration Party two distinct birds, often a grouse and a pheasant, are served as second course.

(36) **Similarity-to-N**
degree to which an individual has properties characteristic of N

a. Surface RT is more tablet than PC.
b. That apple tree is more apple than tree

(37) **Metalinguistic shift**
degree to which something can appropriately be called "N"
a. Bill is more "songwriter" than Marc.
b. This piece of furniture is more "chair" than that one. [15]

It is important here to note that Zamparelli leaves it open as to whether these meaning shifts are derivational or a matter of lexical overspecification. It is also not indicated how productive these shifts are and whether speakers of English can attest the different interpretations proposed by Zamparelli.

Despite the range of meaning shifts he established, Zamparelli faces another issue which cannot be solved by these shifts, i.e. bare singular and plural noun phrases with abstract heads as in (38).

(38) a. I love [action/actions] in movies.
b. [Change/Changes] is/are a part of life's essence.
c. [Activity/Activities] keep(s) sleep at bay. (Zamparelli, to appear)

Zamparelli studies the meaning of abstract nouns in bare singular and bare plural occurrences and tackles the question of how these occurrences have to be distinguished and what exactly the inferences of bare plural versus bare singular are. He assumes that the difference between the two must be located solely in the meaning shift between the count and mass version of these abstract nouns.

Zamparelli's investigation presents interesting observations regarding abstract nouns which have not been discussed before. He points the reader directly to specific occurrences of abstract nouns, with bare singular and bare plural (38) that show similarities not common with concrete nouns as e.g. *I read books.* vs. **I read book*. However, a deeper investigation of such occurrences of abstract nouns is required in order to differentiate the meanings between plural and singular uses of abstract nouns.

3.4 Concluding remarks

Having in mind the different theoretical issues that have been discussed in relation to abstract nouns, I arrived to following conclusions:

1. There is no clear and accurate definition of abstract nouns available. The criteria often used for distinguishing abstract nouns from concrete nouns are (i) ability to

[15] The similarity-to-N and the metalinguistic shift are very similar, yet Zamparelli distinguishes them. For a detailed description see Zamparelli (to appear).

impinge on senses, (ii) imageability, (iii) morphological derivation and (iv) spatio-temporal collocation. Besides attempts to name relevant criteria for the definition of abstract nouns, grammar books - as e.g. Duden - have succeeded in listing specific categories of nouns that are (often) described by abstract nouns: derived nominals (from adjectives and verbs), psych nouns, property- or quality denoting nouns, nouns that denote relations, measure and time terms, sciences and arts. Khokhlova (2014) points out that lexicographic practice plays a role in determining abstract nouns in a way that abstract nouns show some commonalities in their meaning descriptions. They are often described as states, qualities, actions or *shell nouns*[16]. Similarly, Grimm (2012) used a set of WordNet categories, namely *cognition*, *attribute*, *event*, *feeling* and *state* in order to detect abstract nouns. Given all these fact, I conclude that the class of abstract nouns is extremely heterogeneous, as it comprises nouns from different types, including morphologically primary and complex nouns as well as nouns denoting events, qualities or relations. It seems that the difficulty regarding the definition of abstract nouns arises in the heterogeneous character of abstract nouns. They comprise a set of nouns that belong to different semantic classes and have different kinds of denotation. Also taking morphology into account does not provide any informative insight. Indeed, many derived nouns are abstract, but abstract nouns can also be primary nouns or nouns with an unclear etymology such as *joy*.

2. Grimm (2012) argues that countable abstract nouns provide anchoring in either events or participants, and by way of an example with the abstract noun *crime* he concludes that it does not resemble classical count nouns in its countable use, nor does it resemble mass nouns when used as a mass noun. The comparison he draws is based on cumulativity and distributivity. Hence, the homogeneous in reference condition that is claimed to be applicable to mass nouns does not seem to hold for abstract mass noun. However, the question of what is responsible for the distinction between abstract count and abstract mass nouns, remains unresolved.

3. Abstract nouns are often dual-life nouns (or elastic nouns in the terminology of Zamparelli), and it is difficult to grasp the difference between their count and mass uses. This observation implies that there might be no core difference in meaning between count and mass present in abstract nouns, and that the count-mass distinction is purely a syntactic one.

4. Regarding formal approaches to abstract nouns, it has been proposed by Tovena (2001) that a subset of mass nouns apparently has a different denotation, i.e. it consists of weakly discrete units and allows combination with a count determiner.

[16] *Shell nouns* is a term introduced by Schmid (2000) which refers to nouns that can potentially be used as conceptual shells for complex, proposition-like pieces of information as for instance *issue* or *fact*.

She describes this subset as abstract mass nouns. Since her research is a case study, it is disputable whether Tovena's observations can be applied to other abstract nouns or other languages. It is also unclear, whether the case with *nessuno* is an exception, or whether similar issues with abstract nouns can also be found in other languages.

5. It is in my belief that no linguistic phenomenon can depend on or be restricted to just *abstract nouns*. What seems to be established for abstract nouns in linguistics, is actually a matter of a different category as e.g. event nominalizations, or gradable adjectives, or the resolution of shell nouns which also happen to be nouns with abstract denotation, but their distinctive characteristic is not having an abstract denotation. The distinctive property of these sets of nouns is rather purpose driven and differs from topic to topic.

6. As far as the countability of abstract nouns is concerned, it is yet unresolved if and how standard semantic analyses of countability can be applied to abstract nouns. Some subsets of abstract nouns have been studied in relation to countability (e.g. event nominalizations), but these are neither sufficient nor extendable to non-eventive nouns. In order to broaden the understanding of the semantics of count and mass nouns, a thorough investigation into count and mass uses of abstract nouns is necessary.

In the following sections I will not deal with all the problems mentioned above because this is way beyond my scope here. Instead, I will focus on the fact that homogeneity in reference is not sufficient to explain the count/mass distinction in abstract nouns. Following that, I aim to investigate the count and mass uses of abstract nouns in order to grasp how abstract nouns are determined with respect to countability, and to identify the source of *countness* and *massness* in abstract nouns.

4 Investigating abstract nouns

In this chapter, I present a case study of a set of abstract nouns. Following the assumptions that abstract nouns are both highly polysemous and flexible with regard to countability, I aim to discover the main differences between a count and mass use/sense of abstract nouns. In order to pursue this idea, I extracted from BECL those nouns that are lexically ambiguous and abstract. Exploiting the sense description of each pair of count and mass senses that belong to one abstract noun, I analyse the difference in the senses to capture the main ingredient that makes a certain sense classified as count and another as mass. After identifying the distinctive properties of count and mass abstract senses, I will study the relation between count and mass senses in order to survey whether regular patterns exist and can be accounted for in terms of regular polysemy.

The chapter is structured as follows: the first section elaborates on BECL, the lexicon which is the main resource for the following study; the next section presents the data set chosen for the investigation; in the third section, I will describe the main research by means of a manual annotation process of lexical properties; this investigation will be followed by an elaboration of the relation intra senses in section 4; and - finally - the last section summarizes the outcomes of this research and concludes.

4.1 Bochum English Countability Lexicon

The **B**ochum **E**nglish **C**ountability **L**exicon - BECL (Kiss et al., 2014, 2016) is a lexical resource which provides countability classes for English noun-sense pairs. The classes were developed on basis of the results of a large annotation process conducted by four native speakers of Canadian English. Since the classification of noun-senses into count or mass in BECL were constructed on the basis of judgements by native speakers of English, I will accept this classification as a gold standard.

The current release, BECL 2.1[1], contains 11,869 noun-sense pairs (of 7,050 distinct lemmata). The whole lexicon is presented in a CSV file with a line for each noun sense. Besides the countability class, a number of other columns belonging to each noun-sense pair contain the following information:

- number of their singular and plural occurrences in the OANC

[1]BECL 2.1 can be downloaded from its website http://count-and-mass.org/resources.

- the description of the sense from WordNet (Miller, 1995)[2]
- total number of other senses of the same noun from WordNet
- the set of synsets of the respective sense
- six answers to syntactic and semantic tests by the annotators
- other annotations regarding the nature of the sense, e.g. result, state, nominalization or idiomatic expression
- meta information about the annotation process[3]

ID_and_sense	**lemma**	**WordNet sense index number**	**WordNet description**	**occurrences singular in_oanc**
35673,3	concurrence	3	a state of cooperation	7

occurrences plural in_oanc	**Test I.1**	**Test I.2**	**Test II.1**	**Test II.2**
3	yes	not number	not applicable	not applicable

Test III.1	**Test III.2**	**idiomatic**	**nominalization**	**result_state**
no	yes		yes	yes

Phase_No	**annotators**	**class**	**major_class**	**multiple**
11.0	LS+MJ	528	regular_mass	no

Table 4.1: A shortened and simplified entry in BECL

To clarify the description of BECL, a simplified entry of BECL is presented in Table 4.1. Table 4.1 shows *concurrence* with the third sense provided in WordNet, i.e. *a state of cooperation*. The noun appears seven times in singular form and three times in plural in the OANC. Importantly, one has to consider that although BECL provides information on noun-sense pairs, the number of occurrences in the OANC relates to the noun per se, not to specific senses of each noun. The columns "Test I.1" to "Test II.1" are the relevant annotations on basis of which the countability class and major class were developed. Concurrence#3 is assigned the countability class 528 which belongs to the major class "regular_mass". The development of countability classes will be explained in section

[2]For a study of regular cases of polysemy in WordNet see Barque and Chaumartin (2009)
[3]The whole range of columns with descriptions is shown in Appendix A.

4.1.2. *Concurrence* is not a "multiple", which means that other senses of that noun do not occur in countability classes other than 528 (more on this in section 4.1.3.1). Supplementing annotations include data about the type of the noun, e.g. whether the noun sense is an idiomatic expression or a nominalization and other. "Phase_No" and "annotators" include information about the annotation process.

4.1.1 Annotation process

Four native speakers of Canadian English were trained to annotate a set of approx. 14,000 English noun-sense pairs. The annotation task consists mainly of answering questions such as whether the annotators could produce sentences obeying the syntactic patterns specified in the test, while maintaining the noun's meaning as taken from WordNet. Those tests are represented in columns labelled as "Test I.1", "Test II.1", "Test III.1" and "Test III.2". They are also called syntactic tests and are labelled as Syn1 to Syn4 in Kiss et al. (2016). Two of these tests include a follow-up question regarding the semantics of the construction: Test I.2 and Test II. 2 or Sem1 and Sem2. They were designed to detect properties which are known to be distinctive for count and mass nouns in English.

Test	**Question**	**Possible answers**
Syn1 (TestI.1)	Can the noun-sense pair in its singular form appear with *more*?	yes, no, not applicable
Sem1 (TestI.2)	If Syn1 = yes, is the comparison made on number of entities, or a different mode of measurement?	number, not number, not applicable
Syn2 (TestII.1)	Can the noun-sense pair in its plural form appear with *more*?	yes, no, not applicable
Sem2 (TestII.2)	If Syn2 = yes, is the sentence equivalent to one with an explicit classifier?	equivalent, not equivalent, not applicable
Syn3 (TestIII.1)	Can the noun-sense pair in its singular form and combined with the indefinite determiner be the subject of a definition of characterization?	yes, no, not applicable
Syn4 (TestIII.2)	Can the noun-sense pair in its singular form but without the indefinite determiner be the subject of a definition of characterization?	yes, no, not applicable

Table 4.2: Six annotation questions accountable for the development of countability classes

4.1.1.1 Test I - Determining the mode of measurement

Test I consists of two parts: Syn1 and Sem1. The idea behind this test arises from the common property of count nouns to appear in plural from when accompanied by *more* as opposed to mass nouns which request the singular form. This implies that a construction with *more* would require the plural form for count nouns and a singular form for mass nouns. By asking for a singular form with *more*, we are able to detect count nouns that result in ungrammaticality.

(1) a. *John has more *car* than Bill.
b. John has more *sand* than Bill.

A count noun as in (1-a) is ungrammatical in such a construction and would get a "no" in Syn1, while (1-b) represents a prototype mass noun which would get a "yes" in this test[4]. The answer "Not applicable" is designed for cases where annotators are not able to apply this test due to the lack of a singular form, as with plural-only nouns, e.g. *pants, scissors, groceries*.

Since BECL insists on the distinction of senses, *alarm* offers a good example for a noun where one sense got a "yes" (2-a) and another a "no" (2-b) in Syn1.

(2) a. alarm #1 fear resulting from the awareness of danger
b. alarm #4 a clock that wakes a sleeper at some present time

The senses in (2) show the relevance of sense-based approaches to the count/mass distinction. With (2-a) in mind, the annotators had no problems to generate sentences with *more alarm*, but for (2-b) they answered with a "no".

Sem1 would only be considered in cases where Syn1 got answered as "yes". In the other cases Sem1 would get a "not applicable". So, for when Syn1 is "yes" the question follows whether the comparison in Syn1 is made on the number of entities or on a different unit as for example volume. This test employs the experimental results provided in (Barner and Snedeker, 2005; Bale and Barner, 2009) on modes of measurement, which brought to attention the fact that object mass nouns are measured on the number of entities, while substance mass nouns are measured on volume, quantity or intensity.

(3) Sem1 = number
apheresis, art, artwork, blood, china, chlamydia, clergy, clothing, coffee, crossing, dead, extradition, furniture, hyacinth, jewelry, kidnapping, labor, lingerie, mail, merchandise, prey, prey, silver, silverware, slaying, sportswear, theft, typhoid, underwear

[4]Naturally, if one were to think of possible solutions where the use of a count noun such as *car* is acceptable in singular form when accompanied by *more*, the context of advertisements might give a working platform (cf. Krifka, 1991). Under such a condition, a slogan of the form *More car for less many* and alike would be meaningful.

(4) a. mail#1 the bags of letters and packages that are transported by the postal service
b. mail#4 any particular collection of letters or packages that is delivered;
c. coffee#2 any of several small trees and shrubs native to the tropical Old World yielding coffee beans
d. coffee#4 a medium brown to dark-brown color
e. coffee#1 a beverage consisting of an infusion of ground coffee beans

(3) is a list of all nouns for which the annotators answered "number" in Sem1, some of which are repeated in (4) with their sense descriptions from WordNet. We observe here that different senses of a noun lead to fine-grained differences with regard to countability. The first sense of *mail* would be an object mass noun according to the aforementioned two tests, but sense #4 got a "not number" in Sem1 and would, therefore, be interpreted as a substance mass noun since the measurement is not made on number but instead on quantity. The same holds for coffee#2 which is an object mass noun, while coffee#4 and coffee#1 are not.

4.1.1.2 Test II - Type or container-reading equivalence

Test II is constructed analogously to Test I in that it has a syntactic test followed by a semantic question, Syn2 and Sem2 respectively. In Syn2 the annotators were asked for the same construction as in Syn1, the only difference being that this time the noun should be in the plural form. Only count nouns are supposed to pass this test.[5]

For those cases that do not result in a grammatical sentence, the annotators were asked to distinguish between those nouns which do not have a plural form at all ("not applicable") and those which do have a plural form that is ungrammatical in such a construction ("no").

(5) Syn2 = no
background, creation, economy, jogging, polarity, proof, overlap, walnut, travel
a. economy#3 frugality in the expenditure of money or resources
b. proof#3 a measure of alcoholic strength expressed as an integer twice the percentage of alcohol present (by volume)
c. travel#1 the act of going from one place to another

(6) Syn2 = NA
asphalt, awareness, bravery, cohesion, help, input, logic, money, publishing, scholarship, smoke, vulgarity

[5] A naive, but reasonable, expectation would be to assume that all nouns in BECL were divided in two groups following a binary division of nouns into count and mass: one with a "yes" in Syn1 and a "no" in Syn2 and the other with a "no" in Syn1 and a "yes" in Syn2. However, the data in BECL does not support such a classification of nouns. As will be explained in section 4.1.2, English nouns are much more diverse with regard to countability.

a. bravery#2 feeling no fear
b. help#3 a resource
c. smoke#4 something with no concrete substance

(5) shows some examples of noun-senses that were judged to have a plural form which is ungrammatical in Syn2. In (6) are the noun-senses which got a "not applicable" because they were judged as not having a plural form at all. This particular instance of the annotation task in BECL is not straightforward since the line between what counts as having a plural form or not is not precisely determined.

The annotation outcome reveals that Syn2 is also sensitive to senses. Half of the noun-senses with a "no" in Syn2 are so-called *multiples*, meaning that another sense of the same noun belongs to a different countability class. *Proof*, for example, is in the sense *a measure of alcoholic strength expressed as an integer twice the percentage of alcohol present (by volume)* annotated as a mass noun, but sense #2 *a formal series of statements showing that if one thing is true something else necessarily follows from it* got classified as a count noun.

The next step in the annotation process is Sem2. Those noun-senses which got a "yes" in Syn2 are passed to Sem2 which checks whether the construction in Syn2 and a parallel construction with a classifier phrase and the singular form of the noun are equivalent, as illustrated in the self-constructed examples (7-b) and (8-b) below.

(7) a. A drank more whiskeys than B.
b. A drank more kinds/ glasses of whiskey than B.

(8) a. A owns more cars than B.
b. A owns more sorts/brands of car than B.

In this case it is no longer the question of grammaticality since both a and b sentences in (7) and (8) are grammatical. The focus moves now to the meaning of the sentences compared to the ones produced in Syn2. While for *whiskey* it is argued to be true that both a and b sentences are equivalent, the examples with *car* do not provide the same meaning in Syn2 as well as in a classifier construction, as presented in (8b). Thus, *whiskey* would be annotated as "equivalent" and *car* as "not equivalent" in Sem2.

4.1.1.3 Test 3 - Compatibility with and without indefinite article

The third set of annotation questions consists of two syntactic tests: Syn3 and Syn4. Both ask for the same construction in which the tested pattern is constructed as a definition of characterization, such as in (9). Here, the annotators are requested to think of a possible way to define the noun sense under consideration. The difference between Syn3 and Syn4 is that in the former test the noun should occur with the indefinite article, while it has to be omitted in Syn4, as can be exemplified by the following expressions.

(9) [noun]sg is + a valid property of the noun

(10) Syn3

a. A car is a vehicle.
b. *A steel is an alloy.
c. A fish is an animal.
d. *A purgatory is...

(11) Syn4

a. *Car is a vehicle.
b. Steel is an alloy.
c. Fish is eatable and delicious.
d. *Purgatory is....

These examples represent a wide range of combinations for these tests: *car* is grammatical in Syn3 but ungrammatical in Syn4. *Steel* behaves the other way round. *Fish* is a noun which provides a sense that is grammatical in Syn3 and another which is grammatical in Syn4. *Purgatory*, on the other hand, is not grammatical in any of these constructions.

"Not applicable" is also a possibility but only for nouns that do not possess a singular form and thus cannot produce such a construction since the noun is required to be in singular, e.g. plural-only nouns such as *leftovers, outskirts, whereabouts*.

4.1.2 Countability classes

A first significant observation of the annotated noun-senses in BECL is that all of them do not fall in just two (count and mass) or three (count, mass and dual-life) classes, rather the nouns are classified in 18 fine-grained countability classes showing the range of variety present in English nouns.

In order to use the annotations to gain a classification of noun-senses, the annotated data was first filtered in a way that only those noun-senses which got the same annotations for all six tests from two annotators were taken into further consideration. By this way, difficult cases on which the annotators did not agree were excluded. From the approx. 14,000 noun-senses that were annotated, 10,667 noun-senses pairs were annotated unanimously. In a second annotation step, some annotators were chosen to adjudicate upon a correct assignment of annotations, and the results of the adjudication process were added to BECL which makes a total of 11,869 noun-senses included in the current release of BECL 2.1.

In BECL, a countability class is a set of noun-senses that got the same answers in the six relevant annotation tests. This means that all noun-senses in BECL are classified by the values they got in TestI - TestIII. If the answers are taken as features (affirmative, negative, not applicable), a feature space of $3^6 = 729$ possible classes is allowed, but since certain answers are interdependent (as e.g. answering "not applicable" to Syn1 will only allow

answering "not applicable" to Sem1 as well), the space is actually reduced. Out of these 729 possibilities, 18 different combinations of values in tests I - III occur in BECL. These combinations make up the countability classes in BECL.

Class	Syn1	Sem1	Syn2	Sem2	Syn3	Syn4	Major Class	SUM
235	N	NA	Y	¬EQ	Y	N	regular count	8371
721	N	NA	Y	¬EQ	Y	Y	regular count	16
73	N	NA	Y	¬EQ	N	N	regular count	3
528	Y	¬NUM	NA	NA	N	Y	regular mass	2405
519	Y	¬NUM	N	NA	N	Y	regular mass	62
531	Y	NUM	NA	NA	N	Y	regular mass	21
510	Y	¬NUM	Y	EQ	N	Y	both mass and count	412
726	Y	¬NUM	Y	¬EQ	Y	Y	both mass and count	278
729	Y	NUM	Y	¬EQ	Y	Y	both mass and count	6
513	Y	NUM	Y	EQ	N	Y	both mass and count	2
523	N	NA	NA	NA	N	Y	neither mass nor count	50
37	N	NA	NA	NA	N	N	neither mass nor count	37
190	N	NA	N	NA	Y	N	neither mass nor count	21
514	N	NA	N	NA	N	Y	neither mass nor count	9
199	N	NA	NA	NA	Y	N	neither mass nor count	18
28	N	NA	N	NA	N	N	neither mass nor count	6
371	NA	NA	Y	NA	NA	NA	pluralia tantum	37
353	NA	NA	N	NA	NA	NA	pluralia tantum	8

Table 4.3: Countability classes in BECL

The classification of noun-senses into classes was made with *R* and the names in Table 4.3[6] were assigned randomly by R. The numbers might be cryptic at first, but they serve a good purpose in that they allow to define classes without being forced to provide "sensible" names for them. In fact, class 235 could be called "fully countable", but such a simple explanation cannot be provided for each class.

The major classes were defined on basis of the answers regarding the plural inflection, i.e. Syn1 and Syn2. Countability classes with "no" in Syn1 and "yes'" in Syn2 are *regular count*; classes answered with "yes" in Syn1 and "no" in Syn2 represent *regular mass*; classes annotated with "yes" in Syn1 and in Syn2 belong to *both mass and count* and, finally, classes with the annotation "no" in both tests are called *neither mass nor count*. One thing worth mentioning regarding the major class labelled as *neither mass nor count* is that it does not imply that such noun-senses are underspecified with regard to countability. Instead, the respective annotation tests do not show a significant tendency towards the classification as count, nor do they show a tendency towards a classification as mass. Since class 371 and

[6]The answers are abbreviated as follows: Y for "yes", N for "no", NA for "not applicable", NUM for "number", ¬NUM for "not number", EQ for "equivalent" and ¬EQ for "not equivalent".

353 consist of plural-only nouns exclusively, they were not grouped in one of the major classes.

Table 4.3 gives an overview of all countabillity classes in BECL. The majority of noun senses are members of class 235, a *regular count* class. This includes nouns such as *cell, number, sequence, patient, figure, program, child, woman, country*. The second most frequent class is 528, a *regular mass* class. Members of this class are nouns like *study, work, information, life, change, money, value, interest, evidence* etc. In *both mass and count* classes one can find nouns such as *protein, control, tissue, cancer, economy, love, therapy, oil, influence* and in the *neither mass nor count* classes are e.g. *right, sequence, country, world, kid, town, action, nation, stage*. Importantly, the focus is always on senses, thus, certain noun-senses of these nouns fall into the above mentioned classes. The above lists of members of each class serve only as illustrations; a complete description of these members should include also the specification of the senses. In the examples provided in (12) with the noun *country* and (13) with *sequence*, we can once again observe that nouns show different countability classes for their senses.

(12) a. country#1 a politically organized body of people under a single government 235
b. country#2 the territory occupied by a nation 235
c. country#3 the people who live in a nation or country 235
d. country#4 an area outside of cities and towns 523

(13) a. sequence#1 serial arrangement in which things follow in logical order or a recurrent pattern 235
b. sequence#2 a following of one thing after another in time 235
c. sequence#3 film consisting of a succession of related shots that develop a given subject in a movie 235
d. sequence#4 the action of following in order 523

The different senses of *country* and *sequence* are distributed in two different classes. Three of four senses of both nouns belong to class 235 - *regular count*. One individual sense of each of the nouns, however, differs with regard to the tests in Syn2, Syn3 and Syn4 and is thus classified as 523, a class belonging to *neither mass nor count*. From the data in (12) and (13) we conclude the existence of unusual nouns or noun-senses which, due to their specific meaning, are assigned a *neither mass nor count* class.

4.1.3 Unexpected results

In section 2.1 I presented common grammatical properties of count and mass nouns. Some of these properties can be attested through the annotation in BECL, in particular plural morphology in Syn1/Syn2 and the combination with the indefinite article in Syn3/Syn4.

Following grammatical constraints, English count nouns are expected to be answered with a "no" in Syn1, a "yes" in Syn2 and a "yes" in Syn3. Mass nouns are supposed to have "yes" in Syn1, a "no" in Syn2 and a "no" in Syn3.

Table 4.3 is repeated in Table 4.4, and certain countability classes are now highlighted by colour.

Class	Syn1	Sem1	Syn2	Sem2	Syn3	Syn4	SUM
235	N	NA	Y	¬EQ	Y	N	8371
721	N	NA	Y	¬EQ	Y	Y	16
73	N	NA	Y	¬EQ	N	N	3
528	Y	¬NUM	NA	NA	N	Y	2405
519	Y	¬NUM	N	NA	N	Y	62
531	Y	NUM	NA	NA	N	Y	21
510	Y	¬NUM	Y	EQ	N	Y	412
726	Y	¬NUM	Y	¬EQ	Y	Y	278
729	Y	NUM	Y	¬EQ	Y	Y	6
513	Y	NUM	Y	EQ	N	Y	2
523	N	NA	NA	NA	N	Y	50
37	N	NA	NA	NA	N	N	37
190	N	NA	N	NA	Y	N	21
514	N	NA	N	NA	N	Y	9
199	N	NA	NA	NA	Y	N	18
28	N	NA	N	NA	N	N	6
371	NA	NA	Y	NA	NA	NA	37
353	NA	NA	N	NA	NA	NA	8

Table 4.4: Countability classes in BECL

By means of the syntactic test of Syn1, Syn2 and Syn3, I will determine how prototypical English nouns are expected to be annotated, according to grammatical constraints as summarized in Table 2.1. The yellow marked rows in Table 4.4 represent countability classes that have values in Syn1, Syn2 and Syn3 as expected for count nouns. The green countability classes have annotations as would have been predicted for mass nouns. As the numbers in the last column suggest, the yellow classes contain 8,387 and the green classes 2,488 noun-senses. This makes a total of 10,875 noun-senses out of 11,762. This result indicates that 92% of all BECL noun-senses, indeed, is classified in accordance with grammatical constraints regarding the count/mass distinction. Nonetheless, the remaining noun-senses cannot be classified as ordinary or regular count or mass since their annotations do not fit the common properties of count and mass nouns.

