

University of California, Santa Barbara

Lexical flexibility in discourse:
A quantitative corpus-based approach

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of
Philosophy in Linguistics

by

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<https://github.com/dwhieb/dissertation>

Dedication

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ABSTRACT

Lexical flexibility in discourse:
A quantitative corpus-based approach
by
Daniel W. Hieber

This thesis is a quantitative corpus-based study of lexical flexibility in English (Indo-European) and Nuuchahnulth (Wakashan). *Lexical flexibility* is the capacity of lexical items to serve in more than one discourse function—reference, predication, or modification (or more traditionally, noun, verb, or adjective). In this thesis I develop a procedure and metric for quantifying the lexical flexibility of words in a corpus, and apply that metric to English and Nuuchahnulth. I find that the two languages differ drastically in not only their degree of lexical flexibility, but the way in which that flexibility is realized. This study advances the discussion of lexical flexibility—as well as parts of speech more generally—by adding a new kind of empirical evidence to the discussion (quantitative corpus-based data), and in doing so provides answers to several longstanding and much-debated questions about how lexical categories operate in English and Nuuchahnulth.

The abstract should include 1) a brief statement of the problem; 2) a description of the methods and procedures used to gather data or study the problem; 3) a condensed summary of the findings. The abstract should be double-spaced. The recommended length is 1–2 pages. (add Abstract)

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List of Abbreviations

The following table provides the meaning of each abbreviation used in interlinear glossed examples throughout this thesis.

1	first person
2	second person
3	third person
ACC	accusative
CAUS	causative
COMPL	completive
DEF	definite
FIN	finite
HUM	human
INCEP	inceptive
IND	indicative
MOM	momentaneous
NEG	negative
PAST	past
PFV	perfective
PL	plural
SG	singular
SPEC	specific
SUBJ	subject
TR	transitive

List of Languages

The following table provides information about each language mentioned in this thesis: the name of the language in English, the [International Standards Organization \(ISO\) 639-3 language code](#), and the [Glottolog](#) code ([Hammarström, Forkel & Haspelmath 2019](#)). Genealogical information follows the format family > phylum.

Language Name (English)	ISO 639-3	Glottocode	Genetic Affiliation
Ancient Greek	grc	anci1242	Indo-European > Hellenic
Cayuga	cay	cayu1261	Iroquoian > Northern Iroquoian
Central Alaskan Yup'ik	esu	cent2127	Eskimo-Aleut > Yupik
Chamorro	cha	cham1312	Austronesian > Malayo-Polynesian
Classical Nahuatl	nci	clas1250	Uto-Aztecan > Nahuan
English	eng	stan1293	Indo-European > Germanic
Latin	lat	lati1261	Indo-European > Italic
Kutenai	kut	kute1249	isolate
Mandarin	cmn	mand1415	Sino-Tibetan > Sinitic
Mandinka	mnk	mand1436	Mande > Manding
Mundari	unr	mund1320	Austroasiatic > Munda
North Efate	llp	nort2836	Austronesian > Oceanic
Nuuchahnulth	nuk	nuuc1236	Wakashan > Southern Wakashan
Quechua	qwe	quec1387	Quechuan
Quiché Maya	quc	kich1262	Mayan > Quichean

Riau Indonesian	ind	indo1316	Austronesian > Malayan
Russian	rus	russ1263	Indo-European > Balto-Slavic
Sundanese	sun	sund1251	Austronesian > Malayo-Polynesian
Tagalog	tgl	taga1280	Austronesian > Philippine
Tongan	ton	tong1325	Austronesian > Polynesian
Ute	ute	utee1244	Austronesian > Polynesian

CONVENTIONS

This note documents the conventions I have adopted regarding linguistic data, terminology, and presentation of data throughout this thesis.

Interlinear Examples

It is well known that the world's languages realize widely different sets of morphosyntactic categories ([Whaley 1997](#): 58; [Haspelmath 2007](#)). Moreover, even when these categories bear the same name, they may differ drastically in their behavior ([Dixon 2010](#): 9). It is the subject of much debate whether these language-specific categories can be mapped onto each other or compared in any useful way ([Croft 1995](#); [Song 2001](#): 10–15; [Croft 2003](#): 13–19; [Haspelmath 2010a,c](#); [Newmeyer 2010](#); [Stassen 2011](#); [Hieber 2013](#): 308–310; [Croft 2014](#); [Plank 2016](#); [Song 2018](#): 44–58). Recognizing these difficulties, I have made no attempt to standardize the linguistic terminology used in examples from different languages. I have, however, standardized the abbreviations used to refer to those terms. For example, even though one researcher may abbreviate Subject as SUBJ and another researcher abbreviate it as SUB, I nonetheless gloss all Subject morphemes as SUBJ. See the [List of Abbreviations](#) for a complete list of glossing abbreviations.

I have not attempted to standardize the transcription systems and orthographies used in examples. All examples are given as transcribed in their original source. The reader should consult those original sources for further details regarding orthography.

In all interlinear glossed examples, I follow the formatting conventions (but not necessarily the recommended abbreviations) of the Leipzig Glossing Rules ([Bickel, Comrie & Haspelmath 2015](#)). The source of each example is always provided after the example itself.

Prose

It is increasingly common in typological studies to write language-particular terms and categories with an initial capital letter, and to write terms that refer to language-general or semantic/functional concepts (e.g. the crosslinguistic notion of subject) in lowercase ([Comrie 1976](#): 10; [Bybee 1985](#): 47 (fn. 3), 141; [Croft 2000](#): 66; [Haspelmath 2010a](#): 674; [Croft 2014](#): 535). For example, the English Participle suffix *-ing* is, obviously, specific to English, and does not exist in any other language; therefore it is capitalized and written as *Participle*. If, however, a writer is discussing the category of participles generally and crosslinguistically, not specific to any particular language, the term is written in lowercase as *participle*. I follow these same capitalization conventions in this thesis.

