Kurt Erbach, Universität Bonn
THE EVOLUTION OF COUNTABILITY: FROM OLD TO PRESENT DAY ENGLISH

Topic

The general goal of the planned project is to contribute to both the formal semantic analysis of countability and diachronic semantics by focusing on the evolution of the count–mass distinction from Old English to Present Day English. The project will be guided by the following research questions:

1. What exactly are the differences in the morphosyntactic characteristics of the count–mass distinction before Present Day English?
2. To what extent do nouns differ in terms of their count or mass encoding across periods of English?
3. To what extent do the leading analyses of countability (e.g. Chierchia, 2010; Rothstein, 2010; Sutton and Filip, 2016) capture the patterns in English before the present period?
4. What language internal influences contributed to the change in the English countability system from that in Old English to that in Present Day English?

To elucidate the goal and guiding research questions of this project, this proposal will be structured as follows: the present section will review these research questions and strategies for answering them; the second section will review the present state of research into the typology and semantics of countability systems; the third section will present the applicant's preparatory work, and the final section will detail the planned procedure for the proposed project, including work schedule and methods.

Toyota (2009) shows that the use of classifiers in English such as *piece of* and *grain of*, which are used to count mass nouns but not count nouns (1), largely arose in late Middle English and early Modern English. With this data, the research in Toyota (2009) provides a portion of the information needed to address this project's first research question about the differences in the morphosyntactic characteristics of the count–mass

(1)   a.   one piece of mud   **mass**
      b.   two grains of sand   **mass**
      c.   three ?(pieces of) tools   **count**
      d.   four ?(grains of) beans   **count**

distinction before Present Day English. To approach a more complete answer to this question, a great deal more research is needed on the extent to which English syntax has been sensitive to lexically encoded countability before the present period. Chierchia (1998), for example, lists the following morphosyntax sensitive to the countability of nouns other than the use of classifiers: the use of plural morphology (*tools*/#*muds*); direct counting (*one tool*/#*one mud*); count determiners (*many tools*/#*many mud*); and mass determiners (*much mud*/#(*much tool*). In order to understand the differences in the morphosyntactic characteristics of the count–mass distinction beyond the nature of classifiers as discussed in Toyota (2009), it is necessary to examine the nature of these other categories of countability sensitive morphosyntax before the present period.

While countability has long been discussed as a dichotomy between count and mass (see, e.g. Quine, 1960; Link, 1983; Bach, 1986; Krifka, 1989; Chierchia, 1998; Rothstein, 2010, among many others), it has been known for almost as long that it is possible to establish at least eight classes of countability in English (Allan, 1980). The second research question of the proposed project frames this issue in the context of English before the present day, asking about the extent to which nouns differ in their count or mass encoding across periods of English. By organizing the morphosyntax later reported by Chierchia (1998) into groups based on semantic similarity—e.g. fuzzy denumerators: *about 50, one hundred or so,* etc.—Allan (1980) shows that nouns do not fall strictly into two categories, rather eight different countability classes exist in Present Day English (Table 1). With a similar, albeit computational approach, Grimm and Wahlang (2021) shows that the count–mass distinction is even more diverse than argued in Allan (1980), given the way nouns are used in the Corpus of Contemporary American English can be sorted into at least 15 countability

Table 1: Countability classes (Allan, 1980)

Morphosyntax	*car*	*oak*	*cattle*	*Himalayas*	*scissors*	*mankind*	*admiration*	*equipment*
N ... *them*	+	+	+	+	+	+		
a(n) N	+	+		+		+	+	
all N.SG	+		+	+	+			
about 50 N.PL	+	+	+		?			
many N	+	+						

categories, rather than eight. To investigate countability classes prior to present day English, one strategy would be to conduct a computational investigation in the style of Grimm and Wahlang (2021). One benefit of this approach is that direct comparison can be made to the contemporary English data in Grimm and Wahlang (2021). An approach like that in Allan (1980) would be impossible given the absence of Old English speakers who would be needed for acceptability judgments. However, in order to conduct such a computational analysis, it is necessary to first understand the extent to which morphosyntax was sensitive to lexically encoded countability of nouns before Present Day English, as is specified by the first research question.