4.1.3.1 Multiples

We coined the expression *multiples* for those nouns in BECL that have their senses distributed in different, i.e. multiple, countability classes. Our expectation with regards to this class of nouns was to find (within it) dual-life nouns or nouns which shift their countability regularly. BECL contains 732 multiples, which make up 10,3% out of the total of 7,050 noun lemmata in BECL. As an illustration for this type of nouns, I provide the following examples from BECL:

(14) a. vocabulary#1 a listing of the words used in some enterprise 235
b. vocabulary#2 a language user's knowledge of words 528

(15) a. intelligence#1 the ability to comprehend; to understand and profit from experience 528
b. intelligence#2 a unit responsible for gathering and interpreting information about an enemy 523
c. intelligence#3 secret information about an enemy (or potential enemy) 528
d. intelligence#4 information about recent and important events 528

(16) a. dialog#1 a conversation between two persons 235
b. dialog#2 the lines spoken by characters in drama or fiction 528
c. dialog#3 a literary composition in the form of a conversation between two people 235

The examples in (14)-(16) have either a count and mass sense, like *vocabulary* and *dialog*, or a mass sense and a *both mass and count* sense such as the noun *intelligence*. *Vocabulary, dialog* and *intelligence* are not nouns which are likely to appear in a discussion related to variation. Much more prominent and widely accepted cases of dual-life nouns are e.g. *cake, rock, stone, apple* or *fish, lamb, beer, chicken* and *rabbit* which represent cases of regular polysemy with a change in countability (cf. section 2.3). Multiples, precisely, point to the wide coverage of application of BECL and the width of variation in the English language

Be that as it may, it is interesting to look for those nouns which were expected to have multiple countability classes. Unfortunately, some of the nouns mentioned above are not listed in BECL. Below are the entries in BECL for *cake*, *chicken*, *stone* and *lamb* which, indeed, are multiples as expected.

(17) a. chicken#1 the flesh of a chicken used for food 528
b. chicken#2 a domestic fowl bred for flesh or eggs; believed to have been developed from the red jungle fowl 235
c. chicken#3 a person who lacks confidence, is irresolute and wishy-washy 235

(18) a. stone#4 a crystalline rock that can be cut and polished for jewelry 235
b. stone#1 a lump or mass of hard consolidated mineral matter 235

c. stone#3 material consisting of the aggregate of minerals like those making up the Earth's crust 528
d. stone#2 building material consisting of a piece of rock hewn in a definite shape for a special purpose 235

(19) a. lamb#1 young sheep 235
b. lamb#2 English essayist (1775-1834) 523
c. lamb#3 a person easily deceived or cheated (especially in financial matters) 235
d. lamb#4 a sweet innocent mild-mannered person (especially a child) 235

(20) a. cake#3 baked goods made from or based on a mixture of flour, sugar, eggs, and fat 726

A closer look into the specific senses presented above shows that homonymy is not marked in BECL which is why lamb#2 is not excluded. The entry of lamb#2 is the reason why *lamb* got classified as a multiple in the first place, because the countability class of lamb#2 differs from the other lamb senses. However, this noun sense is not the expected mass sense referring to lamb meat but a person, i.e. Charles Lamb. The sense describing lamb meat is, however, not included in BECL due to the limitation of BECL to take only the first four senses from WordNet, and lamb meat is the fifth sense in WordNet.

Unlike *lamb*, *stone* and *chicken* have exactly the relevant senses classified in BECL, as is expected. *Cake*, however, is of particular interest since the countability class is 726 (*both mass and count*). The difference in the count and mass uses of *cake* is not reflected in different senses. Noun senses like *cake* are true cases of dual-life nouns where no additional semantic difference in interpretation is included, only the countability variation[7].

4.1.4 Remarks on senses

BECL confirms the relevance of a sense-based approach to the count/mass distinction by means of accounting for a great amount of nouns whose senses do not fall into the same countability class or even major class. However, sense discrimination in general - or rather polysemy as the superordinate concept - are linguistic areas which deserve special examination. The definition of particular senses, the distinction between homonymy and polysemy, the borders between senses and sense extensions, coercion or meaning shifts are vague issues that form several discrepancies and should be studied on a large scale in relation to this topic.

In BECL, a sense has been equated to an entry in WordNet. This is why some additional remarks regarding certain lexicographic issues that arise while dealing with senses of

[7]Kiss et al. (to appear) elaborate on the issue of those noun-senses which present true cases of dual-life nouns and separate them from other types of variation.

nouns are needed:

1. the number of senses listed in the entry of a noun might not be complete
2. some sense descriptions include other senses / sense discrimination is arbitrary
3. systematic polysemy is not consistently stated for every noun that it concerns

The comparison of other dictionaries to WordNet shows that in many cases they exhibit a distinct number of senses. Searching for the meaning of the noun *head*, we find 15 distinct senses out of 7 categories (i.e. homonyms) in the Cambridge Dictionary [8], 41 senses out of 11 homonyms in the English Oxford Living Dictionary[9], 45 senses out of 21 homonyms in Merriam-Webster[10] and a total of 33 senses in WordNet (which does not draw the distinction between homonyms and polysems). Without going into detail about the sense definitions and reasons why such different results can be gained from dictionaries of one and the same language, it is clear that there is no precise definition of what counts as a sense and it might be possible that other senses of *head* which are not listed in any of these dictionaries exist. This indicates that the listing of senses, indeed, might be purpose-driven, as suggested by Kilgariff (1997).

If we consider the polysemy of event nominalizations which produces (at least) two senses, an event and a non-event (or result) - as reported for instance by Grimshaw (1990); Borer (2005); Alexiadou et al. (2010) - we find evidence for that distinction of senses in WordNet. For many deverbal nominalizations such a sense distinction is provided, but in some cases WordNet does not discriminate senses consistently, as illustrated in the following examples.

(21) a. collection#4 the act of gathering something together EVENT
b. collection#1 several things grouped together or considered as a whole RESULT

(22) destruction#2 an event (or the result of an event) that completely destroys something EVENT + RESULT

While collection#4 presents the event reading and collection#1 the result of that event, destruction#2 includes both the event and the result of that event. On this basis, one could assume that some deverbal nominalizations have two senses, while others have only one which includes the two. Another perspective to be considered is whether the dictionaries provide consistent information, or not. It is my belief that the results of dictionaries as exemplified with WordNet do not mirror the actual use of language.

One case of systematic polysemy, I want to provide as yet another exemplification of the problematic issues concerning lexicography is the animal-food/flesh alternation[11]. Exam-

[8] cf. http://dictionary.cambridge.org/dictionary/english/head
[9] cf. https://en.oxforddictionaries.com/definition/head
[10] cf. https://www.merriam-webster.com/dictionary/head
[11] For a detailed explanation of this case of regular polysemy and many more see Falkum (2010).

ples like *rabbit* and *lamb* in WordNet are both represented with an animal sense as well as a food sense. However, this is not the case with an example like *kangaroo*. It can be argued that *lamb* and *rabbit* are more often used in the food sense than *kangaroo*, but it does not change the fact that *kangaroo* provides a food sense as well.[12]

To sum up, BECL shows that the count/mass properties of nouns are sensitive to their specific senses. Many nouns have different senses which differ with regard to countability as presented with the case of multiples. Yet, the majority of BECL is classified as ordinary count or ordinary mass nouns having different senses classified within one and the same countability class.

4.2 Data selection

In this section I want to explain how I determine a set of nouns to be further studied as representative for the category of abstract nouns. The different approaches to identifying and defining the notions *concrete* and *abstract*, as presented in section 3.1 and repeated in (23), reveal that the specification of the set of abstract nouns is controversial.

(23)
- 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.
- imageability
  This way of distinguishing concrete from abstract nouns implies that concrete nouns denote entities which are imaginable. The denotation of abstract nouns - on the contrary - cannot be visualized.
- morphological derivation
  In this case, abstract nouns are often derived nominals. In English, nouns ending in *-ness*, *-ity*, *-tion* or *-hood*, *- itude*, *-cy*, *-ment*, *-ship* are abstract.
- spatiotemporal collocation
  This criterion implies that abstract nouns denote entities that do not have a location in space or time.

The controversies apply to, for instance, fictional objects such as unicorns or dragons, which cannot be perceived by the senses, but yet they are imaginable. Additionally, there are also cases of morphologically underived nouns as for example *joy* which are not concrete in terms of imaginability, or cases where it is unclear whether the noun was derived from the verb or the other way round, as e.g. *license*. Therefore, the criterion of morphological derivation is also not sufficient.

[12] The issues we experienced with WordNet are not less present in other dictionaries. For example the German dictionary, Duden, has animal and food senses for *Rind* (cow-beef) and *Kalb* (calf-veal) but for *Lamm* (lamb) only the animal sense.

Despite those controversies, a great part of abstract nouns is mapped by all four approaches, which presents their intersection. For a study of the count/mass distinction in abstract nouns, it could be claimed that it is necessary to pin down the object of study, in order to offer a clear and transparent analysis. Yet, the identification of abstract nouns itself is a tricky case and - in my opinion - not particularly needed for a survey of countability within these nouns. Let me explain this a bit further: when it comes to research on the count/mass distinction within abstract nouns, we can say that this issue has been discussed only rudimentary (cf. section on related work in 3.3). With the exception of derived nominals, no other set of abstract nouns has been documented excessively. It does not matter, therefore, which particular criterion of abstract nouns one chooses to investigate when - at the moment - all kinds of abstract nouns are under-researched with regard to their count/mass properties. An analysis of countability in this field - regardless of the chosen definition of abstractness - would be a significant contribution.

Be that as it may, here is how I want to proceed with a study of abstract nouns. Starting with the assumption that abstract nouns can be mass and count, I will focus and limit my study to precisely those cases, i.e. the set of nouns that is polysemous, one sense of which is count and the other mass. For the purpose of this investigation, I extracted all those nouns from BECL that

- are polysemous
- are flexible in terms of countability, i.e. one sense is count and one is mass, and
- provide at least one sense which is abstract in terms of at least one criterion from (23)[13]

	nouns	**noun-senses**
BECL 2.1	7,050	11,869
multiples	732	2115
multiples 235x528	528	1608
excluding homonyms and concrete nouns	**180**	**425**

Table 4.5: Target dataset extracted from BECL 2.1

As Table 4.5 shows, from altogether 732 nouns classified as multiples in BECL, 528 have their senses distributed in the countability classes 235 (*regular count*) and 528 (*regular mass*). Out of these 528 nouns, 180 fall into the domain of my restriction with a total of 425 noun-

[13] Additionally, some minor pairs of noun-senses were excluded from the investigation, such as proper names and nouns belonging to very specific branches, such as technical terms from chemistry, etc.

sense pairs.

As an illustration, consider the following example which is an abstract noun containing two polysemous senses, one of which is count and the other mass.

(24) a. approval#1 the formal act of approving COUNT
b. approval#2 a feeling of liking something or someone good MASS

The selected dataset includes cases akin to (24). My aim is to inspect the differences between the two related senses and to identify the reasons for the difference in countability.

4.3 Annotation of lexical properties

This study considers nouns that have (at least) two different but related meanings, one of which is - according to BECL - classified as count and the other as mass. In order to narrow down the main distinctive ingredients within these senses that make the count noun senses count and the mass noun senses mass we should note and annotate the properties that arise in comparing the different senses.

Let me illustrate this on the pair of senses presented in (24). *Approval* has two senses. One of them is described as *the formal act of approving* and - based on this sense description - the annotators of BECL classified it as count. Unlike this sense, the other sense described as *a feeling of liking something or someone good* is classified as mass by the same annotators. It is natural to conclude that *approval* can refer to bounded eventualities as is *the formal act of approving* in which case the noun is countable, or to feelings or qualities as in the sense *a feeling of liking something or someone good* in which case the noun is used as a mass noun. Accordingly, we add the appropriate features to the senses as exemplified in (25).

(25) 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]

4.3.1 Annotation scheme

The issue of an annotation scheme arises with the question regarding the kind of set of annotations are to be used, as well as the way to define these annotations. Since the nouns in this study are extracted from BECL and the noun senses are defined by WordNet, we have the set of WordNet Tops[14] used for classifying the WordNet senses at our disposal .

I extracted the WordNet Tops for the dataset of abstract nouns used in this study and the outcome shows that this set of Tops does not draw a distinction between count and

[14]WordNet Tops are semantic features used in ontologies as a repository of lexical semantic information.

mass senses. With the exception of some categories that occur only in count or only in mass senses, many other categories are distributed in both count and mass senses, as can be seen in Table 4.6.

WordNet Tops	**count**	**mass**
act	38	54
artifact	23	3
attribute	12	38
cognition	32	30
communication	32	18
event	17	0
feeling	3	14
food	1	0
group	10	1
location	1	0
motive	2	0
object	4	2
person	11	1
phenomenon	1	2
possession	5	1
process	3	8
quantity	2	1
relation	2	2
shape	0	1
state	9	36
substance	1	1
time	1	1
Tops	1	0
total	211	214

Table 4.6: Distribution of WordNet categories in count and mass senses

In particular, the tops *act* and *cognition* are almost equally distributed in count and mass senses. A noun such as *alteration* has, for instance, the same top *act* assigned by WordNet (26), but annotators of BECL classified alteration#1 as mass and alteration#2 as count.

(26) WordNet *act*

a. alteration#3 the act of revising or altering (involving reconsideration and modification) MASS

b. alteration #2 the act of making something different (as e.g. the size of a gar-

ment) COUNT

The difference between the two senses of *alteration* lies in the count sense involving a direct object in the sense description - an object to which the verb applies - unlike the mass sense which emphasizes the process of alteration. This case suggests that boundedness might be the distinctive property here that distinguished these two senses. However, this cannot be concluded on the basis of one example only.

Similar observations can be found with the top *cognition* as in (27)

(27) WordNet *cognition*

a. perception#4 knowledge gained by perceiving MASS
b. perception#1 the representation of what is perceived; basic component in the formation of a concept COUNT
c. necessity#1 the condition of being essential or indispensable MASS
d. necessity#2 anything indispensable COUNT
e. recollection#2 the process of remembering (especially the process of recovering information by mental effort) MASS
f. recollection#3 something recalled to the mind COUNT
g. abstraction#1 a concept or idea not associated with any specific instance COUNT
h. abstraction#3 the process of formulating general concepts by abstracting common properties of instances MASS

In the above named examples the count senses always apply to something that is true of the predicate. It appears like providing a placeholder for *something recalled to the mind* in case of *recollection* or *anything indispensable* in case of *necessity*. The fact that WordNet Tops do not maintain a differentiation between these count and mass senses points directly to the need for a manual annotation task within these senses which also postulates a difference in countability.

Besides WordNet, there are some other ontologies or typologies of eventualities that might provide a better suited working basis for the annotation task. For instance, Asher (1993) offers a fine-grained scheme of different references of abstract objects as sketched in Figure 4.1, or - since the nouns under investigation are often deverbal or otherwise event related - one could consider the typology of eventualities from Bach (1986) based on previous work by Carlson (1981), as illustrated in Figure 4.2.

Although these schemata provide many different categories and a wider range of different references as in Asher (1993), the set of abstract nouns in BECL provides even more variation. I will, therefore, borrow some terms from these schemata and adapt them. I will, however, not adapt either of these schemata completely.

For the annotation of meaning descriptions, I started the annotation process without any scheme, and tried to identify the most appropriate features of the underlying senses. Due

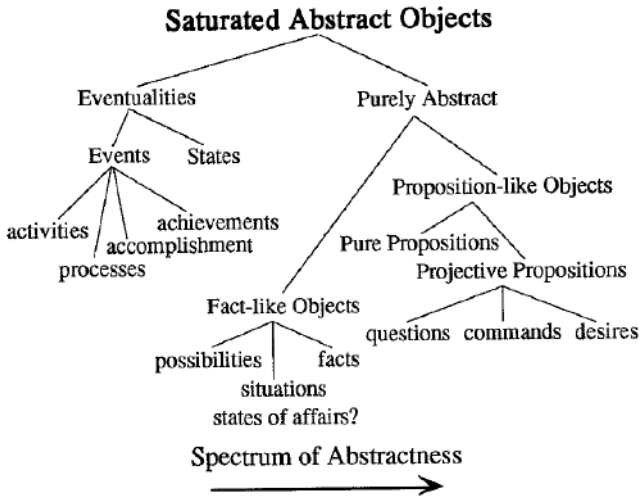


Figure 4.1: Asher's ontology of abstract objects (Asher, 1993: 57)

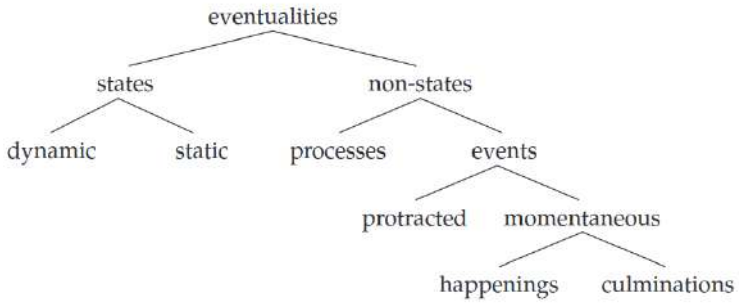


Figure 4.2: Bach's typology of eventive nominals (Bach, 1986: 62)

to many commonalities among these senses of abstract nouns, the annotation grew into a systematic process. This way I developed a self-created inventory of annotations, which I used for a second and systematic annotation procedure. The set of features used for the annotation and their descriptions are presented in Table 4.7.

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 lasts 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 or accomplished	approval#1 the formal act of approving
object	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, even or 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 or has fulfilled its mission	deceit#2 a misleading falsehood
place	location; can also be a building, town, occasion or 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
placeholder	something which is true of being/having a property	fill#2 any material that fills a space or container; need#2 anything that is necessary but lacking
manner	the way/kind of doing/being something	access#3 a way of entering or leaving

Table 4.7: Annotation features and their description

There is no restriction to annotate only one feature. Instead, sometimes more than one feature is applicable, as would be the case with events which are usually bounded, making

these two annotations, **event** and **bounded**, to appear jointly.

In the following, I will present the outcome of the annotation process by first presenting the common annotations of count senses and then the annotations that occur frequently with mass senses[15]. Afterwards, I will elaborate more on certain categories before giving a summary of the result in the final section.

4.3.2 Count and mass senses

The annotations that often appear with count senses are **object**, **event**, **bounded**, **instance** and **placeholder**. Mass senses do not provide the same annotations as count senses (with some exceptions discussed in section 4.3.3.4). The most frequent features annotated for mass senses include: **process, state, quality** and **feeling**. The tables below present a few examples for each annotation feature: in Table 4.8 are some count senses with their annotations listed and Table 4.9 exemplifies certain mass senses.

object	backlog#3 something kept back or saved for future use or a special purpose, consideration#2 information that should be kept in mind when making a decision, forgery#1 a copy that is represented as the original, luxury#1 something that is an indulgence rather than a necessity, painting#1 graphic art consisting of an artistic composition made by applying paints to a surface, perception#1 the representation of what is perceived; basic component in the formation of a concept
event	change#1 an event that occurs when something passes from one state or phase to another, demolition#1 an event (or the result of an event) that completely destroys something, embarrassment#3 some event that causes someone to be embarrassed, recitation#2 a public instance of reciting or repeating (from memory), success#1 an event that accomplishes its intended purpose
bounded	need#2 anything that is necessary but lacking; approval#1 the formal act of approving, detail#2 a small part that can be considered separately from the whole, pull#1 the act of pulling; applying force to move something toward or with you
instance	drama#2 an episode that is turbulent or highly emotional, hope#1 a specific instance of feeling hopeful, inquiry#2 an instance of questioning, perfection#2 an ideal instance; a perfect embodiment of a concept
placeholder	delight#2 something or someone that provides a source of happiness, necessity#2 anything indispensable, need#2 anything that is necessary but lacking, wonder#2 something that causes feelings of wonder

Table 4.8: Examples of annotated count senses

[15] A complete list of all annotated noun-senses is attached in Appendix B.

process	fire#3 the process of combustion of inflammable materials producing heat and light and (often) smoke, forgery#2 criminal falsification by making or altering an instrument with intent to defraud, inquiry#1 a search for knowledge, outflow#3 a natural flow of ground water, recollection#2 the process of remembering (especially the process of recovering information by mental effort)
state	conjunction#2 the state of being joined together, fascination#1 the state of being intensely interested (as by awe or terror), life#4 the condition of living or the state of being alive, need#4 a state of extreme poverty or destitution, order#3 established customary state (especially of society), proportion#3 balance among the parts of something
quality	authority#1 the power or right to give orders or make decisions, charity#2 a kindly and lenient attitude toward people, folly#3 the quality of being rash and foolish, genius#2 unusual mental ability, inconvenience#3 the quality of not being useful or convenient, modernism#2 the quality of being current or of the present, novelty#2 originality by virtue of being new and surprising, skill#2 ability to produce solutions in some problem domain, truth#4 the quality of being near to the true value, virtue#1 the quality of doing what is right and avoiding what is wrong
aggregation	backlog#1 an accumulation of jobs not done or materials not processed that are yet to be dealt with (especially unfilled customer orders for products or services), bull#3 obscene words for unacceptable behavior, coalition#3 the union of diverse things into one body or form or group; the growing together of parts, copy#4 material suitable for a journalistic account, experience#1 the accumulation of knowledge or skill that results from direct participation in events or activities, filing#4 preservation and methodical arrangement as of documents and papers etc., gossip#2 a report (often malicious) about the behavior of other people, hope#3 grounds for feeling hopeful about the future, instruction#2 the activities of educating or instructing; activities that impart knowledge or skill, stock#2 the merchandise that a shop has on hand

Table 4.9: Examples of annotated mass senses

One observation that can be drawn at first sight is that when an abstract noun is polysemous - as it is the case with the above mentioned - and the count sense is annotated with the feature **object** since it describes some kind of object or item, this referent is often concrete or ambiguous between a concrete and abstract meaning, such as *backlog*, *forgery*,

luxury or *painting*. The example approval#4 with the sense *a message expressing a favorable opinion* provides both a concrete interpretation in which the approval might be a document and an abstract interpretation in which the approval is expressed verbally.

In these annotated data sets, we observe that the concrete sense of a noun is always countable, when the noun has two senses one of which is concrete and the other abstract. The following examples can be considered as an illustration of this circumstance:

(28) a. consideration#2 information that should be kept in mind when making a decision COUNT
b. consideration#4 kind and considerate regard for others MASS

(29) a. forgery#1 a copy that is represented as the original COUNT
b. forgery#2 criminal falsification by making or altering an instrument with intent to defraud MASS

At this stage, we can already draw another conclusion from the descriptive results above: mass senses usually denote entities that are not bounded. In case of event related terms as processes or states, when they are denoted by a mass sense, the sense description emphasizes the mere process or state and not the termination of it. In the next section I want to elaborate on a few categories from the annotated data set which I consider worth analysing.

4.3.3 Categories of abstract nouns

4.3.3.1 Qualities and states

There is a conspicuous link between the annotations **quality** and **state**. Whenever there is a quality that can be possessed, there seems to also be a state in which the quality is possessed. This relation exists independently of the question whether both senses or abstractions are listed in the dictionaries or not. One of the senses of *honor* is a quality of people and it also provides a sense that is a state in which a person possesses this quality. The same also holds for similar nouns as exemplified in the table below:

QUALITY	STATE
authority#1 the power or right to give orders or make decisions MASS	authority#4 freedom from doubt; belief in yourself and your abilities MASS
conjunction#1 the temporal property of two things happening at the same time COUNT	conjunction#2 the state of being joined together MASS
fascination#3 the capacity to attract intense interest COUNT	fascination#1 the state of being intensely interested (as by awe or terror) MASS

honor#3 the quality of being honorable and having a good name MASS	honor#2 the state of being honored MASS
luxury#2 the quality possessed by something that is excessively expensive MASS	luxury#3 wealth as evidenced by sumptuous living MASS
wonder#1 the feeling aroused by something strange and surprising MASS	wonder#3 a state in which you want to learn more about something MASS

Table 4.10: Qualities and States

The relation between **quality** and **state** exists independently of the countability assignment to these noun senses. In the cases mentioned above, the state senses are always classified as mass, but the quality senses can be either mass or count.

4.3.3.2 Processes and events

Processes, acts and events are terms which are commonly used to describe the denotations of verbs or deverbal nominalizations. In the linguistic literature these terms have often been used synonymously. The common intuition behind them is that processes are generally atelic and durative whereas events are telic. Besides, the term "eventualities" is also used as a generic term that includes processes and events. In the literature on the countability of such eventive nominalizations it has been claimed that countness is linked to telicity and massness to atelicity (cf. Grimshaw, 1990; Alexiadou et al., 2010; Grimm, 2012a). This way atelic processes should be identified as mass nouns, and telic events are supposed to be countable. The puzzling question in this field is, however, whether the telic or atelic properties are inherited from the verb and if so, whether these are lexical categories or features of a whole noun phrase[16].

Consider the following set of eventive nouns from the annotated data set:

COUNT	**MASS**
demolition#1 an event (or the result of an event) that completely destroys something [EVENT]	demolition#2 the act of demolishing [PROCESS]
alteration#2 the act of making something different (as e.g. the size of a garment) [PROCESS]	alteration#3 the act of revising or altering (involving reconsideration and modification) [PROCESS]

[16]This issue has been discussed cross-linguistically in Alexiadou et al. (2010).

carving#1 a sculpture created by removing material (as wood or ivory or stone) [OBJECT]	carving#2 removing parts from hard material to create a desired pattern or shape [PROCESS]
gossip#3 a person given to gossiping and divulging personal information about others [PERSON]	gossip#1 light informal conversation for social occasions [PROCESS]
approval#1 the formal act of approving [EVENT]	approval#2 a feeling of liking something or someone good [QUALITY]
embarrassment#3 some event that causes someone to be embarrassed [EVENT]	embarrassment#1 the shame you feel when your inadequacy or guilt is made public [QUALITY]

Table 4.11: Count and mass senses annotated as *events*

The data presented in Table 4.11 which was investigated regarding count and mass properties of abstract nouns shows an interesting observation: Processes, events and other eventive categories are terms that occur in both count and mass senses. The above table exemplifies this phenomenon. Examples like *demolition* and *alteration* show just how much these terms resemble each other. Demolition#1 differs from demolition#2 in that it also includes the result of the whole event (in its meanings description), whereas demolition#2 focuses more on the process of demolishing. A similar phenomenon can be observed in the case of *alteration*: the mass sense, alteration#3, emphasizes the process by way of omitting a possible object of the process, but in alteration#2 the meaning obligatorily includes an object which gives reason to a telic interpretation and a classification as countable.