When a language is discussed in the text, its genealogical information is provided in parentheses, following the format family > phylum. For example, Central Alaskan Yup'ik would be listed as “Central Alaskan Yup'ik (Eskimo-Aleut > Yupik)”. A complete list of languages mentioned in this thesis, along with their ISO 639-3 codes, Glottolog codes, and genetic information is in the [List of Languages](#). Each language is also included in the [Language Index](#). Language names are given in English following [Haspelmath \(2017\)](#). Language information is taken from the Glottolog database ([Hammarström, Forkel & Haspelmath 2019](#)).

Quotations

Within quotations, *italics* indicate emphasis in the original, while **boldface** indicates my emphasis.

Chapter 1

Introduction

This chapter motivates the need for research on lexical flexibility by situating it within broader concerns regarding linguistic categories more generally, and categories in human cognition. The specific problem addressed is our lack of understanding regarding what lexical flexibility looks like, and how it varies across languages. This thesis contributes to answering these questions via a quantitative corpus-based study of lexical flexibility in English (Indo-European > Germanic) and Nuuchahnulth (Wakashan > Southern Wakashan). It is the first study to examine lexical flexibility using natural discourse data from corpora. This chapter provides an overview of the thesis, including the specific research questions addressed, the data and methods used, a concise summary of the results, and a preview of the conclusions.

1.1 The “problem” of lexical flexibility

Word classes such as noun, verb, and adjective (traditionally called *parts of speech*) were once thought to be universal, easily identifiable, and easily understood. Today they are one of the most controversial and least understood aspects of language. While language scientists agree that word classes exist, there is much disagreement as to whether they are categories of individual languages, categories of language generally, categories of human cognition, categories of language science, or some combination of these possibilities (Mithun 2017: 166; Haspelmath 2019; Hieber forthcoming). Lexical categorization—how languages assign words¹ to

¹In this thesis, I use the two terms *word* and *lexical item* interchangeably as a convenient cover terms for root, stem, or fully-inflected word. These terms do not here refer to phonological words, syntactic words, or any

categories—is of central importance to theories of language because it is tightly interconnected with linguistic categorization generally, which in turn informs (and is informed by) our understanding of cognition. Categorization is a fundamental feature of human cognition (Taylor 2003: xi)[2–3]LierRijkhoff2013, and lexical categorization is perhaps the most foundational issue in linguistic theory (Croft 1991: 36; Vapnarsky & Veneziano 2017: 1).

One challenge for traditional theories of word classes is the existence of *lexical flexibility*—the use of a word in more than one discourse function with no overt derivational morphology, whether it is used to refer (like a noun), to predicate (like a verb), or to modify (like an adjective). In traditional terms, flexible words are those which may be used for more than one part of speech. (A more precise definition of lexical flexibility is given in §2.5.) Examples of flexible words in several languages are shown below. In the examples, N stands for a word being used nominally, V for a word being used verbally, and A for a word being used adjectivally. The flexible word in each set of examples is shown with **emphasis**.

(1) English (Indo-European > Germanic)

N: And the spots of **paint** would change every hundred degrees.

(Ide & Suderman 2005: FrancisClem)

V: One story does come to my mind though where you **painted** the foundation coating on the house and got tar all over you.

(Ide & Suderman 2005: BorelRaymondHydellIII)

A: And it happened to be one of the rare **paint** jobs.

(Ide & Suderman 2005: sw2236)

(2) Mandinka (Mande > Manding)

N: **Kuuráŋ**-o mán díyaa.
sick-DEF PFV.NEG pleasant
 ‘Sickness is not pleasant.’

(Creissels 2017: 46)

V: Dín-dín-o mán **kuraŋ**.
 child-DEF PFV.NEG **sick**
 ‘The child is not sick.’

(Creissels 2017: 46)

(3) Mundari (Austroasiatic > Munda)

other concept of word. The reason for this vague usage is because languages vary as to which linguistic level bears category information. This issue is discussed more fully in Section 2.3.2.3.

N: **buru**=ko bai-ke-d-a.
mountain=3PL.SUBJ make-COMPL-TR-IND
 ‘They made the mountain.’ (Evans & Osada 2005: 354)

V: saan=ko **buru**-ke-d-a.
 firewood=3PL.SUBJ mountain-COMPL-TR-IND
 ‘They heaped up the firewood.’ (Evans & Osada 2005: 355)

(4) Nuuchahnulth (Wakashan > Southern Wakashan)

N: watqšił ʔałimt ...
 watq-ši(ł) **ʔała**-imt ...
 swallow-MOM **two**-PAST ...
 completely.swallowed two ...
 ‘He swallowed two of them [...]’ (Louie 2003: Qawiqalth 57)

V: wikał haʔuksil ʔałiicił
 wik-’ał haʔuk-ši(ł) **ʔała**-’i.čił
 not-FIN eat-MOM **two**-INCEP
 didn’t ate became.two
 ‘He (Mink) didn’t eat them and the crabs became two.’ (Louie 2003: Mink 266)

A: hiiłtqyaapup ʔała q^wayačiik
 hił-tqya-pi-up **ʔała** q^wayači:k
 there-back-MOM.CAUS **two** wolf
 put.on.the.back two wolf
 ‘Two wolves put (the dead wolf) on their back.’ (Louie 2003: FoodThief 46)

(5) Quechua (Quechuan)

N: rikaška: **hatun**-(kuna)-ta
 I.saw **big**-(PL)-ACC
 ‘I saw the big one(s)’ (Schachter & Shopen 2007: 17)

V: chay runa **hatun** (kaykan)
 that man **big** is
 ‘that man is big’ (Schachter & Shopen 2007: 17)

A: chay **hatun** runa
 that **big** man
 ‘that big man’ (Schachter & Shopen 2007: 17)

(6) Tongan (Austronesian > Polynesian)

N: na’e lele e kau **fefiné**
 PAST run SPEC PL.HUM **woman**.DEF
 ‘The women were running.’ (Broschart 1997: 134)

V: na'e **fefine** kotoa e kau lelé
 PAST **woman** all SPEC PL.HUM run.DEF
 'The ones running were all female.'