Because the majority of analyses of the count–mass distinction focus on countability in Present Day English, the extent to which the widespread analyses of countability (e.g. Chierchia, 2010; Rothstein, 2010; Sutton and Filip, 2016) capture the patterns in English before the present day is unknown, hence the third research question. Testing these analyses against novel data from previous periods of English will provide the data needed to test the aforementioned analyses and answer the proposed project's third research question. As mentioned, most analyses of Present Day English countability treat it as a binary dichotomy between count and mass where the two classes of nouns differ in some way such as referring to countable atoms or not (Link, 1983; Chierchia, 2010, 2015) or being a different semantic type or not (Krifka, 1989; Rothstein, 2010). At the same time, on the sort of data about English before the present day discussed above, Toyota (2009) argues that there was no such distinction between count and mass nouns in Old English, rather nouns were more or less uniform in terms of countability. The claim in Toyota (2009) suggests that analysis of Present Day English will not hold for previous periods of English, rather that analyses of countability in languages like Mandarin, which also have more uniform treatment of nouns in terms of countability, will be more applicable. To pursue an answer to the third research question, it will be necessary to test different analyses of different countability systems, all of which will be discussed further in the next section on the present state of research.

The final research question guiding the present project is focused on the language internal factors that lead to the present state of the English countability system. Answering the previous research questions will provide the necessary data for identifying exactly the sorts of semantic changes that have occurred in the English countability system. For example, it is already known that the Present Day English indefinite article *a(n)* evolved from the Old English numeral *an* ('one'), and that this exemplifies an overall tendency for semantic change from a more concrete meaning to a more abstract one (Heine, 2017). Diachronically analyzing the changes in morphosyntax sensitive to countability and the nouns and their countability classes will be necessary to understand what language internal factors led to the present state of the English countability system.

The planned project will fill in the following research gaps: (i) the massive descriptive gap existing because there has yet to be a detailed description of the countability system in English before the present period, (ii) the evolutionary gap existing because there has not yet been an attempt to understand how the Present Day English countability system arose, which is particularly interesting given certain other Indo-European languages such as Kurdish developed quite distinct countability systems, namely classifier systems.

While Toyota (2009) begins to bridge this gap by providing some data about countability in Old, Middle, and Modern English, there is still much data to be uncovered and much more detail to be provided about the nature of the shift from the countability system in Old English to that in Present Day English. Altogether, the project builds on previous work detailing and analyzing the English count–mass distinction, and contributes to the nascent body of diachronic formal semantics by testing and eventually building formal models of countability against data from English before the present period. Formal analysis of such languages is needed to be able to fully capture the dynamic nature of language use and semantic change.

The Present State of Research
Toyota (2009) is the only known research on countability in English before the present day. The primary methodology in Toyota (2009) consisted of a search of the Helsinki Corpus (Kytö, 1996) for constructions using numerals, classifiers, and a selection of mass nouns. The main finding of this search was that numerals have been used throughout English, though classifiers were rarely used before late Middle English (lME, 1350-1500), and half of the 31 mass nouns investigated did not enter English until after the late Middle English period. Because a clear distinction between count and mass could not be easily made with this data, Toyota (2009) argues that English was previously a classifier language.