The other four examples, *carving*, *gossip*, *approval* and *embarrassment*, are cases in which only one sense of the noun is eventive. It seems that the classification of an eventuality in count or mass depends on the kind of the other polysemous sense. If this sense is a resulting object or item, the eventive sense will be a mass sense, but if the other sense is a quality, state or feeling, the eventive sense is likely to be countable. This is the case with *carving* and *gossip*, the processes of which are mass senses in BECL, but the count senses (which are already concretized) are objects or persons. In *approval* and *embarrassment* it is the other way around: the eventive senses are countable, while the mass senses describe qualities.

If the kind of polysemy, event-object or event-quality, is the reason for the controversial assignment of countability properties to eventualities, one can question the reasons for the existence of two types of eventualities: (i) the ones that rather combine with resulting items, object, instruments or persons, and (ii) others that combine with qualities, feelings

or states and are therefore countable. Furthermore, it is unclear whether different semantic classes of verbs provide different kinds of polysemy, as for example psych verbs as opposed to action verbs.

4.3.3.3 Placeholders

In this section I will elaborate on certain noun-senses which have a particularly interesting meaning contribution since they refer to other entities. What I call **placeholders** are noun-senses that refer to different entities which can be true of the quality or state expressed by the predicate. Placeholders are mostly countable in the annotated dataset. They co-occur with different types of nouns, as listed below in Table 4.12.

COUNT	**MASS**
delight#2 something or someone that provides a source of happiness	delight#1 a feeling of extreme pleasure or satisfaction
novelty#3 a small inexpensive mass-produced article	novelty#2 originality by virtue of being new and surprising
resource#2 a source of aid or support that may be drawn upon when needed	resource#3 the ability to deal resourcefully with unusual problems
concern#1 something that interests you because it is important or affects you	concern#2 an anxious feeling
necessity#2 anything indispensable	necessity#1 the condition of being essential or indispensable
facility#4 something designed and created to serve a particular function and to afford a particular convenience or service	facility#2 skillful performance or ability without difficulty

Table 4.12: Placeholders in the annotated dataset

Placeholders appear often in the annotated dataset and they co-occur with nouns that denote qualities or states, as well as nouns derived from verbs such as *concern* or *delight* or from adjectives like *necessity*.

4.3.3.4 Aggregations

This section describes a category that appears mostly in mass senses and describes an aggregation of (possibly different) things. Only few count senses are also annotated as aggregations. This category is particularly relevant to our study of abstract nouns due to the fact that the mass examples resemble a category of nouns which is prominent in the

literature on the count/mass distinction, i.e. fake mass nouns. The following list (30) of such senses can help illustrate this observation.

(30) a. bull#3 obscene words for unacceptable behavior MASS
b. classification#2 a group of people or things arranged by class or category COUNT
c. coalition#3 the union of diverse things into one body or form or group; the growing together of parts MASS
d. copy#4 material suitable for a journalistic account MASS
e. experience#1 the accumulation of knowledge or skill that results from direct participation in events or activities MASS
f. instruction#2 the activities of educating or instructing; activities that impart knowledge or skill MASS

This list of noun senses includes nouns that denote or refer to a sum, an accumulation of diverse things, each of which are specified, divided and bounded. The resemblance with fake mass nouns (*furniture, jewellery*) is eminent because it confirms a count/mass distinction analogue to the one in concrete nouns.

4.3.4 Intermediate summary

The presented lexical property annotation provides an insight into the types of abstract nouns and their countability assignments: while count senses are often objects, bounded processes and instances which happen to be concrete sometimes, abstract mass nouns represent rather unbounded entities: qualities, states and processes.

annotation feature	**COUNT**	**MASS**
state	8	54
event	77	4
quality	3	69
process	0	59
instance	9	0
quantity	7	3
placeholder	53	7
aggregation	8	11
bounded	194	10
matter	6	12
place	8	0
person	17	0
accomplished	5	0

object	99	19

Table 4.13: Resulting distribution of annotation features

As can be observed from the Table 4.13 some annotation features show very strong tendencies towards one countability classification. States, processes and qualities are mostly mass, while the category bounded is predominantly count due to the varying interpretation of this category which can be assigned to bounded events but also to abstract objects or placeholders. Besides the bounded ones, the categories event and placeholder also tend to be classified as count. The diagram below illustrates the distribution of the different categories in count and mass senses:

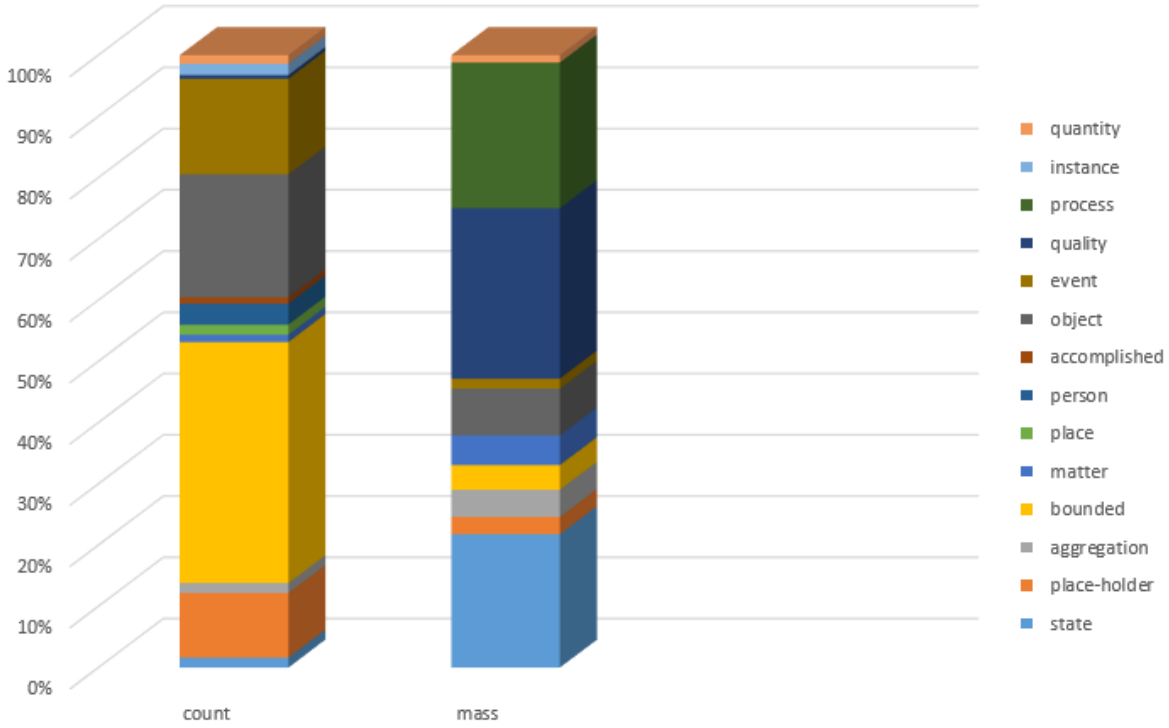


Figure 4.3: Descriptive results of the lexical property annotation

Figure 4.3 demonstrates a summary of the outcomes of the lexical property annotation. It is noticeable that some categories occur much more frequently with count senses than with mass senses, as it is the case with objects and events, bounded entities and placeholders. I provide an example for each of these cases below:

(31) count senses of abstract nouns

a. accord#3 a written agreement between two states or sovereigns OBJECT
b. outrage#3 a disgraceful event EVENT
c. concern#4 something or someone that causes anxiety; a source of unhappiness PLACEHOLDER

Also, there are some categories which appear more often with mass senses than with counts including processes, states and qualities, as exemplified in the list in (32).

(32) mass senses of abstract nouns

a. omission#3 any process whereby sounds or words are left out of spoken words or phrases PROCESS
b. regulation#3 the state of being controlled or governed STATE
c. modernism#2 the quality of being current or of the present QUALITY

Having annotated the dataset of abstract nouns and presented some summarizing observations following from the annotation part, I now want to look at the dataset from the next higher level, the noun lemma. The annotation will be used to determine the intra-sense relations that exist between count and mass senses of one noun, as will be shown in the next section.

4.4 Intra-sense relations

The second part of this study focuses on the combination of senses an abstract noun can have according to the lexical property annotations presented in section 4.3. This investigation is based on the preceding annotation task, the annotation of relevant lexical properties, and uses its outcomes in order to identify common relations between count and mass senses of abstract nouns. The relation between count and mass senses has been discussed before in semantics as well as pragmatics. Before I present the patterns of sense relations that occur in my data, I will briefly repeat what has been proposed so far regarding count$\longleftrightarrow$mass shifts[17].

The polysemy of nouns that goes with a change in the countability preference has been discussed in relation to so-called transformation rules or coercion, which do not explicitly say whether the pairs of count and mass uses are actually senses of nouns, or coerced meanings that occur only in particular contexts. The most prominent transformation rules are Universal Grinder (Pelletier, 1979) and Universal Sorter (Bunt, 1985). An example of each transformation is given below:

(33) Universal Grinder (count to mass)
There was hat all over the floor. $\Rightarrow$ There was hat-stuff all over the floor.

[17]For a more elaborated discussion about countability shifts see section 2.3.2.

(34) Universal Sorter (mass to count)
Maria bought three wines. ⇒ Maria bought three types of wines.

Approaching the same issue from the perspective of lexical ambiguity, Falkum (2010, 2017) argues in favour of a set of rules for an analysis in terms of "systematic polysemy" that includes a change in the countability:

(35) Falkum's systematic polysemy rules:
a. If an expression has an animal use, it also has a meat/fur/animal stuff use.
b. If an expression has a tree use, it also has a wood use.
c. If an expression has a fruit use, it also has a fruit stuff/tree use.

Based on the annotations in section 4.3, I was able to observe a variety of patterns of mass and count senses. It is not straightforwardly clear whether all these cases can be accounted for as derivational, in which one sense is derived from the other, but I will point out the cases in which I believe that it seems reasonable to assume one primary sense and treat the remaining senses as derivations.

Other works on such transformations tend to pin down the direction of the transformation. For example Rothstein (2010) which assumes that all nouns are mass nouns in the beginning and count uses or senses are derived from the original root mass nouns.

In what follows, I will assume that the senses are derived from each other and I will present the transformations that occurred most frequently in my annotated dataset.

4.4.1 Shifts from mass to count

Here I present a set of combinations of count and mass senses for which I assume the mass sense is the basis out of which the count sense is derived. In (36)-(38) we see cases with three basic features of mass senses, i.e. **process**, **state** and **quality** that permit derivations of count senses (i.e. **object, event, aggregation, instance, person, place-holder**):

(36) **process** ⇒
a. **object** (abstraction, decoration, delusion, drink, duplication, forgery, instruction, jest, marking, modelling, omission, painting, payment, plagiarism, publication, recollection, ruin, study, teaching, television, video)
b. **event** (alteration, demolition, dilution, disappearance, dispute, fire, flow, inquiry, outrage, respiration, ruin, sailing, study, synchronization, transplant, urgency, widening)
c. **aggregation** (classification, gathering)
d. **instance** (inquiry)
e. **person** (gossip, opposition)

f. **placeholder** (classification, delegation, delusion, filing, gathering, gossip, marking, omission, opposition, recollection, survival)

(37) **state** ⇒

a. **object** (accord, alarm, certainty, constraint, expectation, finish, honor, luxury, necessity, need, preoccupation, reason, safety, want)
b. **event** (camouflage, impropriety, irritation, possibility, salvation, scatter, success, upset, urgency)
c. **instance** (order, perfection)
d. **placeholder** (backup, consequence, disintegration, inconvenience, luxury, necessity, need, presence, reason, regulation, want)

(38) **quality** ⇒

a. **event** (approval, demand, drama, enterprise, fatality, indiscretion, license, modernism, outrage, pull, unfairness)
b. **object** (absurdity, accord, cachet, concern, consideration, dedication, facility, generality, honor, obligation, license, novelty, provocation, pull, resource, truth, worry)
c. **person** (genius, justice, mediocrity)
d. **instance** (virtue, initiative, individuality, humiliation, hope, drama)
e. **placeholder** (authority, backbone, concern, consequence, deceit, dedication, delight, demand, detail, facility, generality, genius, justice, luxury, mercy, modernism, novelty, perception, provocation, pull, resource, truth, wonder, worry)

The reason for my assumption that mass senses are more basic or more primitive in the cases discussed here, is due to their ability as serving as a more general description. The count senses are rather more specific or emphasize a certain aspect or part of the overall meaning of the nouns, such as the data in (39)-(42).

(39) a. payment#2 the act of paying money MASS
b. payment#1 a sum of money paid or a claim discharged COUNT

(40) a. order#3 established customary state (especially of society) MASS
b. order#2 a degree in a continuum of size or quantity COUNT

(41) a. individuality#1 the quality of being individual MASS
b. individuality#2 the distinct personality of an individual regarded as a persisting entity COUNT

(42) a. honor#3 the quality of being honorable and having a good name MASS
b. honor#1 a tangible symbol signifying approval or distinction COUNT

Taking all possible derivations (36)-(38) into account, it seems difficult to generalize and

cover them all under one function. Instead, I will focus on 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:

(43) 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 (BP)

2.instance thereof (IN)

3.(itemized) placeholders (IPH)

The derivation has to go from mass to count and not the other way round due to the fact that 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. In the next sections, I will discuss each of these interpretations.

4.4.2 Bounded process

This derivation is usually found in combination with a polysemous noun in which the other sense denotes a process. While one sense stresses the particular process of the event, another sense - the Bounded Process - emphasizes the event as a whole, bounded in time and space. I elaborated on this relation already in section 4.3.3.2 by way of examples with *alteration* and *demolition*. Indeed, these relations can be extended to other nouns, as can be witnessed from the following examples.

(44) 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

(45) outrage#4 $\Rightarrow_{BP}$ outrage#3

a. outrage#4 the act of scandalizing MASS

b. outrage#3 a disgraceful event COUNT

(46) dispute#2 $\Rightarrow_{BP}$ dispute#1

a. dispute#2 coming into conflict with MASS

b. dispute#1 a disagreement or argument about something important COUNT

To illustrate this with an example of natural language, consider the following sentences

from COCA with a mass and count sense of *outrage* which correspond to this kind of polysemy:

(47) The new findings were greeted by much **outrage** but no changes. MASS

(48) But to me it was also an **outrage** that the five other members of your congressional delegation went along with this. COUNT

4.4.3 Instances

In this derivation one particular instance or unit of a process or a state or a quality has been singled out and, therefore, enabled for counting, while on the other side the pure process or quality or state remains a mass noun. Consider the following examples:

(49) inquiry#1 $\Rightarrow_{IN}$ inquiry#2

a. inquiry#1 a search for knowledge MASS
b. inquiry#2 an instance of questioning COUNT

(50) initiative#1 $\Rightarrow_{IN}$ initiative#2

a. initiative#1 readiness to embark on bold new ventures MASS
b. initiative#2 the first of a series of actions COUNT

(51) 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

In addition to dictionary entries I found evidence for exactly such count interpretations as instances in corpora:

(52) a. Seeing all this energy coming from young people and also especially technology front as well gives me a **hope**. COUNT
b. Boys and girls are being thrust into adulthood without a **knowledge** of their past, something unimaginable a generation ago. COUNT
c. So I went to my mom that hot day in July with a **hope** in my heart and a tear in my eye. COUNT

4.4.4 (Itemized) placeholders

(Itemized) Placeholders describe noun-senses that denote abstract and/or concrete matters that are true of the state or quality which is described by the polysemous counterpart. Some of these noun senses are concretized as it is the case with luxury#1 *something that is an indulgence rather than a necessity*, obligation#4 *a written promise to repay a debt* or honor#1

a tangible symbol signifying approval or distinction. Others, as the examples below show, remain abstract:

(53) certainty#1 $\Rightarrow_{IPH}$ certainty#2
  a. certainty#1 the state of being certain MASS
  b. certainty#2 something that is certain COUNT

(54) necessity#1 $\Rightarrow_{IPH}$ necessity#2
  a. necessity#1 the condition of being essential or indispensable MASS
  b. necessity#2 anything indispensable COUNT

(55) 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

(56) preoccupation#2 $\Rightarrow_{IPH}$ preoccupation#1
  a. preoccupation#2 the mental state of being preoccupied by something MASS
  b. preoccupation#1 an idea that preoccupies the mind and holds the attention COUNT

In (53)-(56) the meaning descriptions contain indefinite descriptions (*something, anything, idea*) which is the reason I named this category placeholders. The entity to which it applies is not specified, which is why the sense functions as a placeholder for something that has the property denoted by the mass sense. The mass sense describes only the general property of the matter as e.g. need or preoccupation. The corpora examples from COCA below may offer a better illustration:

(57) Property owners act reasonably with regard to surface water drainage if there is **necessity** for such drainage. MASS

(58) Chloe liked to cook when she had the time, so a decent kitchen was a **necessity**. COUNT

Some cases of "Itemized Placeholders" exhibit a specific role, which is either an instrument for achieving the actual state or quality, or a source that is responsible for the state or quality under consideration, as for instance the following noun-senses:

(59)
  a. pull#4 a device used for pulling something
  b. reason#1 a rational motive for a belief or action
  c. mercy#4 something for which to be thankful
  d. wonder#2 something that causes feelings of wonder

In sum, the three categories described above can account for some patterns of mass to

count transformation, but they do not cover all possibilities of abstract nouns to be count as taken from the BECL data. It does, however, reflect the major and most common types of abstract nouns and their mass and count uses.

4.5 Summary

This chapter offered us a fine-grained study of the lexical features of certain abstract nouns. The main resource for this empirical investigation is the Bochum English Countability Lexicon - BECL 2.1 (Kiss et al., 2016) which classifies English noun-sense pairs according to syntactic and semantic tests into different countability classes. In the part of BECL that shows great variation in terms of countability we found a set of polysemous abstract nouns. This set of nouns was further studied, and I showed that some features are dominating in the count senses, and others in the mass senses.

The present survey shows that abstract nouns can appear as count and as mass. The tendencies we observed are that count senses usually have bounded references, either in terms of a shaped object, or a bounded, telic eventuality. Mass senses, on the other hand, denote atelic processes or states that seem to be not terminated. This is what can be concluded on the basis of pure lexical information regarding these nouns from BECL and WordNet.

When we take a look at the nouns and their potential to have different countability assignments, we observe that several categories occur frequently together. Based on a deeper investigation of the specific meanings an abstract noun can possibly have, I argue that some of the single senses can be derived from each other. I assume that the countability has to be assigned at the level of the noun, and starting from there, we might employ various shifts in meaning and countability. I believe that for the majority of investigated nouns the basic meaning is mass, while the count senses are derived from this general mass meaning. Abstract mass nouns (qualities/ states/ processes) enable shifts to count interpretations on a regular basis which can result in either bounded processes, instances of processes, qualities or states and (itemized) placeholders.

In the next section I will make use of a different linguistic resource, i.e. written corpora, and investigate the same set of abstract nouns determined in section 4.2. I aim to study their count occurrences in natural language use and see whether and how they differ from ordinary count nouns.

5 Corpus study

In this section I will describe a corpus study of the abstract nouns under consideration. Unlike the annotation task described in the previous section, this study will investigate only a subset of these nouns. Since the results of the annotation task showed the wide range of abstract nouns and that the generalizations proposed account for only a subset of these nouns, we will now investigate this particular subset in a corpus study.

From the 180 nouns used primarily, for the following corpus study I extract those that have two characteristics:

1. they are de-predicated, which means they are either derived from verbs, adjectives or other nouns.
   I will also consider nouns that are somewhat undetermined with regard to their etymology, i.e. cases in which it is unclear whether the noun was derived from the verb or vice versa, as e.g. *license* or nouns derived from foreign words e.g. *consequence, custom, enterprise*[1]

2. at least one sense of the nouns refers to some kind of eventuality in a broader sense (cf. Bach, 1986).
   Concerning the notion *eventuality*, I follow Bach's typology (Bach, 1986) which also includes states (dynamic and non-dynamic) alongside processes and events.

When these two characteristics are considered, the primary set of nouns is narrowed down to the following 141 nouns: *abstraction, absurdity, access, accommodation, accord, admission, alteration, approval, aspiration, assessment, authority, camouflage, catch, certainty, change, cheer, classification, coalition, concern, conjunction, consequence, consideration, constraint, copy, custom, deceit, decoration, decrease, dedication, delegation, deletion, delight, delusion, demand, demolition, dilution, disappearance, disintegration, disorder, dispute, drink, duplication, embarrassment, enterprise, evasion, expectation, experience, faith, fascination, fatality, filing, fill, finish, fire, flow, forgery, fusion, gathering, generality, gossip, honor, hope, humiliation, impropriety, inconvenience, indiscretion, individuality, initiative, inquiry, instruction, irritation, jest, justice, license, life, marking, mediocrity, membership, mercy, necessity, need, novelty, obligation, obscenity, omission, opening, opposition, order, organisation, outflow, outrage, payment, perception, perfection,*

[1] For borderline cases, I rely on information from the Online Etymology Dictionary at https://www.etymonline.com/.

polity, possibility, preoccupation, presence, production, promise, propensity, proportion, provocation, publication, pull, reach, reason, recitation, recollection, regulation, remark, resignation, resource, respiration, respite, restraint, ruin, safety, sailing, salvation, scatter, sense, skill, spirit, stock, study, success, surgery, survival, synchronization, transplantation, unfairness, upset, urgency, vindication, virtue, want, widening, wit, wonder, worry.

Following the classification in BECL (Kiss et al., 2016), one would assume that the nouns under consideration should occur both in count and mass use. Count uses are computationally easier to target since their distribution patterns can be extracted (semi-) automatically. I expect that all nouns under consideration can occur in count use by providing one of the possible count interpretations concluded from the previous research (cf. section 4.4), repeated in (1).

(1) 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 (BP)

2.instance thereof (IN)

3.(itemized) placeholders (IPH)

The examination here aims to derive some indications regarding the count uses of such abstract nouns. This corpus study targets discriminating count and mass uses, in particular occurrences in plural form, with the indefinite article and with the modifiers *many* and *much*.

The results I will provide should not be taken as conclusive, but rather as an affirmation or rejection of the generalizations made on the basis of the lexical investigation described in the previous section. By means of corpus studies, we can only observe certain tendencies of nouns to occur in a certain distribution. From the fact that some nouns do not appear in a specific distribution, ungrammaticality of those nouns in that particular distribution cannot be deduced. Instead, there may 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. However, if one were to find whole groups of nouns lacking certain distributional patterns, this may indicate a particular distributional restriction of those nouns[2].

The corpus study is conducted on basis of a substantial portion[3] of the COCA corpus

[2]Kiss (2019: 324) discuss a similar observation with regard to the distribution of complement clauses and certain prepositional phrases in German.

[3]In particular, the study is conducted on the academic, fiction, magazine and newspaper texts from the years 1990-2012. Due to copyright restrictions, in our copy a string of 10 tokens after every 200 tokens have been replaced by @ @ @ @ @ @ @ @ @ @ ("masked") to avoid copyright restrictions. Thus, from 432 million tokens in our portion of the corpus, nearly 21 million tokens are masked. As a consequence, from the almost 26 million sentences, 2 million contain masked tokens. Nonetheless, there are more than 110 million nouns available.

(Davies, 2010) provided by the AFM-project[4], parsed with the Stanford Dependency Parser. I further analysed the data by creating python scripts which extracted certain patterns of occurrences along with distributional information and frequencies by using the library *pandas*. The full list of frequencies of all obtained distributions is presented in the appendix in (1). Here I will only elaborate on some broad trends relevant for the count/mass discussion.

5.1 Plural occurrences

Regarding the frequencies of plural uses, we observe that almost all nouns exhibit plural uses. The only ones that do not are the few nouns with low frequencies in plural form (under 3%, as illustrated in Table 5.1). The average proportion of plural occurrences of these nouns lies at 23,79%.

noun	**total**	**plurals**	%
access	36800	143	0,39
approval	11362	302	2,66
camouflage	1369	0	0
delight	4300	45	1,05
disintegration	959	7	0,73
fascination	2567	36	1,4
fill	1750	0	0
fusion	2705	54	2
individuality	1325	18	1,36
mercy	4305	79	1,84
opposition	17439	314	1,8
organisation	212	6	2,83
perfection	3033	44	1,45
presence	29633	198	0,67
respite	1059	31	2,93
safety	31341	248	0,79
salvation	4070	0	0
survival	11962	47	0,39
synchronization	301	0	0
transplantation	653	11	1,68
unfairness	385	2	0,52

[4]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 - BECL, http://count-and-mass.org/

urgency	2938	32	1,09
vindication	432	3	0,69

Table 5.1: Nouns with low frequencies in plural form

A look into the particular occurrences reveals that the plurals can denote different entities (2), such as countable events as exemplified with *vindications*, as well as certain lexicalized meanings, such as *organisation*. In some cases it appears that the plural does not disentangle whether the noun refers to an event or a proposition as is the case with *unfairnesses*.

(2) 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. **Organisations** such as Community-Campus Partnerships for Health present conferences and bring together advocates of the model to strategise about its future development.
c. Once, Andrew grabbed Josh's shirt while Josh was shooting, and they played on as though these were the rules, basketball with little obstacles and **unfairnesses**.

More interesting are those cases with very high frequencies in plural form since the average of plural occurrences of all the nouns lies at 23,79%. Nouns that occur more often in plural than in singular, i.e. more than 50% of the total occurrences, are summarized in Table 5.2. We can observe that some nouns occur even more than 80% of the time in plural. This is the case with *marking, ruin, constraint* and *expectation*.

noun	**total**	**plurals**	%
accommodation	4441	2568	57,82
alteration	1885	1039	55,12
aspiration	4410	3380	76,64
consequence	21500	15496	72,07
constraint	6208	5096	82,09
expectation	8959	7284	81,3
fatality	1262	834	66,09
marking	1026	1013	98,73
payment	15916	8743	54,93
regulation	21049	11339	53,87
remark	7997	5235	65,46
resource	54918	36155	65,83
ruin	3566	3373	94,59

skill	52840	40819	77,25

Table 5.2: Nouns with high frequencies in plural form

While investigating the different uses of these plurals, I came to the conclusion that more context is often needed to disentangle what exactly the nouns refer to, as is the case with *expectations*. In one particular case presented in (3), the noun *expectation* refers to the antecedent in the previous sentence, i.e. that the aspiring Ph.D. can sit and mellow (like a wine?) etc. Besides such uses, *expectations* can also refer more generally to belief about something in the future.

(3) 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. During the period of 1945-1947 the Poles had great **expectations** for post-war economic aid from America through the United Nations Recovery Relief Assistance Agency.

Marking is peculiar in that it mostly refers to the resulting object, as illustrated in (4). I was unable to find an event-denoting occurrence of *markings* since all the syntactic modifiers and governors were object related: for instance, *markings* does not occur as the dependent of certain verbs which are typical for events, such as *(to) begin, start, last* or *continue*, but rather with object-related governors as *(to) alter, brush, carry, create, design, erase* and alike.