(Broschart 1997: 134)

(7) Central Alaskan Yup'ik (Eskimo-Aleut > Yup'ik)

- a. *iqa-* 'dirt'; 'be dirty'
 -ngtak 'very'
 N: ***iqa-ngtak*** 'one that is very dirty'
 V: ***iqa-ngtaq-*** 'be very dirty'

(Mithun 2017: 159)

- b. *tangerr-* 'see'
 -uaq 'imitation, inauthentic'; 'pretend to, without serious purpose'
 N: ***tangerr-uaq*** 'movie, vision, hallucination'
 V: ***tangerr-uar-*** 'hallucinate, watch a movie'

(Mithun 2017: 159)

- c. *iqeq-* 'corner of mouth'
 -mik 'thing held in one's mouth'; 'to put in one's'
 N: ***iq-mik*** 'chewing tobacco'
 V: ***iq-mig-*** 'put in one's mouth'

(Mithun 2017: 160)

In the English example in (1), the predicative use of *paint* takes the English Past Tense suffix *-ed* like any prototypical verb in English, but there is no morpheme present that explicitly converts the word from noun to verb (or vice versa). The remaining examples illustrate the same situation for a variety of language families around the world. Even though in some cases there is inflectional morphology indicating the function of the word, none of these examples have explicit derivational morphology converting the target words from one function to another.

Flexible words like those in the examples above create an analytical problem for traditional theories of parts of speech. Traditional theories assume that words can be partitioned into mutually exclusive categories based on a clear set of criteria, an approach that has its roots in the Aristotelian tradition of defining a category via its necessary and sufficient conditions. Flexible words would seem to violate this assumption because they appear to be members of more than one category at once, and the criteria for classifying them yield conflicting results.

Researchers have proposed numerous solutions to this problem. The most common re-

response is to adjust the selectional criteria so that only certain features are considered definitional of the class, allowing these researchers to dismiss other, potentially contradictory evidence as irrelevant (Baker [2003]; Dixon & Aikhenvald [2004]; Palmer [2017]; Floyd [2011] for Quechua; Chung [2012] for Chamorro). It is also common to analyze different uses of a putatively flexible word as instances of *heterosemy*—that is, entirely distinct words which share the same form but belong to different word classes (Lichtenberk 1991). In this view, heterosemous words are related only historically, via a process of conversion or functional shift, in essence denying the existence of lexical flexibility (Evans & Osada 2005). Another approach is to say that languages exhibiting flexibility have only some of the traditional categories. A notable example of this is Launey’s (Launey 1994; 2004) analysis of Classical Nahuatl (Uto-Aztecan), which he calls an *omnipredicative* language. In this analysis, all lexical words are predicates, so there is just one giant class of verbs.

Some researchers enthusiastically embrace the existence of lexical flexibility and abandon a commitment to the traditional categories of noun, verb, and adjective. Instead they analyze flexible lexemes as belonging to a broader, flexible word class such as “flexibles”, “contentives” or “non-verbs”, etc. (Hengeveld & Rijkhoff 2005; Luuk 2010). Other researchers abandon the commitment to word classes entirely. Mandarin (Sino-Tibetan > Sinitic), Tagalog (Austronesian > Philippine), Tongan (Austronesian > Polynesian), Riau Indonesian (Austronesian > Malayo-Polynesian), and Proto-Indo-European have each been analyzed as lacking parts of speech by some researchers (see Simon [1937], McDonald [2013], and Sun [2020] for discussions of early analyses of Mandarin; Gil [1993] for Tagalog; Broschart [1997] for Tongan; Gil [1994] for Riau Indonesian; Kastovsky [1996] for Proto-Indo-European). Within generative linguistics, the Distributed Morphology framework takes it as an assumption that all word roots are category-neutral (Siddiqi 2018). In a more functionalist orientation, Farrell (2001) argues that *all* instances of flexible words (which he describes as cases of “functional shift”) involve roots underspecified for category.

Note that these differences in perspective do not arise from disagreements about the em-

pirical facts. Researchers mostly agree on the empirical data, but disagree on the relative importance of various pieces of evidence, and on which criteria should be taken as diagnostic of a category (Wetzer 1992: 235; Stassen 1997: 32; Croft & van Lier 2012: 58). Examples of contested languages include Iroquoian (Chafe 2012), Mundari (Evans & Osada 2005; Hengeveld & Rijkhoff 2005), Quechua (Schachter & Shopen 2007: 17; Floyd 2011), and Sundanese (Robins 1968: 352; Hardjadibrata 1985: 62–63), with many others that could be cited as well. It is rare that an argument for flexibility is refuted by linguistic facts alone (though see Mithun’s [2000] response to Sasse [1988] regarding Cayuga).

Since analyses of lexical flexibility depend more on the theoretical commitments of the researchers involved rather than any crucial pieces of evidence, this leads to an intractable problem: researchers cannot agree on the criteria that should be considered diagnostic for a given category in a specific language (let alone crosslinguistically). Instead they partake in *methodological opportunism* (Croft 2001: 30), choosing the evidence and criteria which best support their theoretical commitments. Discussions in the literature about the existence of a particular category in a particular language are therefore often unproductive, and devolve into debates about theoretical assumptions or the relevance or importance of various pieces of evidence, which are ultimately unresolvable (Croft 2005: 435).

This is particularly unfortunate because lexical flexibility is by no means an isolated or minor phenomenon. Additional examples like those above could be provided for many or perhaps even all the world’s languages. Lexical flexibility is not as rare or marginal as traditional approaches to word classes lead one to believe. In a survey of word classes in 48 indigenous North American languages (Hieber forthcoming), every one of the languages surveyed exhibited lexical flexibility in at least some area of the grammar (although not all authors analyzed these cases as such). In my own experience researching lexical flexibility over the last decade, I have yet to encounter a language that does not exhibit a degree of flexibility in at least some words, however marginally. The prevalence with which different areas of the grammars of the world’s languages lack sensitivity to the distinctions between reference (nouns), predica-

tion (verbs), and modification (adjectives) suggests that the existence of lexical categories in a language is not necessarily a given ([Hieber forthcoming](#)).