The remainder of this section will situate the analysis in Toyota (2009) in the context of the state of the art of countability research, beginning with classifier languages, and other types of countability systems. In contrast number marking languages like Present Day English, in which classifiers are used for counting mass nouns but not count nouns, (1), classifiers languages—e.g. Mandarin—use classifiers in all counting constructions, whether they are counting groups, discrete individuals, or species (2). Languages like Hun-

(2)   Mandarin (Krifka, 1995, pp. 398-399)

   a.   sān   qún   xíong
         three herds bear
         'three heards of bears'
   b.   sān   zhī xíong
         three CL bear
         'three bears' (objects)
   c.   sān   zhŏng xíong
         three CL   bear
         'three bears' (species)

garian have been called "mixed" languages on account of the fact that they have properties of both number marking languages and classifier languages. Notably, classifiers are generally optional for count nouns in such languages, as shown in (3) where the Hungarian equivalent of 'three books' could occur with or without the general classifier *darab*. Apart from number marking, classifier and mixed languages, the final known kind of countability system is that in which all nouns can be directly combined with numbers. In Yudja, (4), classifiers are not needed for any noun, though they can be specified when desired (Lima, 2010). In summary,

(3)   Hungarian (Schvarcz and Rothstein, 2017, p. 185)

             három (darab)   könyv
             three $CL_{general}$ book
             'three books'

(4)   Yudja (Lima, 2010, p. 162)

             txabïu y'a ipide   pepepe
             three   water on.the.floor to.drip
             'Three water dripped on the floor'

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the four types of countability systems are (i) classifier languages, where classifiers are always needed to count, (ii) mixed languages, where classifiers can be used to count all nouns but are only required for mass nouns, (iii) number marking languages, where classifiers are only used for mass nouns, and (iv) count languages, where classifiers are always optional for counting.

The earliest formal analyses of countability (Link, 1983; Krifka, 1989) proposed that what made a noun countable is its reference to atoms (Link, 1983), or its ability to specify quantized, countable units—i.e. units that are not part of one another (Krifka, 1989), and therefore can be counted directly while mass nouns were assumed to not refer to atoms (Link, 1983), or not specify countable units (Krifka, 1989), so they require countable units to be specified (1). The fact that contemporary analyses still make use of components of these early analyses shows that consensus has not been reached about which analysis best explains which nouns are count and which are mass: Chierchia (2015), for example argues for an analysis similar to that of Link (1983), using a distinction between kinds of atomicity as the basis of the count–mass distinction, while Sutton and Filip (2019) follow Krifka (1989) in using quantization as one of the necessary criteria for making a noun countable. Broadly speaking, there is still disagreement about whether count and mass nouns are tied to our understanding of the world in terms of distinct kinds of atoms, or our conceptualization of nouns that do refer to quantized individuals and nouns that do not.

While there is evidence that speakers of all types of languages distinguish between solid objects and non-solid substances (Imai and Gentner, 1997; Lucy and Gaskins, 2003), it has long been assumed that nouns in number marking languages like English refer differently than those in classifier languages like Mandarin. While the count nouns and mass nouns in number marking languages are assumed to be predicates that differ in denotation, all nouns classifier languages are most often assumed to be uniform in their kind of reference, namely to kinds (Krifka, 1995; Chierchia, 1998; Rothstein, 2010, and many others). In many analyses, (Krifka, 1995, e.g.), one of the primary functions of classifiers in Mandarin is to shift the nouns from denoting kinds, to denoting countable entities.

This notion of uniform treatment of nouns is at the heart of the analysis of Old English in Toyota (2009). In other words, Toyota (2009) claims Old English was a classifier language given classifier languages treat nouns uniformly, and the data from Old English suggests nouns were treated much more uniformly: recall that evidence has been shown in support of the idea that nouns were not distinguished as count or mass in Old English as they are in Present Day English, given there was an overwhelming lack of classifiers, and of the Present Day English nouns that were investigated, many did not yet exist in Old English. However, the overwhelming lack of classifiers in Old English makes such an analysis unlikely, especially in the context of other types of countability systems, namely those like Yudja.