(4) 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. But in the autumn of 1990, when I was escorted onto the Tarmac that sweeps the shore of the Riviera, I found the **markings** of Jugoslovenski Aerotransport on the side of a dilapidated DC-9 – the airline equivalent of putting plum brandy into old wine bottles.

c. He started to rewrap it but then noticed several faded **markings** on the vellum.

Just like with *marking*, it is also difficult to find an instance of *ruins* which refers to ruin events. The resulting object interpretation is much more dominant, as illustrated in the sentences below:

(5) a. Conceivably, an even more unlucky coincidence of weather systems (say two hurricanes at once) struck the desert some centuries ago, but the ancient Hohokam people whose **ruins** we now study have left no weather records.
b. The attitude of lawmakers was better defined by a verbose version of a bill introduced in 1900 that called for monuments to protect areas of scenic beauty, natural wonders or curiosities, ancient **ruins** or relics, or other objects of scientific or historic interest, or springs of medicinal or other properties.
c. 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.

Unlike *marking* and *ruin*, *constraints* appears to be rather of the same type as *expectation* in that the context determines what exactly the constraints under discussion are.

(6) a. 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.
b. Thus "external impediments" are taken here to mean **constraints** which exist outside the popular sectors at both national and international levels; i.e., the internal and external political economies within which novel forms of popular participation and production are located.
c. Clear domestic **constraints** on U.S. foreign policy began to appear during the 1990s.

5.2 Indefinite article

The ability to occur in combination with the indefinite article is one of the signature properties of count nouns. Unlike the plural form, the occurrences with the indefinite article are rather infrequent. Of course, the occurrence with the indefinite article has to be more restricted than the plural use, since the plural is one of two possible forms of the noun: singular and plural. Each noun has to be in singular or in plural form, whereas only singular forms may (or may not) combine with indefinite articles. The average occurrence with the indefinite article lies at 8,59%. Below, I will discuss the most peculiar cases.

Several nouns have less than 1% occurrences with the indefinite article (Table 5.3), such as *access*, *approval*, *marking*, *organisation*, *respiration*, *ruin*, *survival*, *transplantation* and *want*.

noun	**total**	**indefs**	%
access	36800	203	0,55

approval	11362	71	0,62
marking	1026	6	0,58
organisation	212	2	0,94
respiration	559	3	0,54
ruin	3566	17	0,48
survival	11962	89	0,74
transplantation	653	4	0,61
want	1199	7	0,58

Table 5.3: Nouns that occur rarely with the indefinite article

Ruin and *marking* are nouns which exhibit a very strong preference for the plural form (i.e. 95% and 99% of the time), and their distribution with the indefinite article is accordingly very low. Among the few instances with the indefinite article are often those which form a part of compound, as illustrated in (7).

(7) a. Drenched, Broom and Whitman look down upon an impressive Romanesque **Ruin**.
b. To those who read Joshua Kosman's wildly skewed review ("Poppea' a Roman **Ruin**", June 15) of the San Francisco Opera's "Poppea".

The only two times *organisation* occurs with the indefinite article is also as part of a compound:

(8) a. This is a Quality **Organisation** and our staff are our most valuable asset.

Other eventuality denoting nouns like *transplantation*, *respiration*, *survival* and *approval* are often accompanied by further modifiers within the NP, as in the data below.

(9) a. And many questions whether a machine will ever amount to anything more than a misery-prolonging 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.
c. 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.
d. Although coaches and players indicated a higher **approval** for instrumental aggression, the observed on-ice behaviour told a different story.

Among the cases where the indefinite article combines directly with *approval* we observe both instances of the event reading (10) as well as the object reading (11), although the

object interpretations are more frequent.

(10) While Canadians are critical of their own health system, it would be a mistake to interpret this criticism as an **approval** of their country adopting a U.S. style health system (Brooke 2000).

(11) a. Did you give him an **approval**?
b. An appeal from a non-issuance of an **approval**, or of its terms and conditions, can be made to the Environmental Appeal Board, an independent tribunal.

Let us now turn to those nouns that occur often with the indefinite article, e.g. more than 30%. There are four nouns with such high frequencies in my dataset, i.e. *copy*, *decrease*, *respite* and *sense*.

noun	**total**	**indefs**	%
copy	17317	5711	32,98
decrease	3843	1858	48,35
respite	1059	374	35,32
sense	79941	26060	32,6

Table 5.4: Nouns that occur often with the indefinite article

Since *copy* has a concrete sense as in copy#1 *a reproduction of a written record* it is unsurprising that it occurs with the indefinite article because the object reading is very likely and dominant, as the one in (12).

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

The other nouns, *decrease* and *respite*, often refer to individual events, as the data in (13) suggests.

(13) a. The emphasis on use of vision has resulted in a **decrease** in the number of Braille readers.
b. Salmon prices fell lo percent in 1988 and a rapid **decrease** in prices followed in 1989.
c. The river has offered us a **respite**, a chance to check ourselves out and turn our attentions to looking for a campsite.
d. Not only were both sides ready for a **respite**, but the West seemed poised for an offensive.

The noun *sense* is more polysemous, which is why the combinations with the indefinite article vary a lot in their interpretations. *A sense* can refer to a quality which can be

possessed by people, or to a certain meaning or interpretation of not only words, but also principles and other entities in general, as the data in (14) show.

(14) a. Pluralism is a positive value, but it is also important that we preserve a **sense** of an American community-a society and a culture to which we all belong.
b. I believe the students got a **sense** of how fragile democracies can be in that part of the world.
c. On the other hand, there is a **sense** of separateness in being in part of myself an observing stranger in my own native land.

5.3 *many* and *much*

There are several grammatical markers for count and mass nouns, two of which are: *many* and *much*. The nouns in my database are grammatical with both *many* and *much* due to their dual nature with regard to countability. In what follows, I will present the preferences of the nouns regarding the question whether they occur rather with *many* or with *much*, or whether these modifiers are equally distributed.

First, some nouns occur neither with *much* nor with *many*. *Much* and *many* are themselves not so frequent in use as compared to more prominent elements, such as the definite or indefinite article. Those nouns that lack a combination with *many* or *much* are *camouflage demolition, disappearance, disintegration, impropriety, indiscretion, jest, organisation, propensity, provocation, resignation, respiration, respite, salvation, scatter, synchronization, transplantation, unfairness, vindication, want, widening*. Of course, this does not mean that these nouns cannot occur with *much* or *many* in general, but rather that in this specific corpus they are not used.

What I observe from the data is that there is a group of nouns which never occurs with *many*, but occasionally with *much* as shown in Table 5.5. Similar to this is the opposite group of nouns which never occurs with *much* but does so with *many*. This group of nouns is presented in Table 5.6.

noun	**total**	**many**	**much**
deceit	640	0	2
decrease	3843	0	2
dedication	2585	0	1
dilution	486	0	3
fascination	2567	0	7
fill	1750	0	1
gossip	3390	0	7
individuality	1325	0	3

mediocrity	539	0	1
obscenity	944	0	1
perfection	3033	0	4
presence	29633	0	8
proportion	11250	0	4
recitation	658	0	1
upset	1393	0	1
wit	3764	0	7

Table 5.5: Nouns that do not occur with *many*

noun	**total**	**many**	**much**
abstraction	2334	1	0
accord	4470	1	0
admission	10132	5	0
classification	4769	5	0
coalition	11942	2	0
conjunction	3249	2	0
delegation	3031	5	0
deletion	324	1	0
delusion	1384	6	0
enterprise	12827	57	0
evasion	782	1	0
fatality	1262	13	0
filing	2692	3	0
finish	7791	3	0
forgery	485	3	0
fusion	2705	2	0
gathering	6313	9	0
generality	509	1	0
marking	1026	2	0
necessity	3228	2	0
novelty	2222	2	0
omission	1440	4	0
outflow	553	1	0
payment	15916	5	0
polity	1303	2	0
remark	7997	14	0

ruin	3566	5	0
survival	11962	2	0

Table 5.6: Nouns that do not occur with *much*

Studying these two groups does not show any significant pattern. Both groups contain derived nominals ending in *-tion*, *-ity* or zero derived nominals, as for instance, *upset*, *accord* and *finish*.

A different approach to this data might give a more informative picture. In the tables below I extracted those data that have a significant tendency towards one of the modifiers. Nouns that occur significantly more often with *much* than with *many* are *hope*, *sense* and *success* which are all zero derived nominals, as illustrated in Table 5.7.

noun	**total**	**many**	**many** %	**much**	**much** %
hope	11411	13	0,11	72	0,63
sense	79941	34	0,04	308	0,39
success	29698	16	0,05	125	0,42

Table 5.7: Nouns that occur more frequently with *much* than with *many*

Table 5.8 lists those nouns that occur significantly more often with *many* than with *much*. Among these nouns, we will also find some zero derived nominals such as *copy, resource* and *study*. However, unlike the zero derived nominals from the group of nouns that prefers *much*, these nouns have a prominent object like reading which establishes a preference of countable uses.

noun	**total**	**many**	**many** %	**much**	**much** %
constraint	6208	21	0,34	2	0,03
copy	17317	85	0,49	3	0,02
disorder	14806	53	0,36	4	0,03
opening	15501	22	0,14	1	0,01
possibility	27321	130	0,48	11	0,04
publication	14769	91	0,62	3	0,02
resource	54918	154	0,28	8	0,01
study	185789	769	0,41	32	0,02

Table 5.8: Nouns that occur rather with *many* than with *much*

A closer look into the specific occurrences with *much* reveals that for *hope* the NP always refers to a quality which is possessed by humans and emphasizes the huge amount or the intensity of it (15). *Sense*, on the other hand occurs mostly in the common collocation *make*

sense or in this case *make much sense* (16). Besides these occurrences, *much sense* can also refer to a specific kind, in which case the noun phrase contains further modifiers (17).

(15) a. Although everyone at the Asolo is desperately trying to reinstate the touring program, I don't have much **hope**.
b. Scientific progress is too rapid, verification too difficult, the dual uses of technology too vast to provide much **hope** that either traditional arms control or nonproliferation techniques will have much effect.
c. He went back to bed, though without much **hope** of being able to sleep any longer.

(16) a. Improvements have been made, however, and the old standards don't make much **sense** now.

(17) a. I locked the machine back up without much **sense** of accomplishment, just of time expended.
b. Randy had the look of an eager Doberman pinscher and just about as much fashion **sense**, but to Mark he was as heroic as Charles Lindbergh.

As for the noun *success*, we already mentioned that the mass sense from WordNet refers to *a state of prosperity or fame*, i.e. success#3. Hence, *much success* could perhaps mean something of a state which is dynamic or very intensive. The examples below, however, seem more likely to refer to a sum of events, most of which are successful (with the exception of the cases stating *without much success*). The phrase in (18-b) *Quinn didn't have much success with girls* means that Quinn might have had some events of contact with girls, only few of which or none of which were successful.

(18) a. Unfortunately; neither of the initiatives met with much **success**: The United States, United Kingdom and France voted against the non-aligned countries' resolution on setting up an Ad-hoc (negotiating) Committee on Nuclear Disarmament.
b. Ben didn't know this Shannon, knew only that Quinn , like Nick, hadn't had much **success** with girls, hadn't tried either, both of them loners and proud of it.

As far as the occurrences of nouns with *many* are concerned, these appear very often to refer to the resulting object of the event. For *publications*, for instance, I couldn't find any other interpretation than as printed work (19). *Possibility*, on the contrary, occurs very often as referring to a sum of unspecified entities. These entities can at best be described as events, but this depends on the very specific occurrence of *many possibilities*. (20) illustrates some examples of such uses of *possibility*.

(19) a. This formula foreshadowed the approach that would be taken in many future CRF **publications**.
b. Kisisel has authored many **publications** in his areas of expertise and edited 11 technical volumes.

(20) a. Not since the invention of the phonograph has a relatively new product, the computer, brought about so many **possibilities** for improving music instruction.
b. Thus, there are many **possibilities** for creative work in panorama photography, even with simple equipment.

Constraint resembles *possibility* in that it is also unspecified as to what exactly the constraints are. However, unlike possibilities, constraints are not likely to be events, rather some object-like entities which do not have a time dimension as events have.

(21) a. Thus, there are many **constraints** placed on human behavior, if individuals and groups are to continue to survive and to thrive.
b. Men place many **constraints** on women in traditional marriages, but I have an overall positive regard for my cultural background, which also provides security and safety nets in the form of extended family obligations to help each other in difficult times.

The distribution of nouns with *many* and *much* and the particular occurrences show that some nouns have clear preference for one modifier. Besides, the examples discussed here suggest that the interpretation with *much* do not considerably vary, the inference appears to be the same, intensity and/or growth in amount. Contrary to that, *many* combines with both object-like entities, such as *copy*, and events or proposition. The graph in 5.1 presents the nouns with significant preferences for one modifier over the other.

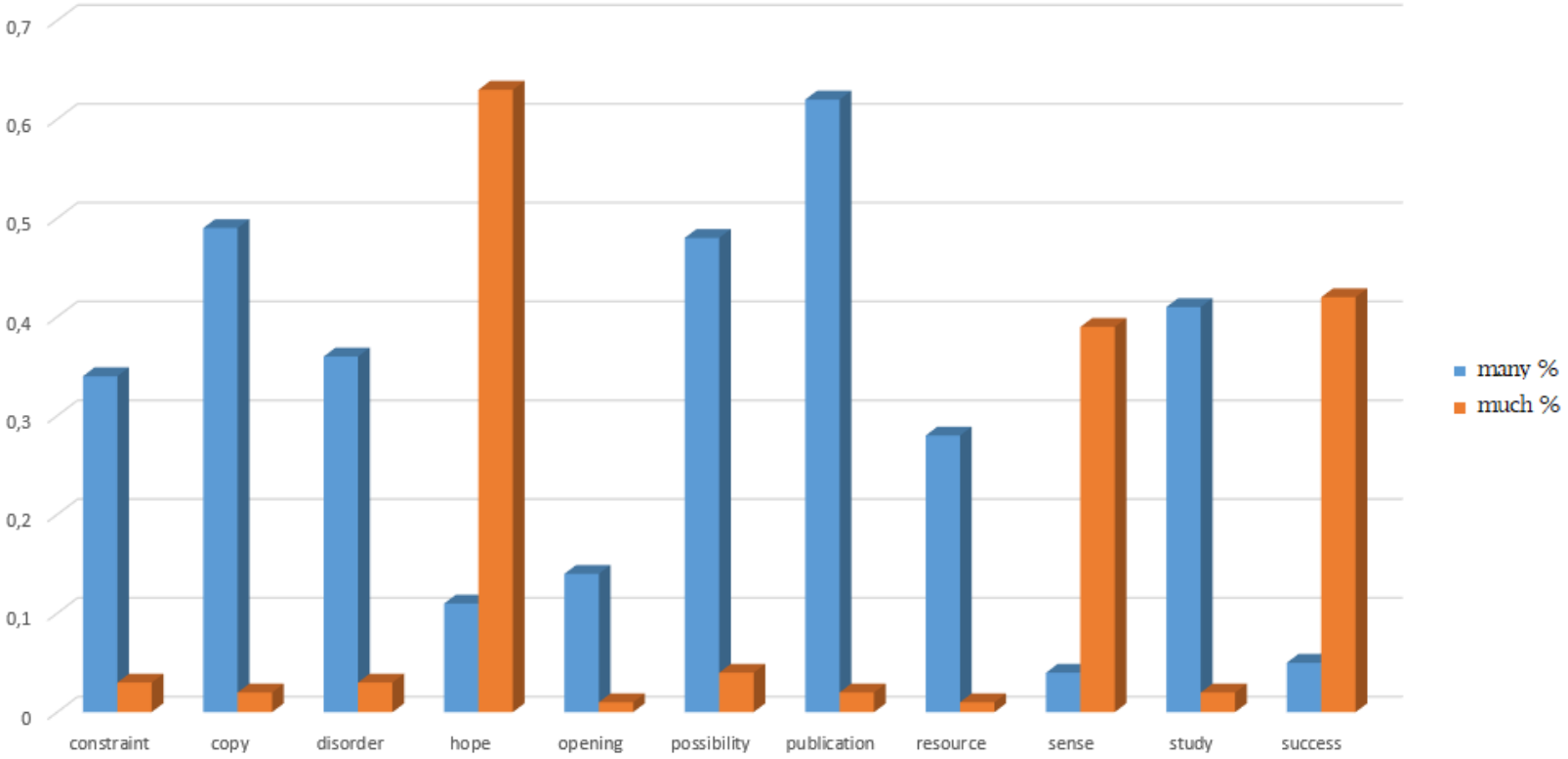


Figure 5.1: Percentage share of the distribution with *many* and *much*

5.4 General observations

In this section, I want to draw a comparison between the outcomes of the count uses in the corpus study and (i) the proposed count uses from the lexical annotation task, and (ii) the counting interpretations observed by Grimm (2012a).

From the three possible interpretations in (1), two could certainly be affirmed: the bounded processes, i.e. events, and the (itemized) placeholders.

(22) events

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.

c. While Canadians are critical of their own health system, it would be a mistake to interpret this criticism as an **approval** of their country adopting a U.S. style health system (Brooke 2000).

d. Salmon prices fell lo percent in 1988 and a rapid **decrease** in prices followed in 1989.

e. The river has offered us a **respite**, a chance to check ourselves out and turn our attentions to looking for a campsite.

(23) placeholders

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. Thus " external impediments " are taken here to mean **constraints** which exist outside the popular sectors at both national and international levels; i.e., the internal and external political economies within which novel forms of popular participation and production are located.

c. 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.

Among the count uses I studied, an interpretation in form of instances was not so common, although a few cases could be found (cf. 4.4.3).

As far as Grimm's proposal in terms of counting as anchors is concerned, in my investigation of plural occurrences, I found evidence for his hypothesis regarding the interpre-

tation as *anchoring* in participants or events:

(24) Participant anchoring

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 i939 pact between Hitler and Stalin.

b. While not totally abandoning the contras (for fear of a conservative backlash), the administration had clearly pinned **its hopes** on a strengthened opposition winning the 1999 elections.

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

d. All the more is this true, more largely, of the races, who live **segregated lives** close together, and of social classes, who mix but do not socialize.

(25) Event anchoring

a. NASA vows that closer vigilance will prevent **similar embarrassments** in the future.

b. Once, Andrew grabbed Josh's shirt while Josh was shooting, and they played on as though these were the rules, basketball with little obstacles and **unfairnesses**.

c. The signatories relied on exchange controls and tariffs to prevent s**poradic outflows**.

d. Now, I understand that not every institution can undertake **such inquiries** on this scale.

The above examples show that there is a correlation between the type of anchoring (event or participant) and the denotation of the noun (quality of social acts vs. mental properties). However, besides such interpretations of plural abstract nouns, I found other count occurrences which cannot be described as anchoring, neither in participant nor in events.

Consider the following list of plurals of abstract nouns which I call placeholders. They resemble conceptual shells - a term coined by Schmid (2000) - as e.g. *idea, issue* or *fact*. They receive a specification/determination of meaning through the context.

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

b. They committed themselves to support the less privileged, calling on their peers to protect the weak and oppressed, while preaching the **virtues** of faithfulness and obedience to the populace.

c. Gradually the screws of rampant consumerism were turned, and wants and

desires became perceived **necessities**: another process pregnant with geographical implications.

d. 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.

The plural nouns in (26) denote different things dependent on the specification of the noun in context. The minimal counting parts can be thought of as concrete objects as is the case with *stuffed animals* and *kitten posters* that are described by the abstract noun *embarrassments* in (26-a). Also, the minimal parts can remain abstract as shown with *wants* and *desires* that represent the counting "atoms" of *necessities* in (26-c).

In the above case, countable abstract nouns refer to abstract or concrete entities which are true of the property or quality denoted by the abstract noun. For instance, stuffed animals, posters and sentiments are entities that are true of being an embarrassment, and death, taxes and someone trying to steal money are true of being a certainty according to the speaker. It seems that the abstract nouns here somehow map the quality/property they denote on other entities, or that all the entities which are being counted function as placeholders for units of whatever is denoted by the abstract noun.

This case is exactly the same as the count derivation of mass nouns I called *(itemized) placeholders* because the minimal counting unit is an entity, either abstract or concrete, that functions as a placeholder for whatever is denoted by the abstract noun. In (26-a), for instance, we have three such elements (stuffed animals, kitten posters and love sentiments) which are placeholders for minimal elements or "atoms" of embarrassment.

5.4.1 Referential nouns

Another issue of plural occurrences of abstract nouns relates to an interpretation familiar from the literature on deverbal nominalizations. Besides the event itself, the polysemy of event-nominalizations can also provide an interpretation as the resulting object of the event, or a referent related to the event (cf. Alexiadou et al., 2010; Melloni, 2007). In our case here, it is usually the resulting object or the agent of the event:

(27) a. I had pushed him for it, and we already had the **approvals** from Janet Reno and Louis Freeh.

b. **Delegations** from across the country as well as from China and the Republic of Korea have visited Ben Franklin High to study and emulate its successes.

c. Instead, the scammers printed **forgeries** that were close enough to the real thing to fool some buyers.

The examples above are often itemized and also concrete. Sometimes the context does not provide more information and the NP remains ambiguous between a concrete and an abstract denotation, as is the case with the *approvals* in (27-a) that can be verbally given,

which would then be abstract, or *approvals* in form of official documents which would be concrete.

5.4.2 Non-canonical plurals

Here I want to summarize a sample of plural occurrences for which I don't have an explanation yet as to how the plural is generated, given that it seems that in these cases it does not represent an operation of sum. Consider the following occurrences of plurals:

(28) a. The only way to attend to the acute humanitarian needs of the present and gradually build **modest hopes** for the future is for the new "Big Three" to take the lead and the responsibility.
b. And, of course, she is gone, and so, too, **her urgencies** that burn in me.
c. Then the sea would wash away the pain, cleansing his soul, restoring the **joys** of creation.

In (28) the abstract terms in plural do allow some kind of anchoring in participants since both urgency and hope are intrinsically related to participants. However, I want to emphasize here that - unlike Grimm's anchoring in participants - the denotation itself does not seem to be individuated as e.g. to be derivable in units of urgency, hope or joy. Instead, the denotation seem to have continuous boundaries. While this issue is certainly of interest in a discussion of pluralities, I am unable to say much more on this now, and leave these issues to be studied at another occasion.

5.5 Summary and conclusion

In conclusion, I can state that although the nouns under consideration, derived nominals denoting some kind of eventuality, 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 narrowed down to the significantly higher number of plural occurrences than singular occurrence, or the preference of *many* over *much*. 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 confounds 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. organisation#1, organisation#2, copy #1, copy#2 or marking#1.

(29) organisation

a. organisation#4 an ordered manner; orderliness by virtue of being methodical and well organized;
b. organisation#2 a group of people who work together
c. organisation#3 an organized structure for arranging or classifying
d. organisation#1 the persons (or committees or departments etc.) who make up a body for the purpose of administering something

(30) copy

a. copy#2 a thing made to be similar or identical to another thing
b. copy#1 a reproduction of a written record (e.g. of a legal or school record)
c. copy#4 material suitable for a journalistic account
d. copy#3 matter to be printed; exclusive of graphical materials

(31) marking

a. marking#3 evaluation of performance by assigning a grade or score
b. marking#1 a distinguishing symbol
c. marking#4 the act of making a visible mark on a surface

Such concrete interpretations colour the results of this study and the only way to exclude them from consideration is to manually disambiguate each occurrence. Accordingly, the number of plurals or count use of such nouns is not surprising.

A consideration of the non-concrete interpretations of the nouns under investigation confirms a generalization I was able to make on basis of the lexical annotation task. Among the count uses detected on the lexical level, we found two cases frequently used: bounded processes, i.e. events, and placeholders. The interpretation as instances of qualities, states and processes seems to be less frequent. Comparing the outcome of the corpus study with Grimm's proposed anchoring interpretations yields a verification of such occurrences. However, anchoring in participants and events does not exhaust the possibilities of countable uses of abstract nouns, as the examples in (26) and (28) show.

Finally, I find it necessary to remark that the results of this study have to be taken with caution. Corpora are limited in use and by conducting corpus studies we can only track tendencies of certain words to occur in certain distributions. We cannot draw strong conclusions from it. In my case here, the corpus study confirmed some previous generalizations, and, due to the diversity in corpora, we were able to observe issues that are yet unresolved.

6 Analysis

In this section, I will offer an analysis of the semantics of eventuality denoting nominals which form a substantial part of abstract nouns. A detailed investigation of a set of 200 English abstract nouns by means of a manual annotation process of lexical categories (chapter 4) and a corpus investigation of discriminating contexts (chapter 5) reveals that the countability of these nouns is not straightforwardly assigned. It varies a lot, depending on the specific sense or specific use of the nouns.

My empirical research into the domain of abstract nouns suggests that certain semantic categories, however, show tendencies towards a countability assignment:

- nouns describing states, qualities, feelings and unbounded processes are predominantly mass nouns
- nouns describing bounded eventualities, bounded processes or just events, and objects are predominantly count nouns

To illustrate the countability preference of these nouns, consider the BECL entries (Kiss et al., 2016) of some such nouns in (1) and (2).

(1) mass nouns from BECL

a. hope#2 the general feeling that some desire will be fulfilled FEELING
b. respiration#3 the bodily process of inhalation and exhalation PROCESS
c. necessity#1 the condition of being essential or indispensable STATE
d. license#2 freedom to deviate deliberately from normally applicable rules or practices (especially in behavior or speech) STATE

(2) count nouns from BECL

a. approval#1 the formal act of approving EVENT
b. need#2 anything that is necessary but lacking OBJECT
c. embarrassment#3 some event that causes someone to be embarrassed EVENT
d. license#1 a legal document giving official permission to do something OBJECT

The assignment of countability on basis of the pure lexical meaning as provided in BECL seems at times difficult to follow, although these assignments are a matter of goldstandard, since they were developed by means of a semi-supervised annotation task by native speakers (cf. section 4.1.1). To give a better description of the present variation of these

nouns, consider (3) and (4) which present corpus examples of the nouns in (1)-(2), taken from COCA (Davies, 2010).

(3) mass examples

a. I lost **hope** that I would ever walk again.
b. The consumption of oxygen in **respiration** is a measurable parameter reflecting mitochondrial function.
c. Property owners act reasonably with regard to surface water drainage if there is **necessity** for such drainage.
d. Even the fool had to sense how **much license** he could take on a particular day. The other courtiers must have been very grateful when the fool made such a ruler laugh and defused some growing tension.