Indeed, given what we know from both cognitive science and diachronic linguistics, it would be surprising if clear-cut categories *did* exist. Word meanings, lexical categories, and mental categories are all prototypical² ([Taylor 2003](#)), and language change is both gradual and gradient ([Hopper & Traugott 2003](#); [Traugott & Trousdale 2010](#)) There will be more or less central members of any given category, and at any given point in time a word might be in a stage of transition or expansion from one category into another, meaning that it will show attributes of both.

Likewise, languages develop constructions dedicated to signaling the discourse functions of reference, predication, and modification over time, but at any given point in time, a language may have few or many of these constructions, and they may be at various stages of development ([Vogel2000](#)). Given these facts, the real curiosity is how discourse functions come to be grammaticalized in language over time, not why it is that some languages lack such distinctions in certain areas of their grammars. Lexical flexibility is not so much a problem as it is a design feature of language. It is precisely the liminal categorial³ status of flexible words that makes them interesting:

In the functionalist view, linguists should recognize the boundary status of the cases in question and try to understand why they are boundary cases. The major empirical fact that has led to concrete results for typology is the discovery that the cross-linguistic variation in such things as the basic grammatical distinctions is patterned. ([Croft 1991](#): 23)

It is only recently that lexical flexibility has become an object of study in itself, rather than a problem to be solved. As explained above, most prior studies aim to advance a particular

²In this thesis, I use the term *prototypical* to mean ‘having the properties of the prototype, exemplar, or central member of a category’ and the term *prototypal* to mean ‘having a prototype structure, with central and less central members’. The term *prototypal* is borrowed from the programming community, where it is used to describe programming languages (such as JavaScript) in which objects inherit properties from shared prototypes. Word classes may be described as prototypal, and their members as prototypical or non-prototypical.

³In this thesis, I use the term *categorial* to mean ‘without exception; unconditional’ and the term *categorical* to mean ‘having to do with categories’.

analysis rather than to expand empirical coverage of the phenomenon. While they often provide numerous examples, they are neither quantitative nor comprehensive. As yet, there are only a small number of empirical investigations into the extent and nature of lexical flexibility in individual languages (let alone crosslinguistically). What follows is a brief synopsis of the existing studies of this latter type.

1.2 Previous research

The existing studies on the empirical extent of lexical flexibility are of two types: lexicon-based studies which examine dictionaries to determine whether words may be used for multiple functions, and corpus-based studies which examine whether and how often words are used for multiple functions in discourse.

An early lexicon-based study, though not explicitly focused on lexical flexibility, is [Croft's \(1984\)](#) study of categories of Russian (Indo-European > Balto-Slavic) word roots (summarized in [Croft \[1991: 66\]](#)). [Croft](#) finds that Russian roots are unmarked, or among the least marked forms, when their semantic category (object, action, or property) aligns with their discourse function (reference, predication, or modification respectively). When roots are used for discourse functions that are atypical for their meaning—in other words, when they are used flexibly—they are marked in some way (or at least as marked as their prototypical uses). These data suggest that lexical flexibility is constrained in a principled way, by what Croft calls the *typological markedness of parts of speech* (explained in detail in §2.4).

A study of Mundari (Austroasiatic > Munda), [Evans & Osada \(2005\)](#) conduct a dictionary analysis using a focused 105-word sample as well as a larger 5,000 word-sample. In the 105-word sample, 74 words (72%) could be used as either noun or verb. In the larger sample, 1,953 words (52%) could be used as both noun and verb. The complete figures for the large sample are shown in [Table 1.1](#). [Evans & Osada](#) argue on the basis of these data that, because not all the words in the Mundari lexicon are flexible, Mundari is *not* a flexible language. As with any

whole-language typology, however, this is an oversimplification. To overlook the flexibility of these words ignores the behavior of a vast portion of the lexicon. It is exactly this flexible behavior which is of interest in this thesis. [Evans & Osada](#)’s study constitutes an important contribution to our knowledge of the empirical extent of lexical flexibility across languages.

Table 1.1: Percentage of words used as nouns, verbs, or both in Mundari (Austroasiatic > Munda) ([Evans & Osada 2005](#): 383)

noun only	772	20%
verb only	1,099	28%
noun and verb	1,953	52%
Total	3,824	100%

[Mithun \(2017: 163\)](#) also conducts a lexicon-based analysis of words roots in Central Alaskan Yup’ik (Eskimo-Aleut > Yupik) using [Jacobson’s \(2012\)](#) exhaustive dictionary, and shows that only a small minority of roots (12%) are flexible, and can be used as both nouns and verbs. The results of this study are shown in [Table 1.2](#). [Mithun](#) reports that the words in these groups cannot be characterized in any general or semantic way. [Mithun](#)’s finding that flexibility in Yup’ik is rather marginal is surprising given that Yup’ik was the focus of an extensive debate about whether the language distinguished nouns and verbs ([Sadock 1999](#)). The fixation with these marginal cases in the literature seems disproportionate to their actual frequency of occurrence, again illustrating the disconnect between research advancing a particular analysis and research aiming to improve empirical coverage of the phenomenon. Just as with Mundari, however, it would be an oversight to simply ignore these flexible cases. Instead we should ask what accounts for the large difference in the extent of flexibility in the lexicons of Mundari versus Yup’ik.

In summary, existing lexicon-based studies have yielded differing results, each contributing to our understanding of lexical flexibility, but there are still too few such studies to draw any general conclusions.

Corpus-based studies of lexical flexibility are also scarce. In a study of the discourse functions of property words in English and Mandarin (Sino-Tibetan > Sinitic), [Thompson \(1989\)](#)

Table 1.2: Percentage of words used as nouns, verbs, or both in Central Alaskan Yup’ik (Eskimo-Aleut > Yupik) (Mithun 2017: 163)

noun only	35%
verb only	53%
noun and verb	12%
Total	100%

reports that predicative uses of adjectives are in fact more common than attributive (modifying) uses of adjectives in conversation. The resulting figures from this study are shown in Table 1.3. Some of the attributive adjectives reported in Table 1.3 have “anaphoric head nouns” (Thompson 1989: 258), meaning that they are adjectives functioning to refer, so the figures presented are not entirely representative of the pragmatic functions of these words. The study also does not discuss the extent to which *individual* words exhibit this predicate-modifier flexibility—we only have the data in aggregate—and it also excludes any prototypical nouns being used to modify. These methodological choices are appropriate for a study of the discourse uses of prototypical adjectives, but the result is that we cannot infer much about the extent of lexical flexibility in English or Mandarin from this study.