Lima (2010) proposes that nouns are number neutral and numbers in Yudja encode a function for specifying countable units. In other words, all nouns refer to individuals and pluralities thereof, and it is the function of a number to make counting possible, as opposed to some encoding in the noun as in the analysis of English in Krifka (1989), or to a classifier specifying a countable unit as in a classifier language Krifka (1995). Given the Old English data from Toyota (2009), it seems that the most promising analysis might, in fact, be one in which Old English is a count language like Yudja, where classifiers are not ever needed for counting, rather than a classifier language like Mandarin, where classifiers are always needed. However, because Toyota (2009) leaves much of English countability to be researched, for example, the use of quantifiers like *many, much, each, every*, etc. as well as which nouns occurred in the plural, and which did not, the nature of countability system before present day English is still largely opaque.

The relative paucity of research into countability in English before the present period is surprising for a number of reasons. First, the count–mass distinction is considered to be the primary grammatical distinction in the English nominal system (Carter and McCarthy, 2007), so the lack of research on how this distinction arose constitutes an enormous gap in research on this particular Germanic language. Second, the semantics of the count–mass distinction is so hotly debated that three books on the topic have been published in the last year alone (Filip, 2021; Kiss et al., 2021; Moltmann, 2020) with at least one more forthcoming. The fact that

the count–mass distinction seems tied to our conceptual understanding of the world (e.g. Quine, 1960), has lead to numerous psycholinguistic studies on the topic as well (e.g. Gordon, 1985; Gathercole, 1985; Soja et al., 1991; Gathercole, 1997; Imai and Gentner, 1997, among many others). While English remains the focus of research on countability, much of the recent work on countability has looked at languages other than English (e.g. Tsoulas, 2008; Lima, 2010; Doetjes, 2012; Schvarcz and Rothstein, 2017; Erbach et al., 2017, 2019; Erbach, 2019, a.o.), which has led to a better understanding of the ways that countability systems can be manifested across languages. One of the main reasons for conducting research on countability is because the nature of what makes nouns like *chair* and *cloud* countable but nouns like *furniture* and *air* not countable, or mass seems to be rooted at least in part to our conceptual understanding of the world.

What is also at stake in the context of the proposed project is crucial insight into the ways that languages evolve. Many languages related to English have also been shown to be number marking languages—e.g. German, Icelandic (Wiese and Maling, 2005)—which could be taken to suggest that there is some sort of natural progression to number marking languages from whatever countability system existed in proto-Germanic. However, while the most commonly discussed classifier languages in semantic analyses are not Indo-European (e.g. Mandarin and Japanese), Wiese and Maling (2005) argue that Kurdish, an Indo-European language, is a classifier language, suggesting that it is somehow possible for typologically distinct countability systems to evolve from a common ancestor. The present proposal can be the first step towards the larger research question about how these distinct countability systems, that in English and that in Kurdish, arose within a single language family.

Preparatory work

As a doctoral researcher in DFG CRC 991: *The Structure of Representations in Language, Cognition, and Science*, Project C09; *A frame-based analysis of countability*, my work focused on in-depth investigations into the countability of typologically distinct languages, namely Greek, Hungarian, and Japanese. For example, I showed that each of these languages show certain reflexes of a count–mass distinction, though in a progressively restricted way. In Table 2, ✓ indicates that a the language has this countability property, ✓- indicates this property is restricted, and × indicates that the language does not have this property. To formally

Table 2: Comparison of Mass/Count Properties across Languages (Erbach, 2021)

Language	DET_{count}	NUM+N	$*N_{count} \rightarrow$ N.PL	DET_{mass}
English	✓	✓	✓	✓
Greek	✓	✓	✓	×
Hungarian	✓	✓	×	×
Japanese	✓	✓-	×	×

account for the countability related phenomena in these languages, I extended the theory of countability first motivated by my advisors Hana Filip and Peter Sutton, which captures the distribution of nouns across countability classes with crosslinguistic validity, but required refinements and extensions to account for the nominal systems of the aforementioned languages. In my PhD thesis and several proceedings papers (Erbach et al., 2017, 2019, 2021; Erbach, 2019), I compare the ability of several semantic analyses (Chierchia, 2010; Rothstein, 2010; Sutton and Filip, 2016) to accommodate novel data in typologically distinct languages. The empirical and analytical work that I completed for my thesis project constitute a solid foundation on which to build new skills in diachronic semantics for the project proposed here. While I will have to rely solely on corpus analyses for the proposed project, my experience in investigating typologically distinct languages will be crucial for finding the morphosyntactic environments that have the potential to uncover a count–mass distinction in English before the present period. My expertise in theories of countability will make testing the novel data against these analyses a very straightforward process.