(4) count examples

a. It says, if you take military action, you've got to notify Congress in 48 hours, and you can't have troops there for more than 60 days without getting **an approval** of Congress.
b. The development of normative values is most likely to show **several needs**, not the least of which are: (a) modification of some of the standards; (b) independent evaluation; and, (c) disclosure.
c. **The embarrassments** of his presidency continue to mount.
d. My next question is if we are going to give up this much of our roadways for bicycle traffic, shouldn't bicycles be required to have **a license** like that of an automobile?

One of the greatest challenges in determining the countability of abstract nouns is precisely the property of having different readings/meanings with individual countability assignments. For instance, a noun can have different meanings which can differ with regard to countability, as the following examples from BECL illustrate:

(5) a. demolition#1 an event (or the result of an event) that completely destroys something COUNT
b. demolition#2 the act of demolishing MASS

(6) a. need#4 a state of extreme poverty or destitution MASS
b. need#2 anything that is necessary but lacking COUNT

In (5) we have a noun that has an event and a process reading where the event is classified as count and the process as mass. (6) shows a noun which can either be a state (mass), or refer to an object which is true of that state (count).

As far as a formal description of the semantics of nouns is concerned, the hitherto

proposed theories have dealt with concrete nouns exclusively - as elaborated in section 2.4. In the following, we will discuss those theories that might be at best suited for the phenomenon presented with abstract nouns.

6.1 Possible solutions

There have been several approaches to determine the count/mass distinction among concrete nouns as for example Link (1983); Krifka (1989); Rothstein (2010); Chierchia (2010); Landman (2016) among others. Those theories account for many issues that concern the count/mass distinction, some of which regard the ultimate criterion for distinguishing count and mass nouns; the model-theoretic interpretation of count and mass nouns; certain subsets of nouns, e.g. furniture nouns or collective nouns; certain syntactic environments, as e.g. measure phrases and numeral phrases, etc. In this section, I want to review the application of some of these theories and decide which of these theories would best be applicable to the issue of abstract nouns.

Due to the great amount of variation and diversity within the countability of abstract nouns, it seems reasonable to consider precisely those theories which focus on the flexibility of nouns to occur as count and as mass nouns. Out of the theories elaborated on in chapter 2, it appears natural to think of two possible solutions to this issue: (i) contextual determination as suggested by Rothstein (2010) or (ii) sense approaches as proposed by (Kiss et al., 2016). Let me discuss these approaches a little bit further.

6.1.1 Contextual determination

One way of analysing the issue of the countability of abstract nouns is to treat the context as the ultimate determinant of countability. The most prominent idea in such terms has been proposed by Rothstein (2010) which accounts for the variations across concrete nouns such as dual-life nouns, as for instance *rope*, *cake* or *rock*, as well as nouns that can be shifted to a different reading in terms of grinding, packaging or sorting (cf. section 2.4.4). Her analysis assumes that every noun is originally mass until a context provides individuation of atomic parts of the noun's denotation. Accordingly, a noun, such as *classification*, would be originally mass which accounts for all the mass uses of this noun, as for illustration in (7).

(7) Additionally, although there will be **much classification** to be accomplished during the fall and winter months, I can not guarantee a position to you upon completion of our field work.

The count uses are generated according to Rothstein (2010) by means of a context parameter which provides the counting units. These counting units can vary from context to

context and analogously, homogeneous object nouns, such as *fences*, can be counted in different ways relative to the given context. Similarly, one could expect the context to govern the atomicity of abstract nouns, as e.g. *classifications*:

(8) According to CCP, the first experiment with human protein data was a massive success and **over 25 million classifications** of human cells were processed.

Such a solution seems plausible assuming that a model-theoretic template and all relevant mechanisms are provided by Rothstein (2010). While the contextual approach manages to account for a great deal of count/mass issues, there is, however, one problem with regard to contextual approaches. There is a very strong and stable tendency of certain nouns to be classified as count or mass respectively. Some nouns, e.g. object denoting nouns such as *car*, *table* or *cat* preserve their countability across languages and they cannot be shifted easily. The same way certain stuff denoting nouns or substances, e.g. as *blood*, *smoke*, *mud* or *cheese*, present a very stable mass category. Even children at a pre-linguistic age seem to perceive a difference in the concepts of things vs. substances (Soja et al., 1991). Moreover, cross-linguistic observations confirm that certain concepts or types of entities have the same countability assignments across languages. This natural division of entities is disregarded in a contextual approach.

It seems that taking the context to determine the countability of a noun is like pushing something unresolved (here the count/mass issue) to something arbitrary and unspecified (the context). It is my belief that there is a system, a reason why objects such as table or door are perceived as countable entities as opposed to substances or stuff. And with regard to abstract nouns, they seem to provide a referential distinction between count and mass nouns, too.

6.1.2 Sense approaches

Sense approaches argue that the locus of countability is not the noun lemma but rather the noun sense, assuming that nouns have multiple senses which differ with regard to countability. Kiss et al. (2016) offer an account in such terms which applies to a large set of data (cf. section 4.1). By means of such an approach, it can easily be accounted for the flexibility of nouns to occur in both count and mass use. A specific sense of a noun is responsible for a change in countability, as illustrated below.

(9) a. fill#1 a quantity sufficient to satisfy COUNT
b. fill#2 any material that fills a space or container MASS

(10) a. novelty #1 originality by virtue of being refreshingly novel MASS
b. novelty #2 originality by virtue of being new and surprising MASS
c. novelty #3 a small inexpensive mass-produced article COUNT

d. novelty #4 cheap showy jewelry or ornament on clothing COUNT

According to BECL, *novelty* has two count senses and two mass senses; *fill* can also vary in that one sense is count and another classified as mass.

Kiss et al. (2016) offer an advantage over many other theories for two reasons: i) they provide a study of countability that applies to more than 7,000 English nouns and by this they stand out from all the theories discussed in 2.4 which are limited to a small number of nouns, and ii) unlike all other theories, they cover also abstract nouns, which have been used for the lexical investigation of abstract nouns in chapter 4.

In spite of the great field of application, I would like to express the concern I see in taking senses to be the locus of the count/mass distinction. First, the very notion of *sense* is not precisely determined. If we take *sense* to be what is listed in dictionaries and also in BECL, than we will have to deal with many inconsistencies in this regard:

1. Nouns have a different number of senses across different dictionaries. Table 6.1 illustrates different entries for the noun *cat* in the three dictionaries:

Oxford Dictionary	**Merriam Webster**	**WordNet**
1. a small animal with soft fur that people often keep as a pet. Cats catch and kill birds and mice, 2. a wild animal of the cat family, the big cats (lions, tigers, etc.)	1a. a carnivorous mammal (Felis catus) long domesticated as a pet and for catching rats and mice, 1b. any of a family (Felidae) of carnivorous usually solitary and nocturnal mammals (such as the domestic cat, lion, tiger, leopard, jaguar, cougar, wildcat, lynx, and cheetah), 2a. guy some young ... cat asked me to go drinking with him—Jack Kerouac, 2b. a player or devotee of jazz, 3. a strong tackle used to hoist an anchor to the cathead of a ship, 4a. catboat, 4b. catamaran, 5. cat-o'-nine-tails, 6. catfish, 7. a malicious woman	cat#1 (feline mammal usually having thick soft fur and no ability to roar: domestic cats; wildcats), cat#2 (an informal term for a youth or man), cat#3 (a spiteful woman gossip), cat#4 (the leaves of the shrub Catha edulis which are chewed like tobacco or used to make tea; has the effect of a euphoric stimulant), cat#5 (a whip with nine knotted cords), cat#6 (a large tracked vehicle that is propelled by two endless metal belts; frequently used for moving earth in construction and farm work), cat#7 (any of several large cats typically able to roar and living in the wild), cat#8 (a method of examining body organs by scanning them with X rays and using a computer to construct a series of cross-sectional scans along a single axis)

Table 6.1: Entries for *cat* in Merriam Webster, WordNet and Oxford Dictionary

2. Sometimes dictionaries treat similar cases non-uniformly in that, for instance, in one case they name two different senses, as is the case in (11), whereas in another case

they combine two senses in one sense, as e.g. in (12).

(11) a. collection#4 the act of gathering something together EVENT
b. collection#1 several things grouped together or considered as a whole RESULT

(12) destruction#2 an event (or the result of an event) that completely destroys something EVENT + RESULT

3. Sometimes dictionaries miss to label certain senses.
For the nouns *lamb*, *chicken*, *fish* and *beef* WordNet lists a meat sense as well as an animal sense, as illustrated with *lamb* in (13) and *beef* in (14). But the meat sense is lacking for e.g. *kangaroo*, *camel* or *alligator*, as (15) shows for *camel*. [1]

(13) lamb
a. **lamb#1 young shee)**
b. Lamb#2 English essayist (1775-1834)
c. lamb#3 a person easily deceived or cheated (especially in financial matters)
d. lamb#4 a sweet innocent mild-mannered person (especially a child)
e. **lamb#5 the flesh of a young domestic sheep eaten as food**

(14) beef
a. **beef#1 cattle that are reared for their meat**
b. **beef#2 meat from an adult domestic bovine**
c. beef#3 informal terms for objecting

(15) kangaroo
a. **kangaroo**#1 (any of several herbivorous leaping marsupials of Australia and New Guinea having large powerful hind legs and a long thick tail)

4. Sometimes dictionaries provide different senses which even native speakers find difficult to disentangle, as illustrated below for the noun *water* as described in WordNet. Water#1 and water#6 could - intuitively - be merged into one sense

(16) a. water#1 binary compound that occurs at room temperature as a clear colorless odorless tasteless liquid; freezes into ice below 0 degrees centigrade and boils above 100 degrees centigrade; widely used as a solvent

[1] Of course this is related to cultural habits, but even the Australian OED misses the meat sense of the noun *kangaroo*.

b. water#2 the part of the earth's surface covered with water (such as a river or lake or ocean)
c. water#3 once thought to be one of four elements composing the universe (Empedocles)
d. water#4 a facility that provides a source of water
e. water#5 liquid excretory product
f. water#6 a liquid necessary for the life of most animals and plants

Second, besides the issue of the term *sense* itself, it is not convincing to assume that senses need to be the locus of the count/mass distinction when in BECL, too, less than a third of the whole lexicon have senses in different countability classes. This means that the majority of English nouns, actually, does not establish a count/mass difference in their specific senses. And third, some countability assignments from BECL seem to be difficult to comprehend, as for example *blame* where the different senses differ only slightly but a difference in countability is nevertheless claimed.

(17) a. blame#2 a reproach for some lapse or misdeed NEITHER MASS NOR COUNT
b. blame#1 an accusation that you are responsible for some lapse or misdeed MASS

Perhaps the differentiation of these two senses in (17) might as well relate to different countability interpretations of these senses. However, I cannot offer an explanation why these senses have been classified differently and have to assume that it might be due to some kind of annotation error.

6.1.3 Structurally driven generalizations

The idea I want to pursue has its roots in theories that link the count/mass distinction of nouns to a certain division among entities, such as substances vs. objects, or stuff vs. things. I am aware of the many issues that cannot be classified binary, as neither objects nor substances and because of that I do not assume a binary division among entities which account for the phenomenon of countability. However, inspired by the work of Chierchia (2010, to appear) who assumes that the count/mass distinction maps a differentiation among entities, I assume that there exists a correlation between references and nouns which is also present among abstract nouns. This is motivated by experiments which show that children at a few months of age have expectations with regard to how objects differ from substances (cf. Soja et al., 1991). I think that certain types of abstract references as well have strong tendencies towards a clear countability preference.

The many issues of variations and counter examples that exist in languages - on which I also elaborate in 2.2.1 - depend mostly on the choice of certain languages. For aggregate

nouns, there are two alternatives for counting. The choice is often to count either aggregates or granularities as is the case with *onions* and *garlic*, *rice* and *lentils*. This explanation is supported by the fact that precisely those nouns are often a matter of cross-linguistic variation. As Sutton and Filip (2016) argue, cross-linguistic mismatches are frequent with aggregate nouns, and highly dependent on the arbitrary assignment of one language.

Nevertheless, some nouns that have a clear countability assignment can appear in *contrary syntactic distribution*, by which I mean the occurrence of a regular mass noun in a distribution which is common for count nouns or vice versa. These instances are regular and thus can be accounted for as productive countability shifts, such as for instance sorting or packaging. They naturally appear to apply to mass nouns since count nouns are already packaged in standard units.

A system that depends on ontological constraints but allow shifts in countability, is precisely what we observe with the set of abstract nouns investigated in this thesis. Note, the division suggested by Chierchia (1998a, 2010) between substances and objects does not hold for abstract nouns, obviously, since they are neither objects nor substances. However, the idea of imposing such a division, which maps the tendencies we witness in language, can be applied to abstract nouns as well. Although all abstract nouns under consideration can appear as mass and as count, this does not imply that the count/mass distinction is underspecified for abstract nouns. On the contrary, I have been able to observe tendencies of certain nouns to be classified as count and of others to be classified as mass, and this strong and stable division is what I will hold on to. The application of Chierchia's theory is further supported by the observation that the differences that arise between count and mass abstract nouns can be narrowed down to the property of minimal units to be vaguely determined, which is also the ultimate determinant of (un)countability in Chierchia (2010, to appear). The difference with regard to minimal components of eventualities is that the notion of stable atomicity is determined by the telicity of such nominals.

The variation that appears within these abstract nouns will be explained by a set of regular shifts, some of which appear also with concrete nouns.

6.2 A vagueness based analysis of eventualities

In this section, I am to present an analysis for a subset of abstract nouns, i.e. eventuality denoting nominals, which identifies the countability of such nominals in dependence to aspectual features provided by the underlying eventuality. The dependency between telicity and countability will be framed in a vagueness based analysis that captures the division of count and mass eventualities.

For the present purpose I will limit the generalizations that follow to abstract nouns that fulfil two criteria:

1. MORPHOLOGICAL

they are depredicated, i.e. derived from verbs, adjectives, other nouns, foreign words

2. SEMANTIC
they denote eventualities in the sense of Bach (1986)

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, as e.g. *license*. The dataset I investigated contains abstract nouns which appear to denote some kind of eventuality although not all of them are derived from verbs, as for instance *surgery, outflow, drama, consequence*. Gerunds are exceptional in this regard and have to be considered separately. I will exclude gerunds from consideration due to their structural resemblance with verbs. The semantic criterion is meant in a broad sense, following Bach's typology of eventualities (Bach, 1986) which includes also dynamic and static states, next to protracted and momentaneous events as well as processes.

One remark regarding BECL: I will distance myself from the classification in BECL to the amount that is possible. While I ground my major motivation in the diverse classification of BECL, I will, however, not be able to explain all the different and more-or-less surprising assignments in BECL for some of which I believe are due to annotation errors or the result of lexicographic influence as described in section 4.1.4. Yet, the claims I want to establish are based on the empirical observations from the annotations task (chapter 4) and the corpus study (chapter 5).

In order to determine a pattern for the adequate classification of eventuality denoting nominals into count or mass, aspectual classes appeared to be highly relevant. I am following the standard classification by Vendler (1967) into states, activities, accomplishments and achievements and argue that the derived nominals can be classified according to this classification of verbal predicates.[2] The focus is on 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 (cf. Verkuyl, 1989). I agree with Krifka (1989) and Hinrichs (1985) that atelic predicates (processes and states) resemble mass nouns, while telic predicates (accomplishments, achievement) are more like count nouns, which can be witnessed in many examples throughout the empirical part of this thesis.

A binary division among the references of eventualities will, however, be difficult to postulate, even impossible when considering the set of annotated categories for abstract nouns in Table 4.7. Yet, some tendencies are very strong and with regard to these tendencies I wish to establish the following claims:

[2]There is, of course, a matter of variation, both context dependent and in terms of lexical ambiguity. In addition to that, telicity is a compositional property, thus the process *running* will be classified as atelic, but *running a marathon* would be a telic predicate. Having these discrepancies in mind, I still want to pursue the idea of determining aspect related generalizations in the solid part of this research.

(18) **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 result as a modification of the noun phrase as in *John's run last session* or *several inquiries into the President's life*.

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 by means of terminating the process which yields a countable noun.

3. States are predominantly mass. They are the hardest to count and 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.

Throughout the data which I investigated it was evident that telic events were classified as countable, which can be observed both on a lexical level, as illustrated with data from BECL in (19), and from corpus usage, as the examples from COCA in (20) show.

(19) a. change#1 an event that occurs when something passes from one state or phase to another COUNT
b. transplant#2 an operation moving an organ from one organism (the donor) to another (the recipient) COUNT
c. embarrassment#3 some event that causes someone to be embarrassed COUNT

(20) a. It said removing the land wasn't **a change** in policy, but rather just cleaning up what the actual policy was supposed to have always been.
b. Dr. Mehmet Oz, the Director of the Cardiovascular Institute at New York Presbyterian Hospital, performed **many transplants**, has used the temporary heart pump and now is convinced the permanent pump will revolutionize treatment.
c. But a series of **embarrassments**, including the revelation that he once falsely claimed he was of Latino origin, and a headstart by Republican rivals, has left Jeb scrambling to reassert his claim to be the party's inevitable candidate.

A noun that denotes a telic eventuality is thus always count. What is being counted are whole completed events, for instance, events of transplants or events of embarrassments. There is (or can be) a matter of variation of how to count the units such as whether an event of crime, where someone murders another person but rapes him or her beforehand, counts as one event or two. But this is due to contextual influence which I will discuss in section 6.2.1.1. Importantly, counting is possible because we are dealing with bounded units and we are able to determine the individual events (a change/embarrassment/transplant) by means of the boundaries provided by telic events.

The relation between telicity and countness is bidirectional. A telic event implies that this event is countable, but also an event which occurs in count use (e.g. with the indefinite article, in plural from or with modifiers such as *many*) implies that this event is telic. This presumption will be easier to follow after introducing processes.

(21) telicity ⇔ countness
Every telic event is referred to by a count noun, and every countable nominal referring to an eventuality implies that the event is telic.

Processes are not as determined as telic events, because they vary a lot and it is not particularly clear what the boundaries of certain processes are, e.g. when the process starts and/or ends. Processes appear to be classified as count and as mass which is evident from the classification in BECL, as the following examples illustrate.

(22) a. alteration #3 the act of revising or altering (involving reconsideration and modification) MASS
b. alteration #1 an event that occurs when something passes from one state or phase to another COUNT

(23) a. decrease #2 a process of becoming smaller or shorter MASS
b. decrease #4 the act of decreasing or reducing something COUNT

(24) a. flow #3 the act of flowing or streaming; continuous progression MASS
b. flow #4 any uninterrupted stream or discharge COUNT

There is, however, a slight difference in the examples (a) and (b) above. The (a) definitions describe atelic processes whereas the (b) counterparts imply a certain boundedness or telicity on that process. *Alteration*, as an illustration, has a count sense which describes the same process as in the mass sense, but within a frame where it is regarded as a completed event, which is telic, similarly *flow*#4 is telic, but flow#3 is not since it emphasizes the unbound process of flowing. *Decrease* is a bit different, the count and mass senses differ only slightly. Yet, the count sense explicitly mentions an object - decreasing or reducing *something* - which will undergo a change due to that process or event of decreasing. The introduction of this object changes the activity to an accomplishment and by this it turns it into a telic event.

It appears naturally possible to count processes once the termination of that process is implied or explicitly specified. *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 yield a count interpretation of a bounded event which consist of the inquiry process. By this, we limit the process to its temporal boundaries. Consider the self-constructed minimal pairs below which reflect this contrast:

(25) 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. When we have a process, it is easy to conceptualize it as a bounded event, namely by terminating it. Consider as an illustration the process of run. It remains an atelic activity as long as we do not modify it or conceptualize it as something which is terminated, as e.g. *John's run last week* or *the run in the afternoon*. However, turning a telic event into an atelic process 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 takes a certain amount of time. But extracting a process from an event is not a regular nor a productive phenomenon. This is, I believe, due to the possible complexity of certain event nouns. *Embarrassment* for instance varies a lot, but if we imagine a situation in which something happened that makes us feel embarrassed, it is difficult to narrow down this (what makes us feel embarrassed) to a process that is homogeneous and runs for certain time. It is rather punctual, a reaction of someone or something alike.

Nouns denoting states are different from processes and events. They present a very stable mass category, as the examples below illustrate. Just like ordinary mass nouns, e.g. *blood* or *water*, states have a divisive reference. They are true of all the minimal instances of the state.

(26) a. faith #1 a strong belief in a supernatural power or powers that control human destiny MASS
b. need #4 a state of extreme poverty or destitution MASS
c. certainty #1 the state of being certain MASS

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

Unlike processes which can be terminated, states are difficult to turn to count expressions in the form of a bounded eventuality.

6.2.1 Vagueness

Regarding the question for the ultimate determinant which explains the division between count and mass nouns, I will follow Chierchia (2010, to appear) assuming that the vagueness of the minimal components lies at the core distinction between count and mass nouns.

It appears that what makes such an eventive nominal count or mass is the extent to which the minimal components are vague. With vagueness I mean the inability to determine an event atom across different worlds. If we consider worlds to be ordered in accordance with the *standards of precision*, then w $\propto$ w' means that the standards of precision in w' are at least as sharp as (perhaps even sharper than) in w. Chierchia explains this by means of an example with the cat predicate P whose positive extension contains the things of which P is true in w (cats) and negative extension contains things of which P is not true in w (other than cat entities). The vagueness band is then meant to contain the things for which P is undefined in w, as e.g. cat-like object or toys. A precisification of such a world will contain fewer things in the vagueness band since vagueness is gradually resolved through precisifications. This means that the things for which P was undefined in a world w will be either in the negative or positive extension of that predicate in w' if w $\propto$ w'. Importantly, once a thing is determined to be in the positive extension, it stays there.

Similarly, telic events can easily be identified. This can at best be illustrated with achievements like death or birth where the termination of the event yields a change in state, such as from alive to dead, or from not-yet-born to born. There is no doubt or difficulty in identifying an event as death or birth. And once an event is determined as such, it will stay in the positive extension also in the precisified worlds. Following Chierchia's definition of relative atomicity as "an individual x is an atom relative to P (a P-atom) in w iff no other individual of which P is true in w is a proper part of x" (Chierchia, to appear), an analogous event atom will stay an atom in all further precisifications of the world.

Contrary to that are atelic processes and states. 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 events that are true of that predicate (running) from events which are not true of that predicate in w (as e.g. sleeping), we cannot determine the units of run within that process which can last over some time. 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. Let us imagine we were in the position to say for a random unit of the process run that it is the run atom in w. Despite that, in a world w' which is a precisification of w (w $\propto$ w') that same atom might not be an atom any more since it is not minimal and parts of it are themselves units of run.

This divisive character of the reference of atelic eventualities is precisely a commonality shared with mass nouns. The inability to narrow down the minimal atom of the mass reference or of the atelic eventuality makes these nouns uncountable. With states, the divisive property is even more dominant because states go down to the most minimal instances and do not allow a possible termination of it, as processes do. For instance, stupidity is a homogeneous state and events of which this state is true in w are of the form that all instances and possible units of that event are also likewise in the positive extension of stupidity.

The reason why we can count telic eventualities (including bounded processes) is because we know very well what we are counting or what we are quantifying over: individual events (*change*, *death*), bounded events of running, drawing, breathing and alike. With atelic processes it is less easy to count. It is not obvious how or what to quantify over (as is with telic events). We cannot decide on the minimal counting parts of processes. But once we set a boundary around the process, either compositionally (draw a circle, run a marathon) or temporally (the running in the morning, or the 15 minutes-run) we quantify over a telic event in which this process takes place.

States are the most difficult to count. We do not know what exactly the minimal components are to count, because the minimal parts are not clearly separated. States go down to the very instances of which the state is true. We cannot bound states the same way as processes in order to count them. States are predominantly mass, just like substances.

6.2.1.1 A remark on optional divisiveness

For analysing the semantics of count and mass abstract nouns, one has to determine whether they can be logically accounted for the same way as concrete count and mass can (cf. section 2.4). The semantic analyses of concrete count and mass nouns depend on their ability to be conceptualized in form of individuated atoms which are quantized. The reference of mass nouns, on the contrary, is cumulative and divisive.

Speaking of divisiveness, some people have shared their concern with regard to abstract nouns which when countable can still be perceived as divisive. For instance, Grimm (2016) argues that *crime* in countable use does not necessarily have to be atomic, since it is possible to conceptualize a crime which consist of other crimes, thus a crime of murder can contain a crime of hurting and raping. My take on this is - and here I am arguing against my conclusion no. 2 in section 3.4 - to assume that the fact that a single crime can be perceived as containing two crimes does not make *crime* less countable. Such a nature of *crime* and other abstract nouns originates from the lack of specification of these nominals. The ability of *a crime* to be conceptualized as divisive is not analogous to the divisiveness of water. It rather resembles homogeneous object nouns, such as *fence*, *wall* or *sequence*. A fence can be thought of as having parts which are fences as well. Unlike water, for fence and crime we need *a qualitative restriction* that tells us what counts as one fence. This, however,

can vary from the type of fence, from person to person, from culture to culture and so on. Similarly, countable *crime* can be thought of as divisive, countable *transplant*, *alteration* alike. Importantly this ability to be interpreted as divisive is not as stable as with the mass use of water which anyhow is interpreted as divisive, and this does not interfere with such nouns being countable.

6.3 The formal frame

Based on the generalizations in (18), I conclude that the derived nominals under consideration either denote 1. (atelic) processes, 2. states or 3. (telic) events. Events are count, states are mass, and processes can be both mass or count depending on the inner aspect of it.

Processes and events are interrelated. Some nouns come out of the lexicon as telic events, such as *death*, *birth*, and some events result from shifting an atelic process to a telic event by means of terminating the process, i.e. setting a temporal boundary around it, as illustrated with some examples from COCA in (28).

(28) countable events

a. It said removing the land wasn't **a change** in policy, but rather just cleaning up what the actual policy was supposed to have always been.

b. Salmon prices fell 10 percent in 1988 and a rapid **decrease** in prices followed in 1989.

Importantly, the core difference between mass processes and count events is that of inner aspect: atelic aspect yields a mass noun, telic aspect a count noun. For states which cannot be terminated, thus shifted to telic, they remain atelic.

So we need to differentiate three types of nominals: E (telic events), S (states), P (processes). P and S behave like ordinary mass nouns, with the difference that P can (and S cannot) shift to a telic event. E behave like ordinary count nouns. I assume that count event nominals, such as *transplant*, permit the individuation of single complete, terminated events, contrary to the assumption of Strawson (1959) that eventualities fail to provide a (prima facie) stable and reliable sortal 'principle for distinguishing and counting individual particulars', as illustrated with the examples in (28).

(29) the relation between E and P:
P $\rightarrow$ E, if P contextually bounded in time or terminated

Since E, P and S denote eventualities, the semantic type of their denotation is event $\langle v \rangle$, not entity $\langle e \rangle$ (as have object nouns) nor propositions $\langle s,t \rangle$. Thus, the properties E, S, and P will denote functions from eventualities to truth values $\langle v,t \rangle$.