Table 1.3: Distribution of functions of property words in English (Indo-European > Germanic) and Mandarin (Sino-Tibetan > Sinitic) (Thompson 1989: 253, 257)

	English		Mandarin	
predicative adjectives	209	86%	243	71%
attributive adjectives	34	14%	97	29%

Nonetheless, Thompson’s study suggests a functional underpinning to the observed flexibility in prototypical property words. She finds that property words have primarily two functions in discourse: 1) to introduce new referents; and 2) to predicate an attribute about a referent. It is therefore no surprise that property words in some languages have their own specialized constructions, since they represent a unique mix of referring and predicating functions. However it is equally unsurprising that some languages encode property concepts

using either referring or predicating constructions, since prototypical adjectives exhibit behavior related to both functions.

A similar study to Thompson's is Croft's (1991: §2.5) investigation of *textual markedness*, which refers to the fact that prototypical uses of a word are more frequent than non-prototypical uses of a word in texts (as might be expected by prototype theory; Taylor 2003: 56). Croft counts the frequency with which object, action, and property words are used for each of the pragmatic functions of reference, predication, and modification in four languages: Quiché Maya (Mayan > Quichean), North Efate (a.k.a. Nguna; Austronesian > Malayo-Polynesian > Oceanic), and Ute (Uto-Aztecan > Numic). The resulting counts give confirmation to textual markedness theory. In all four languages, the most frequent use of words is in their prototypical function. Object words are most frequently used to refer, action words are most frequently used to predicate, and property words are most frequently used to modify. Like Thompson's (1989) study, however, we do not know these distributions for individual words. Additionally, Croft's data include cases of overtly marked uses of words in non-prototypical functions, which would not be considered instances of lexical flexibility.

Finally, there are some studies which count the proportion of nouns vs. verbs vs. adjectives in English texts (Hudson 1994; Polinsky & Magyar 2020). Again, the data are not disaggregated to the word level, so no firm conclusions can be drawn about the extent of lexical flexibility.

In sum, no existing studies examine the distribution of pragmatic functions for individual words, and limit themselves to only flexible (morphologically unmarked) cases. To my knowledge, the studies just reviewed exhaust those that take an empirical approach to determining the extent of lexical flexibility in or across languages. There are numerous additional studies of lexical flexibility, but these either a) focus on particular analyses or theories of flexible words rather than attempt to expand the empirical coverage of lexical flexibility, as mentioned earlier; or b) focus on various dimensions of the *behavior* of flexible words rather than studying the overall *prevalence* of flexibility. This point is not a criticism, but simply

a recognition of a lacuna in existing research. The emergent literature which treats lexical flexibility as a phenomenon of interest in its own right and applies empirical data to the task of understanding its behavior has advanced our knowledge of the various ways lexical flexibility can be realized, and what the constraints on that variation are. Existing research shows, for example, that lexical flexibility is constrained and shaped by the very principles that give rise to the crosslinguistic categories of noun, verb, and adjective in the first place (Croft 2000; 2005; Croft & van Lier 2012). This literature and its many findings are reviewed in Section 2.3.

There is however still much to discover about lexical flexibility. Most significantly, we do not yet know the overall prevalence of the phenomenon. Most grammatical descriptions of flexibility present a relatively small set of handpicked examples, so that we do not know how representative these examples are. Croft (2001: 70) makes this point nicely:

How do we know that when we read a grammar of an obscure “flexible” language X that the author of the grammar has systematically surveyed the vocabulary in order to identify what proportion is flexible? If English were spoken by a small tribe in the Kordofan hills, and all we had was a 150 page grammar written fifty years ago, might it look like a highly flexible language? (Croft 2001: 70)

Equally significant (and equally unknown) is whether there are any commonalities among words or languages which exhibit greater flexibility than others. These questions are relevant even if one adopts the position that flexible uses of words are truly heterosemous, related only historically. There remains the question of how such rampant heterosemy arises in the first place. Are there patterns or principles that guide the emergence of heterosemous forms? Whether one prefers to analyze this phenomenon as conversion, zero derivation, functional shift, polycategoriality, heterosemy, acategoriality, or something else, the fact is we do not yet have a strong empirical grasp of just how this phenomenon is realized in the world’s languages. This thesis is a first foray into filling that empirical gap. The following section describes the contribution made by this thesis to addressing this gap, and gives an overview of the present study.

1.3 Overview of this study

This thesis is a quantitative corpus-based study of lexical flexibility in English (Indo-European > Germanic) and Nuuchahnulth (Wakashan > Southern Wakashan). It is exploratory and descriptive, with the primary goal of describing the prevalence of lexical flexibility within and across languages. The specific research questions investigated are as follows:

R1: How flexible are words in English and Nuuchahnulth?

R2: Is there a correlation between degree of lexical flexibility for a word and frequency (or corpus dispersion)?

R3: How do the semantic properties of words pattern with respect to their flexibility?

I explore each of these questions from several angles. [R1](#), “How flexible are words in English and Nuuchahnulth?” is the core focus of this thesis. To answer it, I count the frequency with which lexical words are used for each of the three functions of reference, predication, and modification in a corpus of spoken texts for each language. Each word is given a flexibility rating from 0 to 1 based on how evenly its uses are distributed across the three functions. A rating of 0 indicates that the word is highly inflexible, with all its occurrences being used for a single function; a rating of 1 indicates that the word is maximally flexible, with its occurrences evenly distributed across the three functions. By quantifying the flexibility of each word in this way, it then becomes possible to look for statistical correlations between the flexibility of a word and other factors, such as those addressed by the other two research questions. It also enables us to answer the question of just how pervasive flexibility is in the two languages.