In addition to testing formal semantic analyses with novel data from multiple languages, the primary hypothesis motivated in my thesis is that there is a relationship between the amount of countability related morphosyntax in a given language (e.g. count and mass quantifiers like *many* and *much*) and number of object mass nouns (e.g. *furniture, jewelry, mail*) in that language. This hypothesis is further explored in Erbach (2020), along with hypotheses about the role that language acquisition plays in constructing this dynamic relationship. In Erbach and Kheder (2021), this hypothesis is expanded once more to include a relationship between countability related morphosyntax and the number of nominal countability categories, given that, compared to English, Sorani Kurdish has far fewer morphosyntactic environments related to countability, and likewise fewer nominal countability classes. The data from Toyota (2009) already supports this hypothesis, given there seems to be a relative lack of classifiers in Old English, and likewise relatively uniform treatment of nouns. However, given the number of additional morphosyntactic environments such as quantifiers like *much* and *many* that have yet to be investigated, this is largely an open question.

Preliminary empirical work shows that *much* evolved from Old English *micyl*, which also was used to talk about large proportions, though it was used with nouns that are currently count nouns (e.g. *people*, (5)). This preliminary evidence about *micyl* ('much') sug-

(5)   Muche poeple to him kam. (*Otuel c1300*)

gests that certain of the morphosyntactic environments that are able to distinguish count nouns from mass nouns in Present Day English, might not have done so before the present period. In terms of nouns' countability classes, preliminary work shows that *furniture*, for example, was a dual-life noun when first borrowed into English, meaning that it was used in both count (6) and mass (7) morphosyntax.

(6)   His wife sitteth vpon the grounde, apparrelled with those furnitures that he did weare. (W. Painter *Palace of Pleasure* I. xi. f. 32v, 1566)

(7)   Their victualles and other provisseounes wherby they had gotten Large furneture. (*MS Cotton Galba Bxii* f. 116, 1549)

While the data about *micyl* ('much') provides support for the hypothesis motivated in Toyota (2009) that countability was much more uniform before the present period of English, the data about *furniture* is less clear. It could be the case that plural demonstratives like *those* only occurred with count nouns, as marked by plural morphology, in Modern English as they do in Present Day English, or it could be the case that both plural morphology and demonstratives were not restricted to count nouns in Modern English. The work planned for this project will uncover exactly these details and allow subsequent formal analysis.

Planned procedure

A mixed-methods design will be used to answer this project's research questions. The methods will include a novel corpus study of English before the present day, as well as deductive and inductive formal semantic analysis. The procedure is outlined in Table 3 where work packages (WPs) state the planned methodology and are listed next to the corresponding research questions. Notably, research question 4, which aims to

Table 3: Summary of the Planned Procedure.

Work Package (WP)	Research Question (RQ)
WP1: Corpus Analysis 10.2021–03.2022	RQ1: Morphosyntax of the counability in before the present day RQ2: Nominal countability classes before the present day
WP2: Formal Analysis 04.2022–09.2022	RQ3: Formal analysis countability before the present day

analyze the language internal influences on the change in countability from Old English to Present Day English is omitted from Table 3. Research question 4 is omitted because of the time constraints on the project, though it remains the overarching research goal that both ties together the current project and constitutes the primary goal for future work.