6.3.1 Event nominals

Since the semantic type of the denotation of eventualities is event $\langle v \rangle$, their extension has to include events. The difference between P and S on one side and E on the other is the same as between ordinary concrete count nouns and ordinary concrete mass nouns (*table* vs. *blood*). Hence, P(e) and S(e) are mass predicates, contrary to E(e) which is count.

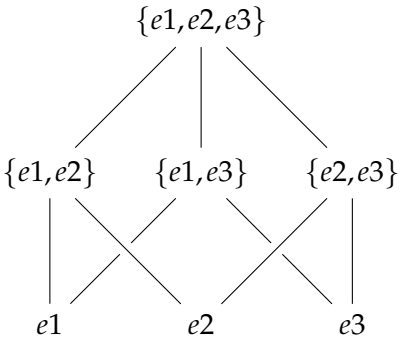
As argued in 6.2.1, the differences in the count and mass reference of eventualities can be narrowed down to the vagueness of the minimal components, which is an idea pursued by Chierchia (2010, to appear) for determining the countability of concrete nouns. In the following, I will try to adopt Chierchia's model so as to account for eventuality denoting nominals.

For the domain interpretation, the model M used in Chierchia (2010) is a tuple of the form <U, W, C, α, F> with 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. We will need to add E as the set of events in the universe, which stores the extension of event nominals:

(30) $E \subseteq U$ 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 many approaches for concrete nouns), which is partially ordered by $\leq$ and closed under a join operation $\cup$, as illustrated in (31).

(31)



Semantic theories of the count/mass distinction rely on the notion of atomicity which is a necessary constraint on count predicates. Following that, the singletons at the bottom present the atomic events, referred to by singular event nominals which are telic, such as *death* or *birth*. The sets above are the sums of these atomic events, which form the extension of plural telic event nominals, such *deaths*, *births*, *transplants*.

(32) Malaria alone is responsible for 400,000 **deaths** a year, and most cases are children

under five years of age 1-3.

Events have a number alternation; in singular they denote a set of atomic events, and in plural the sets of sums of atomic events (including the atomic events) which result from applying the plural operator '*' on the singular predicate. This is in accordance with the singular and plural denotation of concrete count nouns in Chierchia (2010). If we assume that we have three events of death in our domain, say a, b and c, the denotation of the singular noun *death* and the plural counterpart *deaths* would be as in (33) and (34) respectively.

(33) denotation of telic events

a. [[death]] = λwλe.P(w)(e)
where e is of type $\langle v \rangle$
extn = $\{e1, e2, e3\}$

b. [[deaths]] = λwλe.*P(w)(e)
where e is of type $\langle v \rangle$
extn = $\{e1, e2, e3, \{e1, e2\}, \{e1, e3\}, \{e2, e3\}, \{e1, e2, e3\}\}$

For states (S) and processes (P) we do not assume a number alternation unless the predicate is shifted to a count predicate. Similar to ordinary concrete mass nouns, they denote the whole semi-lattice including both the atomic events as well as all the sums generated from the atoms at the bottom. They do not pluralize since they are sum-closed and by that inherently plural. This way the denotation of processes, as given in (34), is of the same structure as states (35).

(34) denotation of processes
[[inquiry]] = λwλe.P(w)(e)
where e is of type $\langle v \rangle$
extn = $\{e1, e2, e3, \{e1, e2\}, \{e1, e3\}, \{e2, e3\}, \{e1, e2, e3\}\}$

(35) denotation of states
[[need]] = λwλe.P(w)(e)
where e is of type $\langle v \rangle$
extn = $\{e1, e2, e3, \{e1, e2\}, \{e1, e3\}, \{e2, e3\}, \{e1, e2, e3\}\}$

From this perspective it seems that the extension of plural count eventualities is the same as singular mass eventualities, because it consists of the atomic entities as well as the sums of atoms. However, the are two differences with regard to the extension of plurals and mass terms. First, the atoms in the extension of mass eventualities are not stable. They are vaguely specified through the precisifications of the world. The definitions of stable and non-stable atoms in Chierchia (to appear) apply to eventualities as well, as described in

(36) which is a slight modification (type adjustments) of his definition of stable atomicity in Chierchia (to appear).

(36) a. $AT(P) = \lambda w \lambda e.P_w(x) \wedge \forall y[P_w(y) \wedge y \leq x \rightarrow x = y]$ P-atoms

b. $\mathbf{AT}(P) = \lambda w \lambda e.P_w(x) \wedge \forall y \forall w'[\, w \propto w' \wedge P_{w'}(y) \wedge y \leq x \rightarrow x = y]$ stable P-atoms

Following the definitions in (36) and our conceptualization of the vagueness in mass eventualities, it follows that the set of stable atoms is an empty set for mass eventualities, such as states or processes: $\mathbf{AT}(P) = \oslash$. Such a proper treatment of atomicity in the extension of count and mass eventualities is needed for accounting the formation with numerals and the indefinite article which target stable atoms (**AT**). The second difference between plural events and mass events regards the sums in the extension of these predicates. While the sums in the plural extension are derived via the operation '*', the sums in the extension of mass eventualities are already specified in the lexicon.

6.3.2 Variation

As mentioned several times and illustrated in (5)-(6), the countability assignment to abstract nouns is peculiar for that it can be easily shifted. I distinguish two types of mass to count shifts which are of relevance for this study. One is related to processes and derives telic processes, i.e. count eventualities, which I will call the *telic shift*. The other shift is not only a shift of countability but also of the reference of the noun. In this case, the eventuality denoting nominal refers to a thematic role of the event, usually the theme. I will call this shift the *theta shift* and elaborate on it separately in 6.4.

Besides these, there is also the ability to refer to kinds of certain events, which I will not discuss in great detail. The shift to kinds is familiar from concrete nouns and its presence among abstract nouns is not surprising. I will therefore assume that the formation of kinds developed in Chierchia (1998b) holds also for eventualities.

(37) a. $K \subseteq U$
is the set of kinds

b. $K \subseteq AT$
kinds are atomic

c. for P which is mass, $^{\cap}P$ is the mass kind (type: <s,e>/<s,v>)

For the sake of illustration, consider the examples in (38) as referring to specific kinds of knowledge or hope.

(38) a. Boys and girls are being thrust into adulthood without a **knowledge** of their past, something unimaginable a generation ago.

b. So I went to my mom that hot day in July with a **hope** in my heart and a tear in my eye.[3]

This type of count interpretation differs from ordinary count eventualities which are telic events, such as *transplants*, *deaths*, *classifications* and alike, as well as from count interpretations that result from turning an atelic predicate to a telic predicate. *Knowledge* is countable in (38-b) because it refers to a specific kind of knowledge which apparently younger generations do not have. Unlike kinds, the telic shift is restricted to atelic predicates.

Regarding the shift to telic eventualities, I argued before that the atelic mass interpretation is the basic meaning and that the telic version is a derivation of it, because the mass form is more general and the count form is a modified version of it, framed as a telic eventuality. The telic shift is very productive and yields a count noun denoting a telic event or a *bounded process*[4]. A mass nominal that refers to a process can easily be turned to a count expression by conceptually putting a boundary around the process, framing it as a telic event, and this is overtly expressed with count syntax. Hence, an atelic process such as *run* can be conceptualized as telic, and by this it enables the determination of minimal components, i.e. the whole, terminated events of running.

The validation of such a telic shift is further supported by the lexical annotation task (chapter 4) as well as the corpus study (chapter 5) which both showed instances of telic shifts. Consider the following examples from BECL, where (a) present the atelic process, while (b) the bounded process, i.e. event:

(39) a. transplantation#2 the act of removing something from one location and introducing it in another location MASS
b. transplantation#1 an operation moving an organ from one organism (the donor) to another (the recipient) COUNT

(40) a. outrage#4 the act of scandalizing MASS
b. outrage#3 a disgraceful event COUNT

(41) a. dispute#2 coming into conflict with MASS
b. dispute#1 a disagreement or argument about something important COUNT

[3]Previously, I classified the examples in (38) in the annotation part as presenting an example of the instance meaning, which has been listed in WordNet for some event nominals, e.g. inquiry#2 *an instance of questioning* or hope#1 *a specific instance of feeling hopeful* (cf. chapter 4). Since the survey of count occurrences of the annotated abstract nouns in chapter 5 did not verify such an interpretation of count eventualities, I need to re-evaluate these examples. Perhaps one could still argue that (38) are indeed cases of an *instance* interpretation, nevertheless it is much easier to assume that *hope* in (38) refers to a specific type of hope, for example, the hope that his mother will let him go abroad for the holidays. The reference to kinds is productive with both count and mass concrete nouns, and thus the possibility to interpret (38) as kinds seems plausible.

[4]I use bounded process and events synonymously, although there is a slight difference. Every bounded process is also an event since it denotes a telic eventualitiy, but not every event is a bounded process. Some telic events are lexically determined as telic, such as *birth* or *death*, and some are derived through compositional modification.

As can be seen in the meaning descriptions above, processes are flexible with regard to countability. I assume that they are originally atelic (hence mass) in their core meaning and that they shift easily to a telic (hence count) interpretation. In this particular case of variation we are dealing with true cases of so-called dual-life nouns in which there is no other difference in meaning between the two - count and mass - meanings except for the difference in countability. (Kiss et al., to appear) refer to this type of ambiguity as T4 ambiguity:

(42) "T4 ambiguity: If X is the mass interpretation, when used as a count noun, the interpretation becomes an individual X." (Kiss et al., to appear)

Kiss et al. (to appear) argue that T4 ambiguity has to be differentiated from other cases of ambiguity with a countability shift in which an additional semantic ingredient is added, such as *chicken* (animals vs. meat). In case of abstract nouns, we can observe the application of the T4 ambiguity, in particular in the telic shift, because there is no other difference in the meanings of the count and mass interpretation except for the one related to countability. Because of this state of affairs, we are able to adopt the partition operator $\prod$ to derive such a count predicate referring to a telic process. The partition operator $\prod$ in Chierchia (2010) was originally aimed to derive count from mass predicates, such as *rope*, *stone* or *rock*.

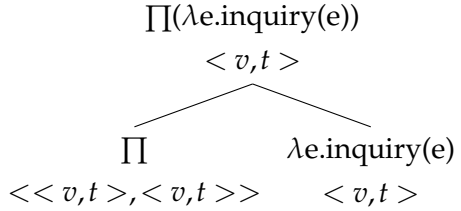
(43) For any model M, c $\in$ C and any P $\in D_{<e,t>}$,
F($\prod$ST)(c)(P) is a partition of P most salient in c (the standard S-partition)
(Chierchia, 2010: 129)

For the purpose of applying $\prod$ to atelic eventualities, we will have to modify (43) such as to apply for any P $\in E_{<v,t>}$. Then the requirements of relative atomicity can be satisfied:

(44) AT($\prod$(P)) = $\prod$(P)
If x is a member of a partition of P, no proper part of x is (Chierchia, 2010: 125)

In Chierchia (2010), the operator $\prod$ is of type $<<e,t>,<e,t>>$ and applies to predicates of type $<e,t>$. I will assume that it is type preserving, hence when it applies to predicates of type $<v,t>$ it will be of type $<<v,t>,<v,t>>$, as illustrated in (45).

(45)



The resulting count predicate refers to a partition of the mass predicate, a unit which is most salient in the given context. Similarly, the countable process can be perceived as the most salient part of the process, namely one which has specified boundaries and a termination.

6.4 Reference to thematic roles

Besides the telic and kind shift, there is another way for eventuality denoting nominals to be interpreted as countable, and this is when referring to thematic roles of the event. In this case, the nominal no longer refers to an eventuality but instead to a salient thematic role of the eventuality. From the point of my observations, this thematic role is usually the *theme* or *patient*.

This shift corresponds to the count interpretation observed in the lexical annotation task (chapter 4) as well as in the corpus study (chapter 5) which I called *placeholders*. I named them *placeholders* for the fact that in WordNet and possibly also in other dictionaries this specific meaning of the nominal was described as *something/anything that is X*, as is the case with the examples in (46). It thus reminded me of placeholders for other things - their thematic roles, for instance *need* is a placeholder for the object which is necessary, but lacking, as e.g. water.

(46) a. certainty#2 something that is certain
b. necessity#2 anything indispensable
c. need#2 anything that is necessary but lacking

This specific interpretation of nouns was further supported in the corpus study. My survey of the corpus use of count occurrences of eventuality denoting nouns shows cases in which the noun refers to a salient theta role, although this meaning was not listed in BECL or WordNet, as e.g. *embarrassment* in (47-a). The following examples of COCA illustrate this specific meaning.

(47) a. She was glad she'd had enough warning to hide a few **embarrassments**: stuffed animals, posters showing kittens and cloying sentiments about love.
b. Gradually the screws of rampant consumerism were turned, and wants and desires became perceived **necessities**: another process pregnant with geographical implications.
c. 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.
d. Chloe liked to cook when she had the time, so a decent kitchen was a **necessity**.
e. **Delegations** from across the country as well as from China and the Republic

of Korea have visited Ben Franklin High to study and emulate its successes.

f. Instead, the scammers printed **forgeries** that were close enough to the real thing to fool some buyers.

The nominals in the examples in (47) can be described as placeholders for the things which are necessities, virtues or certainties. However, bearing in mind that these nouns are actually eventive and many of them are derived from verbs, guides us to the option that in (47) we might actually be dealing with the arguments of these events.

As an illustration consider some examples from (47) with additional explanations of how the nominal can be thought of as referring to the theme or patient in (48)-(50).

(48) She was glad she'd had enough warning to hide a few **embarrassments**: stuffed animals, posters showing kittens and cloying sentiments about love.
⇒ she is embarrassed by stuffed animals, posters showing kittens and cloying sentiments about love
⇒ embarrassments = stuffed animals, posters showing kittens, cloying sentiments about love

(49) 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.
⇒ X is certain about death, taxes and someone's out there trying to steal your money
⇒ certainties = death, taxes, someone's out there trying to steal your money

(50) Chloe liked to cook when she had the time, so a decent kitchen was a **necessity**.
⇒ For Chloe a kitchen is necessary
⇒ necessity = decent kitchen

It is not necessary to overtly express what exactly the theme of the eventuality is, such as in the following example with *delegations*.

(51) **Delegations** from across the country as well as from China and the Republic of Korea have visited Ben Franklin High to study and emulate its successes.
⇒ X delegated Y to Ben Franklin High
⇒ delegations = Y

Previously, in linguistic literature on deverbal nominals it has been claimed that the event nominal can also refer to the result of that event (cf. Grimshaw, 1990; Alexiadou et al., 2010) in which case the nominal would be called *Result Nominal*. Contrary to Result Nominals which are restricted to events that yield a result of that event, the *reference to thematic roles* is a broader phenomenon which comprises also Result Nominals next to other cases of referring to thematic roles. Besides result nominals, it also comprises cases

of *Referential Nouns* (cf. Melloni, 2007).

A description of this interpretation of nominals along the lines of referring to thematic roles of the underlying eventuality sheds new light on the event semantics in the nominal domain.

6.4.1 Proposal

In the following I will try to propose an informal analysis of the reference to thematic roles. There is a striking similarity of the reference to thematic roles in the examples above and the themes of events in the verbal domain. One could assume that since processes P, states S and events E denote eventualities they have an argument structure containing the event argument (Davidsonian) + one argument for the salient theta-role (most probably theme). This would imply a denotation similar to events in the verbal domain, as illustrated in (52).

(52) $\lambda x \lambda e.P(e) \wedge TH(e,x)$ (Neo-Davidsonian style)

(52) perfectly describes what is referred to with the event nominals in (47). However, if we were to assume that (52) is the denotation of eventualities then we would be obliged to assume that the thematic role is always present, and more importantly already introduced in the lexical entry, which does not correspond to the actual state. It is incorrect. There are many more examples in which the event nominal refers to the actual event, and not a thematic role of it. Hence, the problem we are facing is that of ambiguity. An eventuality denoting nominal can refer to only one element when used in natural language. This is either the event (53-a), or the theme of that event (53-b).

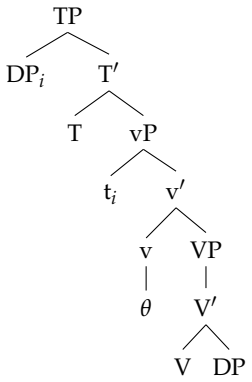
(53) a. $\lambda w \lambda e.P(w)(e)$
b. $\lambda w \lambda x \lambda e.P(w)(e) \wedge TH(w)(e,x)$

In my opinion, it seems plausible to assume that (53-a) is the denotation of eventuality denoting nominals independent of the specific interpretation, eventive or referential in case of referring to thematic roles. The information concerning the theme (or likewise patient) have to be adjoined at a higher syntactic position.

(54) [[theme]] = $\lambda w \lambda x \lambda e.TH(w)(e,x)$
where TH(w)(e,x) = x is the theme of e in w

In order to formalize such an idea, we need to borrow some ingredients usually used in event semantics. Functional heads introduce thematic roles (although for Kratzer (1996) only the external thematic role, the agent). Let us look a bit closer into this. Kratzer (1996) assumes that VoiceP (or light vP) houses the verb's external argument and assigns a theta-role to it, as depicted in (55).

(55)



For the semantics combining the voice head with the VP, Kratzer introduces the event identification rule to combine the meaning components of light v and VP, as described in (56).

(56) f:⟨e,⟨s,t⟩⟩ g:⟨s,t⟩ ⇒h:⟨e,⟨s,t⟩⟩
λxλe.ag(e,x) λe.P(e) λxλe.P(e)∧ag(e,x)
Kratzer's event identification rule

Along the same lines, one could assume that a functional projection inside the noun phrase provides the necessary information regarding the reference to the theme of the event. For our purpose, we need a modification of that rule which accounts for the theme instead of the agent, as proposed in (57).

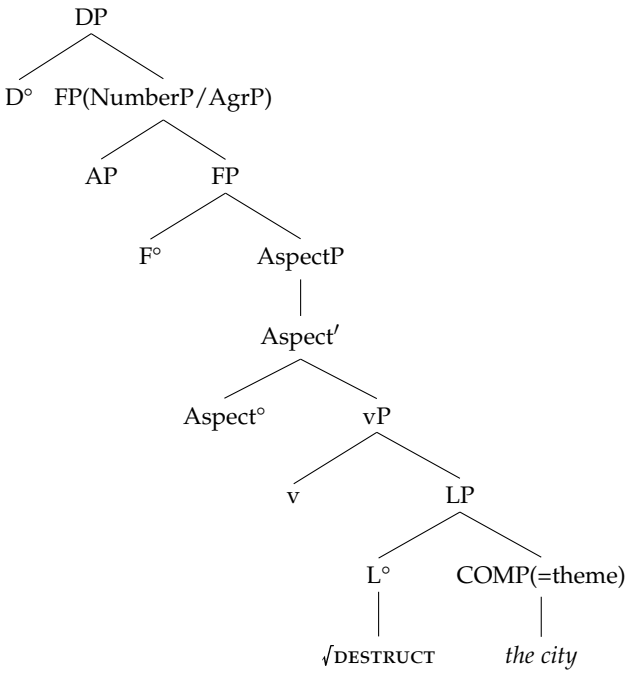
(57) f:⟨e,⟨v,t⟩⟩ g:⟨v,t⟩ ⇒h:⟨e,⟨v,t⟩⟩
λxλe.TH(e,x) λe.P(e) λxλe.P(e)∧TH(e,x)
THEME IDENTIFICATION

However, we cannot simply adopt the same analysis of the external agent because unlike our reference to thematic roles, the thematic roles in (56), as well as in other areas of event semantics in the verbal domain, introduce new discourse referents which are overtly expressed. This is a very challenging issue because with the reference to thematic roles our eventualities do not introduce new discourse referents. Instead, we have a discourse referent which refers either to the event or to the thematic role of that event. Nonetheless, the idea of having a functional head introduce the relevant component of the thematic role of the event and the mode of composition via the rule in (57) is on the right track.

Regarding functional projections, it might be noteworthy to consider the proposal suggested by Alexiadou (2001) where it is assumed that some functional projections, which are common in verb phrases, are also present in the nominal projection, as e.g. AspP and little v illustrated in (58)[5].

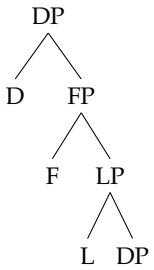
[5]Importantly, Alexiadou considers the inclusion of vP inside the nominal projection, but with the difference

(58) from (Alexiadou, 2001: 57):



Alexiadou assumes that derived nominals have two interpretations, one eventive and the other as a result nominal. In order to account for the eventive interpretation of deverbal nominals she posits AspP and vP inside the nominals projection. AspP yields aspectual properties of the events while vP accounts for the eventive reading. These functional projections are not needed in the syntactic structure of Result Nominals. For them, Alexiadou assumes a projection of the DP without AspP and vP, similar to ordinary non-eventive nouns, as presented in (59).

(59)



(59) is precisely the interpretation which I address by *reference to thematic roles*. While Alexiadou's analysis might be useful for other reasons, for our purpose it is not necessary to include the projection of vP inside the noun phrase in order to yield an eventive inter-

that the vP inside the nominal projection is not meant to host the external argument. It's only purpose is to provide an eventive interpretation. This is not needed in our case because the nominals are already specified as eventive in the lexical entries.

pretation. Because in my analysis the event interpretation is already present in the lexical meaning of the nominal which is unlike object nouns of type $\langle v \rangle$. Hence, the division between event reference and object reference is provided by the semantics of these nominals. As far as AspP is concerned, there might be independent reasons to include this projection, but for the specific issue discussed here it does not seem necessary. While I do take inner aspect into consideration due to the dependency between telicity and countness, I would not adopt an extra functional projection for the aspect within the noun phrase, because the division of telic and atelic aspect is (i) not overtly marked on eventive nominals and (ii) it is disentangled on the lexical level[6]. Telic eventualities denote stable atoms while atelic eventualities denote sums of unstable atoms. Concerning Alexiaodu's analysis of Result Nominals which resembles ordinary object nouns, I find it not reasonable to analyse them analogous to ordinary object nouns although these nominals might refer to ordinary objects, such as *forgery* or *classification*. The reason for my concern is that these nouns are indeed related to the underlying event. Without the event of forgery or classification no objects could have resulted from it, or in other words, there would not be a reference to the thematic role without an event. Ideally, the dependency between these Result Nominals (or as I call them reference to thematic roles) is recognized either in the semantics or syntax, or both.

What comes closest to my perception of the phenomenon with Result Nominals or the reference to thematic roles is to introduce a new functional projection for the introduction of the theme reference. This has to be different from other functional projections which introduce thematic roles for the very reason that we do not want to introduce a new discourse referent. Instead we aim to introduce a new property which applies to the discourse referent provided by the event. I will pursue my idea of a unified lexical entry for eventive nominals, as illustrated in (60). The reference to the thematic role will be accounted for by adjoining the theme at a higher position within a functional projection. In case of an interpretation as the here discussed reference to thematic roles, I assume that one functional layer will carry this information as given in (61).

(60) $\lambda w \lambda e.P(w)(e)$

(61) [[theme]] = $\lambda w \lambda x \lambda e.TH(w)(e,x)$
where TH(w)(e,x) = x is the theme of e in w

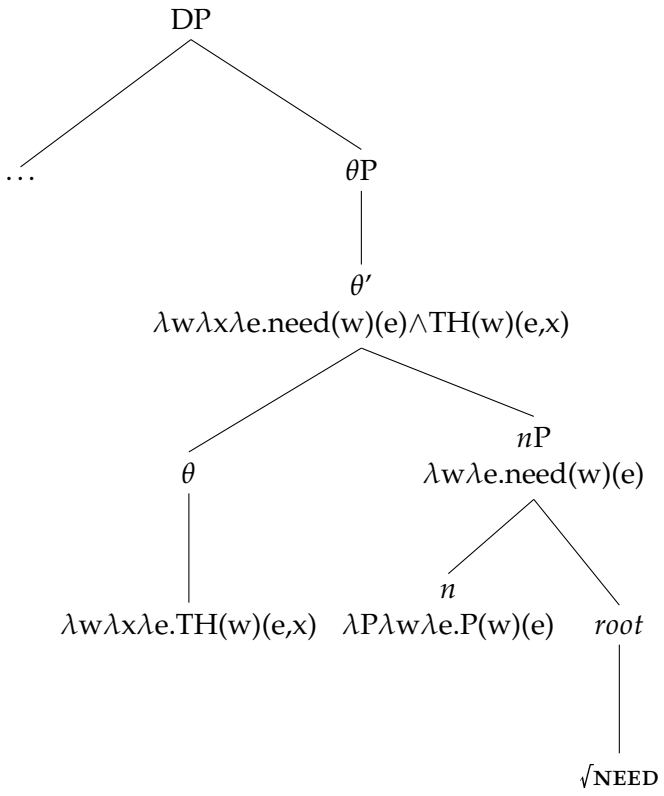
At some level in the syntactic structure, this information should be adjoined. The functional head that introduces the thematic role needs to be a phrase with the characteristics that it has to be non-obligatory since the lack of such a phrase should imply the eventive reading of the nominal[7]. Regarding the syntactic position of this composition, it seems nat-

[6] This issue might differ in languages other than English, in which case the inclusion of AspP is legitimate.

[7] Such properties of phrases resemble much those of modification in NPs. One idea could also be to implement the reference to thematic roles akin to modification. There are several theories regarding the

ural to assume a position below D, but above *n*P. I introduce θ to be the head of θP which takes as input the event nominal categorized as a noun and yields the semantics of the event with the theme reference. (62) illustrates one way of doing so with the eventuality denoting nominal *need*.

(62)



In (62) *n*P hosts the event nominal and θP adds the thematic reference ingredient which derives the targeted meaning. θ' is composed by *theme identification* (57). Importantly, the theme reference is not included in the denotation of the nominal but is externally introduced similar to agents of events in the verbal domain. This proposal is, however, not a fully specified analysis, but an idea to start with. For a complete compositional analysis a more thorough study of other modes of composition is required.

semantics of modification. An analysis which seems adoptable in this regard is one along the lines of intersective composition as advocated by Larson (1998) and Chung and Ladusaw (2016). They treat modifiers within the NP as first-order properties and adopt another mode of composition. i.e. the intersective composition operation MODIFY, to derive the meaning of the NP, as shown in (i).

(i) MODIFY(λx[nurse(x)],λy[male(y)]) = λx[male(x)$\wedge$nurse(x)]

An analysis in this terms is perhaps also suited for the reference to thematic roles.

6.5 Summary

In this chapter I presented an analysis of the semantics of eventuality denoting nominals. While I did not manage to solve completely the puzzle that still troubles us with regard to abstract nouns, I succeeded in providing generalizations regarding a subset of these nouns. With the analysis of the semantics of eventuality denoting nominals as the basis, we can develop it further to possibly account for other types of abstract nouns as well.