[R2](#), “Is there a correlation between degree of lexical flexibility for a word and frequency (or corpus dispersion)?”, uses the flexibility ratings calculated in [R1](#) to consider whether the flexibility of a word correlates with either its overall frequency or with its corpus dispersion. *Corpus dispersion* refers to how evenly/regularly the word appears in a corpus, a measure which is thought to more accurately capture the notion of frequency of exposure ([Gries 2008](#);

forthcoming). This question has three motivations: First, some researchers have claimed or implied that all words may exhibit flexibility if you examine enough tokens of the word (Mosel & Hovdhaugen 1992: 77). If true, this would lend some empirical support to the claim that all words are to some degree flexible, or perhaps even acategorical. Second, higher-frequency words often preserve irregular or atypical forms or functions (Bybee 2007: Ch. 13), such that words with higher frequencies might be more likely to retain their non-prototypical, flexible uses. Third, the fact that a word is flexible means that there is a wider range of constructions it can appear in. This could reasonably result in a higher overall frequency for flexible words. Each of these potential factors invite inquiry into the relationship between frequency and flexibility.

R3, “How do the semantic properties of words pattern with respect to their flexibility?”, is investigated using a mix of quantitative and qualitative methods. Unlike the other two research questions, which are intended to capture the extent of flexibility in and across languages, R3 is an inquiry into the semantic *behavior* of flexible (and inflexible) words. This research question is directly motivated by Croft’s (1991; 2000; 2001; forthcoming) typological markedness theory of lexical categories, which claims among other things that words used in non-prototypical functions (for example, a property word being used to refer, as a noun) will always show a semantic shift in the direction of the meaning typically associated with that function. So, if a property word is used to refer, its meaning should be more object-like than property-like; that is, it should mean something like ‘an entity with the property X’ rather than ‘the abstract property X’. Croft’s (1991) seminal work in this area provides strong empirical evidence for this semantic markedness principle, but is nonetheless somewhat preliminary. Croft himself has in various places implored linguists to investigate the lexical semantics of these functional shifts further (Croft 2005: 440; Croft & van Lier 2012: 70), but as yet little research has responded to this call (though see Rogers [2016] and Mithun [2017]). Investigating the semantic patterns that appear in cases of lexical flexibility is therefore another contribution of this thesis, addressed by question R3.

The preceding notes are simply a high-level summary of the principal research questions investigated in this thesis. A complete description of the methods used in answering each question is given in [Chapter 3](#).

This study aims to be framework neutral in the sense of [Haspelmath \(2010b\)](#). Its findings should be interpretable and of interest to researchers working in a range of linguistic theories and with different approaches to lexical categories. As mentioned in §1.2, the results of this study do not depend on whether one analyzes lexical flexibility as polycategoriality, conversion, or something else. While my own perspective on language is decidedly functional, this is of little relevance to how I coded the data, the procedures for which are described in detail in [Chapter 3](#). The relevant factors in this study are operationalized in a theory-neutral way (to the extent such a thing is possible), and I expect that my coding decisions for individual data points will be found largely unobjectionable.

Several principles guided the choice of data used for this study. First, a self-imposed requirement for this project is that of empirical accountability and replicability. It should be possible for other researchers to apply the measure of lexical flexibility defined in [Chapter 3](#) to new corpora, or to replicate the results of the present study on the existing dataset. As such, I only used data that were publicly available and, if possible, open access. Second, since the aim of this study is to investigate lexical flexibility in actual language *use*, I rely solely on naturalistic data from spoken texts. This has the additional advantage of abetting comparison between other, less well documented languages, since the majority of corpora of minority languages consist mainly of spoken texts. Third, I sought to examine data from languages that have featured prominently in discussions of lexical flexibility in the literature, with the intention of offering a more expansive empirical foundation for future discussions. With these principles in mind, I chose to focus this study on English and Nuuchahnulth.

English has at various times been described as both a highly flexible language with fluid category membership ([Crystal 1967](#): 47–48; [Vonen 1994](#); [Farrell 2001](#): 111; [Cannon 1985](#)) and a fairly rigid language with clearly-delineated categories ([Rijkhoff 2007](#): 710; [Schachter](#)

& Shopen 2007: 4, 11, 12; Velupillai 2012: 122, 126). It is used as a point of comparison for nearly every discussion of lexical flexibility, but we do not have a clear idea of just how flexible English words are. Its inclusion in this study is therefore well justified. The data for English are from the [Open American National Corpus](#) (OANC), a 15-million word corpus of American English comprising numerous genres of both spoken and written data, all of which is open access (Ide & Suderman 2005). This study uses just the spoken portion of the corpus, consisting of approximately 3.2 million words, which is itself composed of two distinct subcorpora—the [Charlotte Narrative & Conversation Collection](#) (or simply “the Charlotte corpus”) and the [Switchboard Corpus](#).

Nuuchahnulth (formerly referred to in the literature as Nootka) is a Wakashan language presently spoken by a hundred or so people on and around Vancouver Island, British Columbia, in the Pacific Northwest. Nuuchahnulth, together with the other members of the Wakashan family (especially Makah and Kwak’wala / Kwakiutl) is one of the widely discussed languages in the literature on lexical flexibility (Swadesh 1939; Jacobsen, Jr. 1979; Braithwaite 2015). This is due largely to the following examples of flexible words from Swadesh (1939).

Nuuchahnulth (Wakashan > Southern Wakashan)

- (8) a. qo·ʔas-ma ʔi·h-ʔi
 man-3SG.IND large-DEF
 ‘The large one is a man.’ (Swadesh 1939: 78)
- b. ʔi·h-ma ʔo·ʔas-ʔi
 large-3SG.IND man-DEF
 ‘The man is large.’ (Swadesh 1939: 78)
- (9) a. mamō·k-ma ʔo·ʔas-ʔi
 work-3SG.IND man-DEF
 ‘The man is working.’ (Swadesh 1939: 78)
- b. ʔo·ʔas-ma mamō·k-ʔi
 man-3SG.IND work-DEF
 ‘The working one is a man.’ (Swadesh 1939: 78)