The first work-package of this project aims to begin to answer research questions 1 and 2, by expanding on the corpus study in Toyota (2009), which has begun to uncover the countability systems in Old English, Middle English, and Modern English. The planned procedure is to take a much more methodical and detailed approach to the investigation of countability before present day English, by investigating the historical use of the full set of known countability properties in Present Day English, which is summarized in the style of Grimm and Wahlang (2021) in Table 4. In addition to uncovering the extent to which the complexity of the

Table 4: Countability indicators

Unit denumerators	*a(n), one*
Fuzzy denumerators	*few, many, hundreds, thousands, about 20, 30 or so, more than 100...*
Other denumerators	*both, each, every, two, three, 4, 5...*
Non-denumerators	*much, little, all, some...*

count–mass distinction differs from Present Day English, by following the corpus methods of Grimm and Wahlang (2021), examining the classes of nouns that co-occur with different sets of determiners will reveal the distribution of nouns across countability classes in English before the present day.

Rather than following Toyota (2009) in using the un-annotated Helsinki corpus (Kytö, 1996), which contains data from Old English to the present, I plan to first use the Penn Parsed Corpus of Modern British English (PPCMBE2) (Kroch et al., 2016), which is syntactically annotated and therefore ideally situated for replicating the computational methodology of Grimm and Wahlang (2021). Another reason for using PPCMBE2 is that the Middle English data will be that much more easily accessible to the novice academic of historical English. More plainly, because close analysis of Middle English and Old English in particular require more extensive experience with the orthography and morphology of these periods than close analysis of Modern English does, PPCMBE2 can be searched and analyzed much more quickly than a corpus of Middle or Old English.

This work package will result in a paper that tests the theory in Toyota (2009) against novel data from Modern English. If Toyota (2009) is correct, then the aforementioned corpus analysis of PPCMBE2 will reveal that Modern English had fewer properties of countability than Present Day English does, and more uniform treatment of nouns. What this would also entail is support for the hypothesis motivated in my PhD thesis (Erbach, 2021) that there will be fewer nouns in distinct countability classes.

The second work-package will answer research question 3 by testing the leading theories of countability (such as Chierchia, 2010; Rothstein, 2010; Sutton and Filip, 2019) against the novel data from Modern English uncovered in the first work package. Recall that the only previous research suggests that Old English was a classifier language in the sense that it treated all nouns the same, though it had no classifiers (Toyota, 2009). This already suggests that a more appropriate analysis of the Old English data would be one more in line with that of Yudja in Lima (2010), which also does not seem to distinguish between count and mass nouns nor make general use classifiers. As a first step towards developing such an analysis of Old English, capturing the intermediate period, Modern English, with a formal model will lay the groundwork for a diachronic semantic analysis that captures the evolution of English's countability system from that in Old English to that in the present day. Instead of assuming countability is based on reference to things in the world perceived to be countable atoms (following Chierchia, 2010) or sets of contextually quantized, individuated entities (following Sutton and Filip, 2019), what might capture the relevant data most easily might be an

analysis along the lines of the approach in Rothstein (2010), in which nouns can be counted if they are indexed to entities in the domain of countable individuals, which seems to be the case for all nouns in Yudja. In summary, the novel data gathered in work package 1 will allow for writing a paper motivating a formal semantic analyses of countability in Modern English in Work Package 2.

In concert with the projects two work packages, it is also my goal to conduct a review of empirical methods in diachronic semantics for the purposes of implementing these methods with the collected data in a future research project. Eckardt et al. (2003); Eckardt (2006); Bisang et al. (2008); Allan and Robinson (2011) and Deo (2015) are key resources on methods in the field of diachronic semantics, which is relatively new compared to formal syntax and semantics. Each of the aforementioned resources contains empirical approaches to diachronic semantics, such as diachronic collostructional analysis, which may prove useful for a future, diachronic analysis of English's countability system.

By collecting and analyzing the data in the aforementioned manner, this project will provide an account of the countability system in Modern English, and it will accomplish the main goal of the proposed project, namely to investigate the evolution of the count–mass distinction from Old English to Present Day English. While the present project focuses on Modern English because of time constraints, it will provide a foundation for subsequent research on Middle English, Old English, and countability systems in general, thereby informing us about countability and the nature of semantic change on a much larger scale.

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