I decided to pursue a formal frame of countability proposed by Chierchia for two reason: 1. the ontological contrast present across languages which maps count and mass nouns to certain types of reference, and 2. the dependency between countness and atomicity which remains stable across worlds unlike the atoms of mass reference. In the same fashion, eventuality denoting nominals provide some strong tendencies towards a countability assignment related to the telicity of the eventualities. With regard to such nominals, I distinguish three types of eventualities: telic events, processes and states. While telic events are predominantly count, states are predominantly mass and processes present a flexible category since they can be count or mass depending on the inner aspect of the nominal.

The differences that arise with regard to countability among eventualities can be understood in terms of the vague character of the minimal components of mass eventualities. The reason why we can count telic events but not atelic processes is the fact that we know what is being counted and we are completely confident in determining what counts as one telic event. This is not the case with atelic processes. What could possibly count as one process in a world w, might have a part which is itself a process in a precisified world w'. For processes we cannot determine an atom as the minimal component which does not have a proper part which is itself that process. Count eventualities, such as telic events, have atoms which remain atoms across different presicifications.

One peculiarity of eventualities is the ability to refer to thematic roles. This interpretation comprises the case of *Result Nominals* (cf. Grimshaw, 1990; Alexiadou, 2001) or what Melloni (2007) calls *Referential Nouns*. Contrary to the analysis of *Result Nominals* suggested in Alexiadou (2001) which presumes a syntactic structure akin to those of ordinary object nouns, I argue that the reference to thematic roles has to be adjoined to the noun meaning at the functional projection θP. Such an analysis conveys the relation between the underlying event and the reference to the thematic role. This proposal, however, has to be developed further. All in all, the analysis provided here contributes to our understanding of the semantics of eventuality denoting nominals and how countability is manifested in abstract nouns.

7 Conclusion and future research

The present thesis offers a thorough case study of a set of 200 polysemous abstract nouns which were annotated with fine-grained lexical features. This annotation task provided us with the possibility to observe certain patterns that emerge among different semantic categories of these abstract nouns as well as to identify the basic or original meaning of these ambiguous nouns.

The annotation of lexical features suggests that some noun senses have very strong tendencies towards one countability classification. Mass noun senses often describe states, processes and qualities. The annotation feature *bounded* is predominantly count due to the diverse interpretation of this category which can be assigned to bounded events but also to objects (which are ambiguous between a concrete and abstract reference) or placeholders. Besides boundedness, count noun senses also refer to events and placeholders.

A detailed observation of the specific senses and the combination of count and mass senses of a certain noun offers the possibility to observe common patterns of regular polysemy that emerge in this data set. I provide such a rule for deriving a count sense from a mass noun, as illustrated in (1).

(1) 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 (BP)
2.instance thereof (IN)
3.(itemized) placeholders (IPH)

The investigation of lexical features of a subset of abstract nouns was enriched by a corpus study of these nouns targeting discriminating contexts which disentangle the count and mass uses of these nouns. Although the results of the corpus study cannot be taken as conclusive, they sharpened my approach to countability in many ways: (i) the corpus study did not verify the count interpretation of (1-2) although this specific meaning was listed in WordNet and BECL; (ii) it showed a large degree of lexicalization for some nouns, such as *ruin*, *copy* or *marking* which are rarely used as referring to events of ruining, copying or marking and (iii) the count interpretation of certain abstract nouns identified in the lexical annotation task under the name placeholders, appears to have a much wider range of application. Even nouns that do not have this kind of meaning listed in dictionaries, provide such an interpretation.

Based on the outcome of these studies I proposed a semantic analysis for eventuality denoting nominals which comprise a substantial part of abstract nouns. I argue that their difference in countability relates directly to the Aktionsart of the event, in particular to the inner aspect. Accordingly, telic events are predominantly count, states are predominantly mass and processes can be count and mass relative to the realization of aspect which is compositional and contextually dependent. These observations constitute a reasonable hypothesis according to which the denotation of eventuality denoting nominals and the distinction between count and mass events can be represented by a vagueness based analysis which presumes that countable events are those that have stable atoms. Contrary to that, mass eventualities (states and atelic processes) have atoms which do not remain such in every precisification. A setting of this sort for the denotation of eventuality denoting nominals and the identification of regular countability shifts in this domain offers a means to account for the countability distinctions and variation among these nouns. One further achievement of this research is the identification of the reference to thematic roles of events in the nominal domain. This particular phenomenon comprises the commonly acknowledged cases known under the name *Result Nominals* which I argued is not rooted in the lexical entry of these nouns. Instead, I propose to analyse them as being composed on a higher syntactic level by a functional projection which delivers the meaning of the theme reference.

The analysis I propose for a set of abstract nouns contributes to:

- the research on event semantics, in particular events in the nominal domain, the relation between base verbs and nominalizations and the representation of aspect in eventuality denoting nominals,
- the research on the varieties of abstract nouns in philosophy of language as well as their identification and relevance in linguistic theories, and
- the ongoing debate on countability, the ultimate determinant of the count/mass distinction and especially on countability distinctions in abstract nouns.

Throughout this research I have been able to identify several issues which could be further studied. There are two cases I find most relevant in the discussion on countability of abstract nouns and necessary for a complete analysis of such nouns. One of these cases is to target event nominals that have not been classified in BECL as being polysemous and flexible with regard to countabiltiy, as for instance event nominals with only mass senses. These nouns should then be further studied in order to determine whether they are different than the eventualities discussed in this thesis or they actually provide the same diagnostics but happen to be differently classified in BECL or WordNet due to some lexicographic issues. Another direction for future research is the attempt to extend the vagueness based analysis of countability to other types of abstract nouns such as measure and timer terms or relational nouns.

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Appendix

A: BECL 2.1 columns

Column	Description	Example
id_and_sense	The ID of the noun-sense pair	36054,1
lemma	The noun lemma	activator
WordNet_senseindex number	The number of the senses provided by WordNet	1
WordNet description	The description of the sense provided by WordNet	(biology) any agency bringing about activation; a molecule that increases the activity of an enzyme or a protein that increases the production of a gene product in DNA transcription
WordNet_total_senses	Total number of sense of this noun provided by WordNet	1
sense_synset	The synset of the noun taken from WordNet	activator.n.01
similar.LCH..2.5	Other noun-senses that are semantically similar to this one according to LCH 2.5.	substance.n.01, matter.n.03, body substance.n.01, protoplasm.n.01, part.n.01, chemistry.n.02, material.n.01, phlogiston.n.01, mixture.n.01, atom.n.01, chemical element.n.01, activator.n.01, activating agent.n.01, catalyst.n.01, biocatalyst.n.01, sensitizer.n.01, enzyme.n.01, substrate.n.01, element.n.05, medium.n.07, medium.n.06, fluid.n.01, platinum black.n.01, volatile.n.01, essence.n.02
occurrences_in_oanc total	Total frequency of the noun in open ANC	191
occurrences_singular in_oanc	Frequency of the noun in singular form in open ANC	123
occurrences_plural in_oanc	Frequency of the noun in plural form in open ANC	68
TestI.1	Can the noun-sense pair in its singular form appear with more?	no

TestI.2	If Syn1 = yes, is the comparison made on number of entities, or a different mode of measurement?	not applicable
TestII.1	Can the noun-sense pair in its plural form appear with more?	yes
TestII.2	If Syn2 = yes, is the sentence equivalent to one with an explicit classifier?	not equivalent
TestIII.1	Can the noun-sense pair in its singular form and combined with the indefinite determiner be the subject of a definition of characterization?	yes
TestIII.2	Can the noun-sense pair in its singular form but without the indefinite determiner be the subject of a definition of characterization?	no
comment	Optional comment of annotator(s)	science
idiomatic	Is the noun an idiomatic expression?	
nominalization	Is the noun a nominalization?	yes
result_state	In case of a nominalization, does the noun sense describe a result or state of the event?	
process	In case of a nominalization, does the noun sense describe a process?	
act_event	In case of a nominalization, does the noun sense describe an act or event?	
proper_name_final	Is the noun a proper name?	
Phase_No	Phase number of the annotation process	8.0
annotators	Initials of the annotators	LS+MJ
class	Countability class generated by Syn1 and Syn2	235
major_class	The countability classes are grouped in four major classes: regular count, regular mass, both mass and count, neither mass nor count	regular count
adjudication	Is the annotation gained from the final adjudication process?	yes
complete	Are all WOrdNet senses of this noun annotated	no
variation_in_writing	Does BECL include a duplicate of this noun sense that varies only in writing	no
multiple	Is the noun sense a multiple? Does the noun have other senses that belong to different countability classes than this noun-sense?	no
unit_letter	Does this entry describe (an abbreviation of) a unit or letter?	no

B: Lexical property annotation

noun	#	sense description	class	state	event	process	object	quality	bounded	instance	quantity	accomplished	place	person	aggregation	placeholder	manner	CMT
abstraction	# 1	(a concept or idea not associated with any specific instance)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
abstraction	# 3	(the process of formulating general concepts by abstracting common properties of instances)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
absurdity	# 1	(a message whose content is at variance with reason)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
absurdity	# 2	(a ludicrous folly)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
access	# 1	(the right to enter)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
access	# 3	″(a way of entering or leaving)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
accommodation	# 2	″(a settlement of differences)	count	no	no	no	yes	no	yes	no	no	yes	no	no	no	no	no	
accommodation	# 3	(in the theories of Jean Piaget: the modification of internal representations in order to accommodate a changing knowledge of reality)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	yes	
accord	# 1	(harmony of people's opinions or actions or characters)	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	

accord	# 3	(a written agreement between two states or sovereigns)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
admission	# 2	(an acknowledgment of the truth of something)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	ambiguous
admission	# 3	(the fee charged for admission)	mass	no	no	no	no	no	yes	no	yes	no	no	no	no	no	no	
admission	# 1	(the act of admitting someone to enter)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
alarm	# 3	(an automatic signal (usually a sound) warning of danger)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
alarm	# 1	(fear resulting from the awareness of danger)	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	
allegory	# 1	(a short moral story (often with animal characters))	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
allegory	# 3	(an expressive style that uses fictional characters and events to describe some subject by suggestive resemblances, an extended metaphor)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	
alteration	# 1	(an event that occurs when something passes from one state or phase to another)	count	no	yes	no	no	no	yes	no	no	yes	no	no	no	no	no	

alteration	# 3	(the act of revising or altering (involving reconsideration and modification))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
alteration	# 2	(the act of making something different (as e.g. the size of a garment))	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
approval	# 2	(a feeling of liking something or someone good)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
approval	# 4	(a message expressing a favorable opinion)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
approval	# 1	(the formal act of approving)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
assessment	# 1	(the classification of someone or something with respect to its worth)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
assessment	# 2	(an amount determined as payable)	count	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	
authority	# 4	(freedom from doubt, belief in yourself and your abilities)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
authority	# 1	(the power or right to give orders or make decisions)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
authority	# 2	((usually plural) persons who exercise (administrative) control over others)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	

backbone	# 1	(a central cohesive source of support and stability)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	ambiguous
backbone	# 2	(fortitude and determination)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
backlog	# 1	(an accumulation of jobs not done or materials not processed that are yet to be dealt with (especially unfilled customer orders for products or services))	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	fake mass?
backlog	# 3	(something kept back or saved for future use or a special purpose)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
backup	# 1	(an accumulation caused by clogging or a stoppage)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
backup	# 2	(someone who takes the place of another (as when things get dangerous or difficult))	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
bass	# 3	(an adult male singer with the lowest voice)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
bass	# 2	(the lowest part in polyphonic music)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	difficult
bull	# 4	(a serious and ludicrous blunder)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
bull	# 3	(obscene words for unacceptable behavior)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	fake mass?

cachet	# 1	(an indication of approved or superior status)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
cachet	# 3	(a seal on a letter)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
camouflage	# 1	(an outward semblance that misrepresents the true nature of something)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
camouflage	# 4	(the act of concealing the identity of something by modifying its appearance)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
capacitance	# 2	(an electrical device characterized by its capacity to store an electric charge)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
capacitance	# 1	(an electrical phenomenon whereby an electric charge is stored)	mass	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	
carving	# 1	(a sculpture created by removing material (as wood or ivory or stone) in order to create a desired shape)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
carving	# 2	(removing parts from hard material to create a desired pattern or shape)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
catch	# 2	(the quantity that was caught)	mass	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	

catch	# 4	(anything that is caught (especially if it is worth catching))	mass	no	no	no	yes	no	no	no	no	no	no	no	no	yes	no	fake mass?
catch	# 3	(a person regarded as a good matrimonial prospect)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
certainty	# 2	(something that is certain)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
certainty	# 1	(the state of being certain)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
change	# 2	(a relational difference between states, especially between states before and after some event)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
change	# 1	(an event that occurs when something passes from one state or phase to another)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
charity	# 2	(a kindly and lenient attitude toward people)	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	
charity	# 1	(a foundation created to promote the public good (not for assistance to any particular individuals))	count	no	no	no	no	no	yes	no	no	no	yes	no	no	no	no	institution
cheer	# 2	(the quality of being cheerful and dispelling gloom)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
cheer	# 1	(a cry or shout of approval)	count	no	yes	no	no	no	yes	no	no	yes	no	no	no	no	no	

church	# 2	(a place for public (especially Christian) worship)	count	no	no	no	no	no	yes	no	no	no	yes	no	no	no	no	
church	# 3	(a service conducted in a house of worship)	mass	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
cinema	# 1	(a medium that disseminates moving pictures)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
cinema	# 2	(a theater where films are shown)	count	no	no	no	no	no	no	no	no	no	yes	no	no	no	no	institution
classification	# 2	(a group of people or things arranged by class or category)	count	no	no	no	no	no	no	no	no	no	no	yes	yes	yes	no	
classification	# 3	(the basic cognitive process of arranging into classes or categories)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
coalition	# 3	(the union of diverse things into one body or form or group, the growing together of parts)	mass	no	no	no	no	no	yes	no	no	no	no	no	yes	no	no	fake mass?
coalition	# 1	(an organization of people (or countries) involved in a pact or treaty)	count	no	no	no	no	no	no	no	no	no	no	yes	yes	yes	no	
coalition	# 2	(the state of being combined into one body)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
concern	# 3	(a feeling of sympathy for someone or something)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling

concern	# 1	(something that interests you because it is important or affects you)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
concern	# 4	(something or someone that causes anxiety, a source of unhappiness)	count	no	no	no	yes	no	yes	no	no	no	no	yes	no	yes	no	
concern	# 2	(an anxious feeling)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling
conjunction	# 1	(the temporal property of two things happening at the same time)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
conjunction	# 2	(the state of being joined together)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
consequence	# 3	(having important effects or influence)	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	
consequence	# 1	(a phenomenon that follows and is caused by some previous phenomenon)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
consequence	# 2	(the outcome of an event especially as relative to an individual)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	
consideration	# 4	(kind and considerate regard for others)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
consideration	# 2	(information that should be kept in mind when making a decision)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

constraint	# 1	(the state of being physically constrained)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
constraint	# 2	(a device that retards something's motion)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
copy	# 3	(matter to be printed, exclusive of graphical materials)	mass	no	no	no	yes	no	no	no	no	no	no	no	no	yes	no	
copy	# 4	(material suitable for a journalistic account)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	fake mass?
copy	# 1	(a reproduction of a written record (e.g. of a legal or school record))	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
custom	# 4	(habitual patronage)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
custom	# 2	(a specific practice of long standing)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
custom	# 1	(accepted or habitual practice)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
deceit	# 1	(the quality of being fraudulent)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
deceit	# 2	(a misleading falsehood)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	yes	no	ambiguous
decoration	# 1	(something used to beautify)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
decoration	# 3	(the act of decorating something (in the hope of making it more attractive))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
decrease	# 2	(a process of becoming smaller or shorter)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	

decrease	# 3	(the amount by which something decreases)	count	no	no	no	no	no	yes	no	yes	no	no	no	no	no	no	
decrease	# 4	(the act of decreasing or reducing something)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
dedication	# 3	(a message that makes a pledge)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
dedication	# 1	(complete and wholehearted fidelity)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
delegation	# 2	(authorizing subordinates to make certain decisions)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
delegation	# 1	(a group of representatives or delegates)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
deletion	# 1	(any process whereby sounds or words are left out of spoken words or phrases)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
deletion	# 3	(the omission that is made when an editorial change shortens a written passage)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
delight	# 2	(something or someone that provides a source of happiness)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
delight	# 1	(a feeling of extreme pleasure or satisfaction)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	

delusion	# 1	((psychology) an erroneous belief that is held in the face of evidence to the contrary)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
delusion	# 3	(the act of deluding, deception by creating illusory ideas)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
delusion	# 2	(a mistaken or unfounded opinion or idea)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
demand	# 3	(required activity)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	yes	no	
demand	# 1	(an urgent or peremptory request)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
demand	# 4	(the act of demanding)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
demand	# 2	(the ability and desire to purchase goods and services)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
demolition	# 2	(the act of demolishing)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
demolition	# 1	(an event (or the result of an event) that completely destroys something)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
detail	# 3	(extended treatment of particulars)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
detail	# 2	(a small part that can be considered separately from the whole)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
dilution	# 1	(a diluted solution)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

dilution	# 2	(weakening (reducing the concentration) by the addition of water or a thinner)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
disappearance	# 2	(the event of passing out of sight)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
disappearance	# 3	(gradually ceasing to be visible)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
disintegration	# 2	(a loss (or serious disruption) of organization in some system)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
disintegration	# 1	(in a decomposed state)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
disorder	# 1	(a physical condition in which there is a disturbance of normal functioning)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
disorder	# 2	(a condition in which things are not in their expected places)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
dispute	# 1	(a disagreement or argument about something important)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
dispute	# 2	(coming into conflict with)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
drama	# 2	(an episode that is turbulent or highly emotional)	count	no	yes	no	no	no	yes	yes	no	no	no	no	no	no	no	
drama	# 4	(the quality of being arresting or highly emotional)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	

drama	# 3	(the literary genre of works intended for the theater)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	
drink	# 2	(the act of drinking alcoholic beverages to excess)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
drink	# 1	(a single serving of a beverage)	count	no	no	no	yes	no	yes	no	yes	no	no	no	no	no	no	
duplication	# 1	(a copy that corresponds to an original exactly)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
duplication	# 2	(the act of copying or making a duplicate (or duplicates) of something)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
embarrassment	# 3	(some event that causes someone to be embarrassed)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
embarrassment	# 1	(the shame you feel when your inadequacy or guilt is made public)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling
enterprise	# 2	(an organization created for business ventures)	count	no	no	no	yes	no	yes	no	no	no	yes	no	no	no	no	institution
enterprise	# 3	(readiness to embark on bold new ventures)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
enterprise	# 1	(a purposeful or industrious undertaking (especially one that requires effort or boldness))	count	no	yes	no	no	no	yes	no	no	no	no	no	yes	no	no	

evasion	# 3	(nonperformance of something distasteful (as by deceit or trickery) that you are supposed to do)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
evasion	# 4	(the act of physically escaping from something (an opponent or a pursuer or an unpleasant situation) by some adroit maneuver)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
expectation	# 3	(the feeling that something is about to happen)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	feeling
expectation	# 1	(belief about (or mental picture of) the future)	count	yes	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
expectation	# 2	(anticipating with confidence of fulfillment)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
experience	# 3	(an event as apprehended)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
experience	# 1	(the accumulation of knowledge or skill that results from direct participation in events or activities)	mass	no	no	no	no	no	no	no	no	no	no	no	yes	yes	no	fake mass?
facility	# 3	(a natural effortlessness)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	

facility	# 4	(something designed and created to serve a particular function and to afford a particular convenience or service)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
facility	# 2	(skillful performance or ability without difficulty)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
faith	# 3	(an institution to express belief in a divine power)	count	no	no	no	yes	no	yes	no	no	no	yes	no	no	no	no	institution
faith	# 1	(a strong belief in a supernatural power or powers that control human destiny)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
fascination	# 3	(the capacity to attract intense interest)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	difficult
fascination	# 1	(the state of being intensely interested (as by awe or terror))	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
fatality	# 1	(a death resulting from an accident or a disaster)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
fatality	# 2	(the quality of being able to cause death or fatal disasters)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
filing	# 1	(the entering of a legal document into the public record)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

filing	# 3	(the act of using a file (as in shaping or smoothing an object))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
filing	# 4	(preservation and methodical arrangement as of documents and papers etc.)	mass	no	no	no	no	no	no	no	no	no	no	no	yes	yes	no	fake mass?
fill	# 2	(any material that fills a space or container)	mass	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	substance
fill	# 1	(a quantity sufficient to satisfy)	count	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	
finish	# 1	(a decorative texture or appearance of a surface (or the substance that gives it that appearance))	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
finish	# 4	(the place designated as the end (as of a race or journey))	count	no	no	no	no	no	no	no	no	no	yes	no	no	no	no	
finish	# 3	(a highly developed state of perfection, having a flawless or impeccable quality)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
fire	# 4	(a fireplace in which a relatively small fire is burning)	count	no	no	no	no	no	no	no	no	no	yes	no	no	no	no	
fire	# 1	(the event of something burning (often destructive))	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
fire	# 2	(the act of firing weapons or artillery at an enemy)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	

fire	# 3	(the process of combustion of inflammable materials producing heat and light and (often) smoke)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
flow	# 4	(any uninterrupted stream or discharge)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
flow	# 2	(the amount of fluid that flows in a given time)	mass	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	
flow	# 3	(the act of flowing or streaming, continuous progression)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
fog	# 3	(confusion characterized by lack of clarity)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	ambiguous
fog	# 2	(an atmosphere in which visibility is reduced because of a cloud of some substance)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
folly	# 3	(the quality of being rash and foolish)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
folly	# 2	(a stupid mistake)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
folly	# 1	(the trait of acting stupidly or rashly)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
folly	# 4	(foolish or senseless behavior	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
forgery	# 2	(criminal falsification by making or altering an instrument with intent to defraud)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	

forgery	# 1	(a copy that is represented as the original)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
formality	# 1	(a requirement of etiquette or custom)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
formality	# 2	(a manner that strictly observes all forms and ceremonies)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
fusion	# 1	(an occurrence that involves the production of a union)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	ambiguous
fusion	# 2	(the state of being combined into one body)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
gathering	# 2	(the social act of assembling)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	difficult
gathering	# 1	(a group of persons together in one place)	count	no	no	no	no	no	yes	no	no	no	no	yes	yes	yes	no	
generality	# 1	(an idea or conclusion having general application)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
generality	# 2	(the quality of being general or widespread or having general applicability)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
genius	# 2	(unusual mental ability)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
genius	# 1	(someone who has exceptional intellectual ability and originality)	count	no	no	no	no	no	no	no	no	no	no	yes	no	yes	no	

gossip	# 2	(a report (often malicious) about the behavior of other people)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	
gossip	# 3	(a person given to gossiping and divulging personal information about others)	count	no	no	no	no	no	no	no	no	no	no	yes	no	yes	no	
gossip	# 1	(light informal conversation for social occasions)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
honor	# 2	(the state of being honored)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
honor	# 3	(the quality of being honorable and having a good name)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
honor	# 1	(a tangible symbol signifying approval or distinction)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
hope	# 3	(grounds for feeling hopeful about the future)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	
hope	# 2	(the general feeling that some desire will be fulfilled)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling
hope	# 1	(a specific instance of feeling hopeful)	count	no	no	no	no	no	yes	yes	no	no	no	no	no	no	no	
humiliation	# 2	(strong feelings of embarrassment)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
humiliation	# 3	(an instance in which you are caused to lose your prestige or self-respect)	count	no	no	no	no	no	yes	yes	no	no	no	no	no	no	no	

humour	# 2	(a message whose ingenuity or verbal skill or incongruity has the power to evoke laughter)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	difficult
humour	# 1	(a characteristic (habitual or relatively temporary) state of feeling)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
ideology	# 2	(imaginary or visionary theorization)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	difficult
ideology	# 1	(an orientation that characterizes the thinking of a group or nation)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	yes	system
impropriety	# 2	(the condition of being improper)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
impropriety	# 3	(an indecent or improper act)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
inconvenience	# 3	(the quality of not being useful or convenient)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
inconvenience	# 2	(a difficulty that causes anxiety)	count	no	yes	no	yes	no	yes	no	no	no	no	no	yes	yes	no	ambiguous
indiscretion	# 2	(a petty misdeed)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
indiscretion	# 1	(the trait of being injudicious)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
individuality	# 2	(the distinct personality of an individual regarded as a persisting entity)	count	no	no	no	no	yes	yes	yes	no	no	no	no	no	no	no	
individuality	# 1	(the quality of being individual)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
initiative	# 2	(the first of a series of actions)	count	no	no	no	no	no	yes	yes	no	no	no	no	no	no	no	

initiative	# 1	(readiness to embark on bold new ventures)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
inquiry	# 3	(a systematic investigation of a matter of public interest)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
inquiry	# 1	(a search for knowledge)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
inquiry	# 2	(an instance of questioning)	count	no	yes	no	no	no	yes	yes	no	no	no	no	no	no	no	
instruction	# 2	(the activities of educating or instructing, activities that impart knowledge or skill)	mass	no	no	yes	no	no	no	no	no	no	no	no	yes	no	no	fake mass?
instruction	# 3	(the profession of a teacher)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	difficult
instruction	# 1	(a message describing how something is to be done)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
irritation	# 2	(a sudden outburst of anger)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
irritation	# 1	(the psychological state of being irritated or annoyed)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
jest	# 1	(a humorous anecdote or remark intended to provoke laughter)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
jest	# 2	(activity characterized by good humor)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
justice	# 1	(the quality of being just or fair)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	

justice	# 3	(a public official authorized to decide questions brought before a court of justice)	count	no	no	no	no	no	no	no	no	no	no	yes	no	yes	no	
justice	# 2	(judgment involved in the determination of rights and the assignment of rewards and punishments)	mass	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	difficult
landscape	# 3	(a genre of art dealing with the depiction of natural scenery)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	
landscape	# 2	(painting depicting an expanse of natural scenery)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
license	# 4	(the act of giving a formal (usually written) authorization)	count	no	yes	no	no	no	yes	no	no	yes	no	no	no	no	no	
license	# 3	(excessive freedom, lack of due restraint)	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	difficult
license	# 2	(freedom to deviate deliberately from normally applicable rules or practices (especially in behavior or speech))	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	
license	# 1	(a legal document giving official permission to do something)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