Hardly a single typological survey of lexical categories or study of lexical flexibility has

failed to include these examples since. Yet we still do not know how representative these examples are of Nuuchahnulth in general. What is more, lexical flexibility is an areal feature of the entire Pacific Northwest. The nearby Chimakuan, Chinookan, Coosan, Sahaptian, Salishan, and Tsimshianic families as well as the isolate Kutenai each exhibit lexical flexibility to a presumably strong degree, since they have caught the attention of so many researchers in this regard (Chimakuan: [Andrade \[1933: 179\]](#); Chinookan: [Duncan, Switzler & Zenk \[2023\]](#); Coosan: [Frachtenberg \[1922: 318\]](#); Sahaptian: [Wetzer \[1996: 142\]](#); Salishan: [Kuipers \[1968\]](#), [Hébert \[1983\]](#), [Kinkade \[1983\]](#), [van Eijk & Hess \[1986\]](#), [Jelinek & Demers \[1994\]](#), [Martina \[1996\]](#), [Beck \[1999: 135–169\]](#), [Montler \[2003\]](#), [Beck \[2013\]](#), [Davis, Gillon & Matthewson \[2014\]](#); Tsimshianic: [Davis, Gillon & Matthewson \[2014\]](#); Kutenai: [Morgan \[1991\]](#)). Again, we do not actually know whether this literature is truly representative of the pervasiveness of the phenomenon, or whether its “exotic” nature as compared to Indo-European languages has simply garnered undue attention to the topic in this geographic region. Nuuchahnulth, being the most discussed of these languages, is therefore nearly obligatory to include in a study such as this one.

The data used for the investigation of Nuuchahnulth come from a corpus of texts collected and edited by Toshihide Nakayama and published in [Little \(2003\)](#) and [Louie \(2003\)](#). The corpus consists of 24 texts dictated by speakers Caroline Little and George Louie, containing 2,081 utterances and 8,366 tokens (comprising 4,216 types). The texts cover a variety of genres, including procedural texts, personal narratives, and traditional stories. I manually retyped these texts as [scription](#) files for analysis. Scription is a simple text format for representing interlinear glosses in a way that is both familiar to linguists and computationally parseable ([Hieber 2020a](#)). The resulting digitally-searchable corpus is available on GitHub at <https://github.com/dwhieb/Nuuchahnulth>.

Other languages that would have been obvious choices for inclusion in this study are Riau Indonesian (Austronesian > Malayo-Polynesian) ([Gil 1994](#)), Mundari (Austroasiatic > Munda) ([Evans & Osada 2005](#); [Hengeveld & Rijkhoff 2005](#)), Classical Nahuatl (Uto-Aztecan) ([Launey](#)

1994; 2004), and Central Alaskan Yup'ik (Eskimo-Aleut > Yupik) (Thalbitzer 1922; Sadock 1999; Mithun 2017). Each of these has generated contested claims about their flexibility and the existence of flexibility more generally. However, practicalities have limited me to examining just English and Nuuchahnulth for the time being. I leave investigations of other languages to future research and researchers.

Both the English and Nuuchahnulth corpora were converted to the [Data Format for Digital Linguistics](#) (DaFoDiL) (a JSON format for representing linguistic data; Hieber [2020b]) for tagging and scripting purposes. This made it possible to use the [Digital Linguistics](#) (DLx) ecosystem of tools and software to more quickly tag and analyze the data. More information about Digital Linguistics may be found at <https://digitallinguistics.io>.

All of the datasets, scripts, and source files for this thesis are publicly available on GitHub at <https://github.com/dwhieb/dissertation>.

Turning now to results:

Regarding R1, “How flexible are words in English and Nuuchahnulth?”, I find that English and Nuuchahnulth differ significantly not only in their overall degree of flexibility, but also in how that flexibility is realized. In English, the majority of words surveyed are flexible, but only to a small degree. Most lexical words of English can be used as nouns, verbs, or adjectives, but there is a strong tendency for each word to be used for primarily one function. English thus shows a consistent but somewhat marginal degree of flexibility. In contrast, most words in Nuuchahnulth are highly flexible, but primarily along the noun-verb axis; Nuuchahnulth words are very freely used as both nouns and verbs, but only infrequently used as adjectives. Nuuchahnulth thus shows a consistently high degree of flexibility, but primarily in just one dimension.

For R2, “Is there a correlation between degree of lexical flexibility for a word and frequency (or corpus dispersion)?”, I find that higher frequency words are more flexible than lower frequency words, but that the effect is very small. The same facts hold when comparing degree of lexical flexibility with corpus dispersion. Words that are more evenly dispersed in a corpus

have a slight tendency to be more flexible than those that are less evenly dispersed. These findings suggest that the degree of flexibility exhibited by a word does depend in part on how regularly speakers use it.

Lastly, R3 asks “How do the semantic properties of words pattern with respect to their flexibility?”. With respect to Nuuchahnulth, I find that property words, especially numerals and quantifiers, are the most flexible semantic class of words. Nearly all of the most flexible words denote property concepts. Deictic expressions such as *this*, *that*, *here*, *there* also rank very highly in their flexibility. I also find that there are strong correlations between morphologically marked aspect (durative, continuative, inceptive, etc.) and discourse function. In Nuuchahnulth, aspect markers may be used with either predicates or referents; they are not an exclusively verbal category. However, I find that the presence of any aspect marker does correlate strongly with predication, lending additional empirical evidence to Hopper & Thompson’s (1984) claim that items used in their prototypical function will show the inflectional behaviors typical of that function. The momentaneous and telic aspect markers are the only ones in Nuuchahnulth which show any sort of tendency towards use with referents, while the durative was the only aspect marker to show any sort of tendency towards use with modifiers. Since aspect is a grammatical category that expresses how speakers construe the temporal structure of an event, these data suggest that flexibility has a great deal to do with how speakers conceptualize or construe words—as an action, object, or property—as has been suggested by Croft (1991: 99; 2001: 104).