life	# 1	(a characteristic state or mode of living)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	
life	# 3	(the course of existence of an individual, the actions and events that occur in living)	count	no	yes	no	no	no	yes	no	no	no	no	no	yes	no	no	
life	# 4	(the condition of living or the state of being alive)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
luxury	# 3	(wealth as evidenced by sumptuous living)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
luxury	# 2	(the quality possessed by something that is excessively expensive)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
luxury	# 1	(something that is an indulgence rather than a necessity)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
marking	# 1	(a distinguishing symbol)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
marking	# 4	(the act of making a visible mark on a surface)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
mediocrity	# 2	(a person of second-rate ability or value)	count	no	no	no	no	no	no	no	no	no	no	yes	no	yes	no	
mediocrity	# 1	(ordinariness as a consequence of being average and not outstanding)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
membership	# 2	(the state of being a member)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	

membership	# 1	(the body of members of an organization or group)	count	no	no	no	no	no	no	no	no	no	no	yes	yes	no	no	
mercy	# 1	(leniency and compassion shown toward offenders by a person or agency charged with administering justice)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
mercy	# 4	(something for which to be thankful)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
meritocracy	# 1	(a form of social system in which power goes to those with superior intellects)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	yes	system
meritocracy	# 2	(the belief that rulers should be chosen for their superior abilities and not because of their wealth or birth)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
modeling	# 3	(the act of representing something (usually on a smaller scale))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
modeling	# 1	(sculpture produced by molding)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
modeling	# 2	(a preliminary sculpture in wax or clay from which a finished work can be copied)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

modernism	# 2	(the quality of being current or of the present)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
modernism	# 3	(practices typical of contemporary life or thought)	count	no	yes	no	no	no	yes	no	no	no	no	no	yes	yes	no	
necessity	# 2	(anything indispensable)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
necessity	# 1	(the condition of being essential or indispensable)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
need	# 2	(anything that is necessary but lacking)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
need	# 3	(the psychological feature that arouses an organism to action toward a desired goal, the reason for the action, that which gives purpose and direction to behavior)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
need	# 4	(a state of extreme poverty or destitution)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
need	# 1	(a condition requiring relief)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
novelty	# 3	(a small inexpensive mass-produced article)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
novelty	# 2	(originality by virtue of being new and surprising)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	

obligation	# 2	(the state of being obligated to do or pay something)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
obligation	# 4	(a written promise to repay a debt)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
obligation	# 1	(the social force that binds you to the courses of action demanded by that force)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
obscenity	# 3	(an obscene act)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
obscenity	# 1	(the trait of behaving in an obscene manner)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
obscenity	# 2	(an offensive or indecent word or phrase)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
omission	# 1	(a mistake resulting from neglect)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
omission	# 3	(any process whereby sounds or words are left out of spoken words or phrases)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
omission	# 2	(something that has been omitted)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
opening	# 1	(an open or empty space in or between things)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
opening	# 3	(becoming open or being made open)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
opposition	# 1	(the action of opposing something that you disapprove or disagree with)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	

opposition	# 4	(a contestant that you are matched against)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
opposition	# 3	(the act of hostile groups opposing each other)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
opposition	# 2	(the relation between opposed entities)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
order	# 2	(a degree in a continuum of size or quantity)	count	no	no	no	no	no	yes	yes	no	no	no	no	no	no	no	
order	# 3	(established customary state (especially of society))	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
organisation	# 4	(an ordered manner, orderliness by virtue of being methodical and well organized)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	yes	
organisation	# 3	(an organized structure for arranging or classifying)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	system
orthodoxy	# 1	(the quality of being orthodox (especially in religion))	mass	yes	no	no	no	yes	no	no	no	no	no	no	no	no	no	
orthodoxy	# 2	(a belief or orientation agreeing with conventional standards)	count	no	no	no	no	yes	yes	no	no	no	no	no	no	no	no	
outflow	# 3	(a natural flow of ground water)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
outflow	# 2	(the process of flowing out)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
outrage	# 2	(a wantonly cruel act)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

outrage	# 4	(the act of scandalizing)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
outrage	# 1	(a feeling of righteous anger)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling
outrage	# 3	(a disgraceful event)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
painting	# 1	(graphic art consisting of an artistic composition made by applying paints to a surface)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
painting	# 3	(the act of applying paint to a surface)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
painting	# 2	(creating a picture with paints)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
payment	# 2	(the act of paying money)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
payment	# 1	(a sum of money paid or a claim discharged)	count	no	no	no	yes	no	yes	no	yes	no	no	no	no	no	no	
perception	# 4	(knowledge gained by perceiving)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
perception	# 1	(the representation of what is perceived, basic component in the formation of a concept)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
perception	# 2	(a way of conceiving something)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	yes	
perfection	# 2	(an ideal instance, a perfect embodiment of a concept)	count	no	no	no	yes	no	yes	yes	no	no	no	no	no	no	no	
perfection	# 1	(the state of being without a flaw or defect)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	

plagiarism	# 1	(a piece of writing that has been copied from someone else and is presented as being your own work)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
plagiarism	# 2	(the act of plagiarizing, taking someone's words or ideas as if they were your own)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
polity	# 2	(a politically organized unit)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
polity	# 3	(shrewd or crafty management of public affairs)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	
possibility	# 1	(a future prospect or potential)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	ambiguous
possibility	# 4	(a possible alternative)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	ambiguous
possibility	# 2	(capability of existing or happening or being true)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
preoccupation	# 1	(an idea that preoccupies the mind and holds the attention)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
preoccupation	# 2	(the mental state of being preoccupied by something)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
presence	# 3	(an invisible spiritual being felt to be nearby)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
presence	# 1	(the state of being present, current existence)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	

production	# 2	(a presentation for the stage or screen or radio or television)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
production	# 1	(the act or process of producing something)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
promise	# 2	(grounds for feeling hopeful about the future)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
promise	# 1	(a verbal commitment by one person to another agreeing to do (or not to do) something in the future)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
propensity	# 1	(an inclination to do something)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
propensity	# 2	(a natural inclination)	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	difficult
proportion	# 3	(balance among the parts of something)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
proportion	# 4	(the relation between things (or parts of things) with respect to their comparative quantity, magnitude, or degree)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
provocation	# 2	(something that incites or provokes, a means of arousing or stirring to action)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	

provocation	# 1	(unfriendly behavior that causes anger or resentment)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
publication	# 1	(a copy of a printed work offered for distribution)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
publication	# 3	(the communication of something to the public, making information generally known)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	difficult
pull	# 1	(the act of pulling, applying force to move something toward or with you)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
pull	# 4	(a device used for pulling something)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
pull	# 2	(the force used in pulling)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
radio	# 2	(an electronic receiver that detects and demodulates and amplifies transmitted signals)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
radio	# 1	(medium for communication)	mass	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	difficult
radio	# 3	(a communication system based on broadcasting electromagnetic waves)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	system
reach	# 4	(the limit of capability)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	difficult

reach	# 3	(the act of physically reaching or thrusting out)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
reason	# 4	(the state of having good sense and sound judgment)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
reason	# 1	(a rational motive for a belief or action)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
reason	# 2	(an explanation of the cause of some phenomenon)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
recitation	# 1	(written matter that is recited from memory)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
recitation	# 2	(a public instance of reciting or repeating (from memory) something prepared in advance)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
recollection	# 1	(the ability to recall past occurrences)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
recollection	# 2	(the process of remembering (especially the process of recovering information by mental effort))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
recollection	# 3	(something recalled to the mind)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
regulation	# 2	(a principle or condition that customarily governs behavior)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
regulation	# 1	(an authoritative rule)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

regulation	# 3	(the state of being controlled or governed)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
remark	# 2	(explicit notice)	mass	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	difficult
remark	# 1	(a statement that expresses a personal opinion or belief or adds information)	count	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
resignation	# 2	(the act of giving up (a claim or office or possession etc.))	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
resignation	# 1	(acceptance of despair)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
resource	# 3	(the ability to deal resourcefully with unusual problems)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
resource	# 2	(a source of aid or support that may be drawn upon when needed)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
respiration	# 3	(the bodily process of inhalation and exhalation, the process of taking in oxygen from inhaled air and releasing carbon dioxide by exhalation)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
respiration	# 2	(a single complete act of breathing in and out)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
respite	# 2	(a pause from doing something (as work))	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

respite	# 1	(a (temporary) relief from harm or discomfort)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
respite	# 4	(a pause for relaxation)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
restraint	# 4	(a rule or condition that limits freedom)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
restraint	# 2	(discipline in personal and social activities)	mass	no	no	no	yes	no	no	no	no	no	no	no	no	no	yes	system
ruin	# 3	(the process of becoming dilapidated)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
ruin	# 4	(an event that results in destruction)	count	no	yes	no	no	no	yes	no	no	yes	no	no	no	no	no	
ruin	# 2	(a ruined building)	count	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	
safety	# 1	(the state of being certain that adverse effects will not be caused by some agent under defined conditions)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
safety	# 3	(a device designed to prevent injury or accidents)	count	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	
sailing	# 3	(the departure of a vessel from a port)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
sailing	# 1	(the work of a sailor)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	fake mass?
sailing	# 2	(riding in a sailboat)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
salvation	# 1	((theology) the act of delivering from sin or saving from evil)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

salvation	# 2	(a means of preserving from harm or unpleasantness)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
salvation	# 3	(the state of being saved or preserved from harm)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
scatter	# 2	(the act of scattering)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
scatter	# 1	(a haphazard distribution in all directions)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
sense	# 4	(sound practical judgment)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
sense	# 1	(a general conscious awareness)	count	yes	no	no	no	no	yes	no	no	no	no	no	no	no	no	countable state
skill	# 1	(an ability that has been acquired by training)	count	no	no	no	no	yes	yes	no	no	no	no	no	no	no	no	difficult
skill	# 2	(ability to produce solutions in some problem domain)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	difficult
spirit	# 3	(a fundamental emotional and activating principle determining one's character)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	difficult
spirit	# 1	(the vital principle or animating force within living things)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	difficult
stock	# 4	(a certificate documenting the shareholder's ownership in the corporation)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

stock	# 2	(the merchandise that a shop has on hand)	mass	no	no	no	yes	no	no	no	no	no	no	no	yes	no	no	fake mass?
study	# 1	(a detailed critical inspection)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
study	# 2	(applying the mind to learning and understanding a subject (especially by reading))	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
study	# 3	(a written document describing the findings of some individual or group)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	
success	# 3	(a state of prosperity or fame)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
success	# 1	(an event that accomplishes its intended purpose)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
success	# 2	(an attainment that is successful)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
surgery	# 2	(a room where a doctor or dentist can be consulted)	count	no	no	no	no	no	yes	no	no	no	yes	no	no	no	no	
surgery	# 1	(the branch of medical science that treats disease or injury by operative procedures)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	discipline
survival	# 3	(something that survives)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	

survival	# 2	(a natural process resulting in the evolution of organisms best adapted to the environment)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
symbolism	# 1	(a system of symbols and symbolic representations)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	yes	system
symbolism	# 2	(the practice of investing things with symbolic meaning)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	yes	
synchronization	# 3	(coordinating by causing to indicate the same time)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
synchronization	# 2	(an adjustment that causes something to occur or recur in unison)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
teaching	# 3	(the activities of educating or instructing, activities that impart knowledge or skill)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	fake mass?
teaching	# 1	(the profession of a teacher)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	
teaching	# 2	(a doctrine that is taught)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	yes	system
television	# 1	(broadcasting visual images of stationary or moving objects)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
television	# 3	(an electronic device that receives television signals and displays them on a screen)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	

theology	# 1	(the rational and systematic study of religion and its influences and of the nature of religious truth)	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	discipline
theology	# 2	(a particular system or school of religious beliefs and teachings)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	no	yes	system
theology	# 3	(the learned profession acquired by specialized courses in religion (usually taught at a college or seminary))	mass	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
transplant	# 2	(an operation moving an organ from one organism (the donor) to another (the recipient))	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
transplant	# 3	(the act of removing something from one location and introducing it in another location)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
truth	# 1	(a fact that has been verified)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
truth	# 4	(the quality of being near to the true value)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
unfairness	# 2	(injustice by virtue of not conforming with rules or standards)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
unfairness	# 3	(an unjust act)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	

upset	# 1	(an unhappy and worried mental state)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
upset	# 2	(the act of disturbing the mind or body)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
urgency	# 3	(an urgent situation calling for prompt action)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
urgency	# 1	(the state of being urgent, an earnest and insistent necessity)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
urgency	# 2	(pressing importance requiring speedy action)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
value	# 1	(a numerical quantity measured or assigned or computed)	count	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	
value	# 2	(the quality (positive or negative) that renders something desirable or valuable)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
video	# 2	(a recording of both the visual and audible components (especially one containing a recording of a movie or television program))	count	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	ambiguous
video	# 4	(broadcasting visual images of stationary or moving objects)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	

vindication	# 2	(the justification for some act or belief)	mass	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	difficult
vindication	# 1	(the act of vindicating or defending against criticism or censure etc.)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
virtue	# 1	(the quality of doing what is right and avoiding what is wrong)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
virtue	# 2	(any admirable quality or attribute)	count	no	no	no	no	no	yes	yes	no	no	no	no	no	no	no	
volleyball	# 2	(an inflated ball used in playing volleyball)	count	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	
volleyball	# 1	(a game in which two teams hit an inflated ball over a high net using their hands)	mass	no	yes	no	yes	no	yes	no	no	no	no	no	no	no	no	
volume	# 2	(the property of something that is great in magnitude)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
volume	# 1	(the amount of 3-dimensional space occupied by an object)	count	no	no	no	no	no	yes	no	yes	no	no	no	no	no	no	
want	# 3	(anything that is necessary but lacking)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
want	# 2	(the state of needing something that is absent or unavailable)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
want	# 1	(a state of extreme poverty)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	

widening	# 1	(an increase in width)	count	no	yes	no	no	no	yes	no	no	no	no	no	no	no	no	
widening	# 3	(the act of making something wider)	mass	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	
wit	# 3	(a witty amusing person who makes jokes)	count	no	no	no	no	no	yes	no	no	no	no	yes	no	yes	no	
wit	# 1	(a message whose ingenuity or verbal skill or incongruity has the power to evoke laughter)	mass	no	no	no	yes	no	yes	no	no	no	no	no	no	no	no	diffi-cult
wonder	# 2	(something that causes feelings of wonder)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	
wonder	# 1	(the feeling aroused by something strange and surprising)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	feeling
wonder	# 3	(a state in which you want to learn more about something)	mass	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	
worry	# 2	(a strong feeling of anxiety)	mass	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	
worry	# 1	(something or someone that causes anxiety, a source of unhappiness)	count	no	no	no	yes	no	yes	no	no	no	no	no	no	yes	no	

C: Corpus frequencies

noun	total	Plurals	Plurals %	indefs	indefs %	many	many %	much	much %
abstraction	2334	694	29.73	248	10.63	1	0.04	0	0.0
absurdity	949	184	19.39	64	6.74	2	0.21	2	0.21
access	36800	143	0.39	203	0.55	10	0.03	31	0.08
accommodation	4441	2568	57.82	280	6.3	6	0.14	3	0.07
accord	4470	898	20.09	519	11.61	1	0.02	0	0.0
admission	10132	2689	26.54	499	4.92	5	0.05	0	0.0
alteration	1885	1039	55.12	180	9.55	8	0.42	2	0.11
approval	11362	302	2.66	71	0.62	2	0.02	2	0.02
aspiration	4410	3380	76.64	107	2.43	2	0.05	1	0.02
assessment	28660	5336	18.62	3296	11.5	19	0.07	5	0.02
authority	41231	13830	33.54	1445	3.5	46	0.11	41	0.1
camouflage	1369	1	0.07	38	2.78	0	0.0	0	0.0
catch	7786	1737	22.31	902	11.58	7	0.09	1	0.01
certainty	3738	239	6.39	341	9.12	5	0.13	5	0.13
change	106088	47361	44.64	11042	10.41	316	0.3	113	0.11
cheer	2766	1096	39.62	372	13.45	2	0.07	7	0.25
classification	4769	846	17.74	334	7.0	5	0.1	0	0.0
coalition	11942	1073	8.99	2249	18.83	2	0.02	0	0.0
concern	52379	23857	45.55	3677	7.02	86	0.16	82	0.16
conjunction	3249	165	5.08	114	3.51	2	0.06	0	0.0
consequence	21500	15496	72.07	2604	12.11	43	0.2	9	0.04
consideration	13563	4699	34.65	990	7.3	13	0.1	35	0.26
constraint	6208	5096	82.09	265	4.27	21	0.34	2	0.03
copy	17317	7356	42.48	5711	32.98	85	0.49	3	0.02
custom	10465	3826	36.56	390	3.73	15	0.14	3	0.03
deceit	640	41	6.41	17	2.66	0	0.0	2	0.31
decoration	3485	1462	41.95	152	4.36	5	0.14	4	0.11
decrease	3843	638	16.6	1858	48.35	0	0.0	2	0.05
dedication	2585	100	3.87	171	6.62	0	0.0	1	0.04
delegation	3031	445	14.68	723	23.85	5	0.16	0	0.0
deletion	324	110	33.95	23	7.1	1	0.31	0	0.0
delight	4300	45	1.05	377	8.77	2	0.05	8	0.19
delusion	1384	623	45.01	154	11.13	6	0.43	0	0.0
demand	31923	13261	41.54	1426	4.47	54	0.17	48	0.15
demolition	1277	106	8.3	23	1.8	0	0.0	0	0.0
dilution	486	66	13.58	40	8.23	0	0.0	3	0.62
disappearance	2424	280	11.55	60	2.48	0	0.0	0	0.0
disintegration	959	7	0.73	29	3.02	0	0.0	0	0.0

disorder	14806	6611	44.65	1700	11.48	53	0.36	4	0.03
dispute	10378	3980	38.35	1720	16.57	27	0.26	5	0.05
drink	24252	6889	28.41	5448	22.46	53	0.22	31	0.13
duplication	586	54	9.22	26	4.44	1	0.17	2	0.34
embarrassment	3298	126	3.82	497	15.07	2	0.06	8	0.24
enterprise	12827	3459	26.97	1267	9.88	57	0.44	0	0.0
evasion	782	120	15.35	44	5.63	1	0.13	0	0.0
expectation	8959	7284	81.3	251	2.8	8	0.09	3	0.03
experience	56119	17769	31.66	3361	5.99	54	0.1	74	0.13
faith	26224	844	3.22	896	3.42	32	0.12	101	0.39
fascination	2567	36	1.4	416	16.21	0	0.0	7	0.27
fatality	1262	834	66.09	74	5.86	13	1.03	0	0.0
filing	2692	991	36.81	293	10.88	3	0.11	0	0.0
fill	1750	1	0.06	68	3.89	0	0.0	1	0.06
finish	7791	1433	18.39	1488	19.1	3	0.04	0	0.0
fire	56198	5630	10.02	5391	9.59	35	0.06	22	0.04
flow	18390	2103	11.44	1276	6.94	5	0.03	11	0.06
forgery	485	155	31.96	74	15.26	3	0.62	0	0.0
fusion	2705	54	2.0	252	9.32	2	0.07	0	0.0
gathering	6313	1540	24.39	1204	19.07	9	0.14	0	0.0
generality	509	196	38.51	19	3.73	1	0.2	0	0.0
gossip	3390	121	3.57	47	1.39	0	0.0	7	0.21
honor	16671	3223	19.33	866	5.19	31	0.19	12	0.07
hope	11411	2211	19.38	296	2.59	13	0.11	72	0.63
humiliation	2047	182	8.89	75	3.66	1	0.05	2	0.1
impropriety	474	197	41.56	15	3.16	0	0.0	0	0.0
inconvenience	1143	188	16.45	170	14.87	2	0.17	5	0.44
indiscretion	319	150	47.02	28	8.78	0	0.0	0	0.0
individuality	1325	18	1.36	28	2.11	0	0.0	3	0.23
initiative	15662	6080	38.82	1554	9.92	60	0.38	16	0.1
inquiry	8840	1836	20.77	1030	11.65	11	0.12	2	0.02
instruction	24779	7989	32.24	301	1.21	21	0.08	9	0.04
irritation	1859	133	7.15	90	4.84	1	0.05	2	0.11
jest	375	54	14.4	40	10.67	0	0.0	0	0.0
justice	36315	2064	5.68	605	1.67	14	0.04	6	0.02
license	11070	2405	21.73	1875	16.94	8	0.07	4	0.04
life	96712	14565	15.06	4742	4.9	77	0.08	24	0.02
marking	1026	1013	98.73	6	0.58	2	0.19	0	0.0
mediocrity	539	26	4.82	19	3.53	0	0.0	1	0.19
membership	10204	577	5.65	570	5.59	5	0.05	1	0.01
mercy	4305	79	1.84	52	1.21	1	0.02	2	0.05
necessity	3228	344	10.66	289	8.95	2	0.06	0	0.0

need	49599	20339	41.01	3783	7.63	34	0.07	28	0.06
novelty	2222	170	7.65	237	10.67	2	0.09	0	0.0
obligation	9019	4128	45.77	1545	17.13	9	0.1	3	0.03
obscenity	944	308	32.63	78	8.26	0	0.0	1	0.11
omission	1440	494	34.31	132	9.17	4	0.28	0	0.0
opening	15501	1956	12.62	1888	12.18	22	0.14	1	0.01
opposition	17439	314	1.8	464	2.66	1	0.01	36	0.21
order	59445	7430	12.5	4325	7.28	38	0.06	4	0.01
organisation	212	6	2.83	2	0.94	0	0.0	0	0.0
outflow	553	183	33.09	55	9.95	1	0.18	0	0.0
outrage	2890	130	4.5	181	6.26	5	0.17	13	0.45
payment	15916	8743	54.93	1355	8.51	5	0.03	0	0.0
perception	21473	10113	47.1	1081	5.03	4	0.02	2	0.01
perfection	3033	44	1.45	57	1.88	0	0.0	4	0.13
polity	1303	307	23.56	231	17.73	2	0.15	0	0.0
possibility	27321	8268	30.26	2021	7.4	130	0.48	11	0.04
preoccupation	1828	406	22.21	288	15.75	1	0.05	2	0.11
presence	29633	198	0.67	3460	11.68	0	0.0	8	0.03
production	12026	363	3.02	131	1.09	5	0.04	7	0.06
promise	15788	3782	23.95	1783	11.29	44	0.28	71	0.45
propensity	1347	136	10.1	331	24.57	0	0.0	0	0.0
proportion	11250	3369	29.95	2364	21.01	0	0.0	4	0.04
provocation	814	166	20.39	93	11.43	0	0.0	0	0.0
publication	14769	4945	33.48	1095	7.41	91	0.62	3	0.02
pull	3023	364	12.04	606	20.05	1	0.03	6	0.2
reach	7608	1285	16.89	255	3.35	1	0.01	4	0.05
reason	43674	15282	34.99	2616	5.99	337	0.77	41	0.09
recitation	658	94	14.29	110	16.72	0	0.0	1	0.15
recollection	1862	749	40.23	141	7.57	2	0.11	4	0.21
regulation	21049	11339	53.87	483	2.29	44	0.21	24	0.11
remark	7997	5235	65.46	713	8.92	14	0.18	0	0.0
resignation	2968	249	8.39	70	2.36	0	0.0	0	0.0
resource	54918	36155	65.83	2269	4.13	154	0.28	8	0.01
respiration	559	26	4.65	3	0.54	0	0.0	0	0.0
respite	1059	31	2.93	374	35.32	0	0.0	0	0.0
restraint	3698	1175	31.77	115	3.11	5	0.14	7	0.19
ruin	3566	3373	94.59	17	0.48	5	0.14	0	0.0
safety	31341	248	0.79	365	1.16	8	0.03	6	0.02
sailing	1409	84	5.96	34	2.41	1	0.07	1	0.07
salvation	4070	2	0.05	43	1.06	0	0.0	0	0.0
scatter	981	42	4.28	83	8.46	0	0.0	0	0.0
sense	79941	4848	6.06	26060	32.6	34	0.04	308	0.39

skill	52840	40819	77.25	1405	2.66	92	0.17	25	0.05
spirit	28278	6058	21.42	2072	7.33	14	0.05	15	0.05
stock	23751	7342	30.91	816	3.44	62	0.26	53	0.22
study	185789	65232	35.11	22890	12.32	769	0.41	32	0.02
success	29698	2128	7.17	1130	3.8	16	0.05	125	0.42
surgery	16855	1068	6.34	221	1.31	14	0.08	8	0.05
survival	11962	47	0.39	89	0.74	2	0.02	0	0.0
synchronization	301	0	0.0	15	4.98	0	0.0	0	0.0
transplantation	653	11	1.68	4	0.61	0	0.0	0	0.0
unfairness	385	2	0.52	14	3.64	0	0.0	0	0.0
upset	1393	528	37.9	267	19.17	0	0.0	1	0.07
urgency	2938	32	1.09	326	11.1	1	0.03	10	0.34
vindication	432	3	0.69	94	21.76	0	0.0	0	0.0
virtue	8718	2979	34.17	477	5.47	13	0.15	2	0.02
want	1199	133	11.09	7	0.58	0	0.0	0	0.0
widening	332	17	5.12	62	18.67	0	0.0	0	0.0
wit	3764	899	23.88	232	6.16	0	0.0	7	0.19
wonder	12362	2837	22.95	601	4.86	32	0.26	6	0.05
worry	7024	3291	46.85	267	3.8	19	0.27	9	0.13

Halima Husić

Curriculum Vitae

Personal details

Date of birth 27th July 1989

Place of birth Zvornik (Bosnia and Herzegovina)

Education

since July 2015 **PhD Program in Computational Linguistics**, *Ruhr-Universität, Bochum*.
Title: "On Abstract Nouns and Countability. An Empirical Investigation into the Countability of Eventuality Denoting Nominals".
Dissertation Committee: Tibor Kiss, Francis Jeffry Pelletier, Gennaro Chierchia, Agata Renans

2011 - 2013 **Master of Arts in Computational Linguistics**, *Ruhr-Universität, Bochum*.
Thesis: Definition eines Goldstandards für die Präpositionalanbindung in automatisierten Dependenzgrammatiken (*A Goldstandard for PP-attachment in automated dependency grammars*)

2008 - 2011 **Bachelor of Arts in Computational Linguistics and Oriental Studies**, *Ruhr-Universität, Bochum*.
Thesis: Die Semantik des Positivs (*The Semantics of the Positive*)

2004 - 2008 **Matura**, *Gazi Husrev-begova medresa*, Sarajevo, Bosna i Hercegovina.

Academic Employment

since 2013 **Research Assistant**, *Department of Linguistics*, Ruhr-Universität, Bochum.

- 2014 - 2018 in project "Accounting for the Foundations of Mass" (PI: Tibor Kiss and Francis Jeffry Pelletier)
- 2013 - 2014 in project "Grammatische Analyse von Präposition-Substantiv-Sequenzen" (PI: Tibor Kiss)

2010 - 2013 **Student Assistant**, *Department of Linguistics*, Ruhr-Universität, Bochum.

['stʌdiːz 'ɪn lɪŋ'gwɪstɪks ənd lɪŋ'gwɪstɪk 'deɪtə 'saɪəns]

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