Nuuchahnulth also has a definite suffix *-ʔi:* used with referents. Nakayama (2001: 48) states that this suffix is used with action words being construed as objects. This observation suggests that the definite suffix may have a clarifying function, appearing whenever an action word is used for the atypical role of reference (as predicted by Croft’s structural coding hypothesis; see §2.4 for more details). One hypothesis that arises from applying typological markedness theory to Nuuchahnulth is that aspect markers which correspond to more object-like construals of a word (durative, telic, momentaneous) are more likely to be marked

with the definite suffix. This turns out to be true, but only trivially so—only a tiny percentage (7.98%) of words with definite markers also had aspect markers. However, this leads to the far more interesting observation that the definite marker and the aspect markers in Nuuchahnulth are *almost* entirely mutually exclusive. They only rarely co-occur. These facts demonstrate that even in a language with rampant flexibility, as this study shows Nuuchahnulth to be, flexibility is nonetheless bound by universal typological constraints.

To summarize, this thesis makes contributions in several areas. The first is methodological: this thesis lays out a procedure for quantifying lexical flexibility for individual words in a corpus that can be replicated for other languages and corpora ([Chapter 3](#)). The second is empirical and descriptive: I describe the extent of lexical flexibility and the manner in which it operates in English and Nuuchahnulth ([Chapter 4](#)). The final contribution is analytical and theoretical: I argue that the data and statistical analysis presented in this thesis support Croft’s typological markedness theory of word classes, in which lexical categories such as noun, verb, and adjective are not in fact categories of particular languages as has been historically assumed, but instead are emergent patterns that arise from how speakers use object, action, and property words for different functions in discourse (reference, predication, and modification). Words used for functions that are not prototypical of their meaning *tend* to be more marked (morphologically, behaviorally, semantically, and/or frequently) than prototypical uses, but this is not an absolute universal. Lexical flexibility is the natural and expected result of the fact that these non-prototypical uses are *not* always *morphologically* marked, even when they are marked in other ways ([Chapter 5](#)).

The remainder of this thesis is organized as follows: [Chapter 2: Background](#) summarizes previous definitions of lexical flexibility and discusses their shortcomings. I propose an alternative, functionally-oriented definition that is consistent with cognitive and typological approaches to word classes instead. [Chapter 3: Data & Methods](#) describes in detail how the data were coded and analyzed for each of the major research questions (and contributing subquestions) in this study. I discuss factors that influenced how the data were coded, and

outline the various coding decisions that were made. I present and explain a measure of corpus dispersion that is used partly in place of, and partly as a complement to, raw frequencies of words. Lastly, I set forth a procedure for operationalizing and quantifying lexical flexibility in a crosslinguistically comparable way. [Chapter 4: Results](#) presents the empirical findings from this study. I demonstrate how the methodological techniques from [Chapter 3](#) are applied to individual words, and then present aggregated views of the data for English and Nuuchahnulth respectively. [Chapter 5: Discussion & Conclusion](#) considers the implications of the results in [Chapter 4](#) for theories of lexical categories. I argue that the data support a typological-universal theory of word classes, and that lexical flexibility should be viewed as a natural result of the cognitive and diachronic processes at work in language, rather than as an exceptional phenomenon. I conclude by discussing some limitations of the present study and avenues for future research, followed by closing remarks.

Chapter 2

Background

The focus of this chapter is to explain the concept of lexical flexibility, consider its criticisms, and offer a more robust, functionally-grounded definition instead. I first briefly describe how flexible approaches to lexical categories developed as a response to weaknesses in traditional theories of parts of speech. I then survey the landmark studies and important findings on lexical flexibility, along with criticisms of this research. Following that, I summarize approaches to lexical categories from several functionalist perspectives—cognitive linguistics, typology, and construction grammar. I conclude by offering a revised formulation of lexical flexibility which is more in line with this functional research.

2.1 Introduction: Approaches to lexical flexibility

The field of linguistics as a whole, and the subfield of typology in particular, is undergoing a radical shift in how we understand lexical categories, along primarily two dimensions. The first dimension is our understanding of what lexical categories are a property of. Early researchers viewed categories as universal properties of both language and languages (CITE: Haspelmath on g-language vs. p-language; add these terms in parentheses). I call this the *universalist* position. After Boas, many researchers then came to view categories as language-specific, with patterned similarities across languages. I call this the *relativist* approach. Most recently, some researchers view categories as typological patterns rather than properties of any particular language. This is the *typological* position, and the one I adopt here.

The second dimension of historical change in linguistic theories of categories is in the *nature* of the categories themselves. In the Classical tradition, categories were thought to be categorical and well-defined by a set of necessary and sufficient conditions (in the tradition of Aristotle). After the cognitive turn in the 1980s, many linguists came to view categories as prototypical, with some members of a category being more central, or better exemplars, than others. Cognitive research into the nature of idioms then led to the development of construction grammar, which sees language as consisting of a network of constructions rather than monolithic categories. I adopt a constructional approach to categories in this thesis.

These theoretical paradigm shifts are summarized in (10). At each stage of development, there has not been a wholesale displacement of previous theories (CITE: Kuhn). There are still many who regard word classes as universal and categorical, and the typological-constructional approach is still nascent.

- (10) a. universal > language-specific > typological
b. categorical > prototypical > constructional

Section 2.2 gives a synopsis of these theoretical positions and shows how research on lexical flexibility developed in recognition of the shortcomings of traditional approaches. Section 2.3 summarizes the key concepts and findings that have arisen from the research on lexical flexibility. Such research, however, is not without its own shortcomings. Section 2.3 also presents the main criticisms that have been leveled against flexible analyses of word classes. Section 2.4 then presents an alternate, functionally-oriented approach—the typological-constructional perspective. The final section of this chapter (§2.5) then applies this functional perspective to formulate an improved definition of lexical flexibility.

2.2 Traditional approaches

This section is a necessarily brief history of approaches to lexical categories up until the cognitive turn of the 1980s. It covers the universalist position that developed in the Classical

tradition, the relativist position that developed as a result of Boas' cultural relativism, and the structuralist (or "distributionalist") position that developed in the tradition of Saussure. Depending on how one understands and applies these different perspectives, none of them are mutually exclusive. It is especially common for linguists to simultaneously hold that lexical categories must be identified on the basis of language-internal evidence alone (the relativist position) and that lexical categories are universal in some sense or another (the universalist position).

2.2.1 Universalism

Historically and still presently, many researchers assumed that a small set of lexical categories are basic and universal to all languages (BolingerSears1981Croft 1991: 2Payne1997; Stassen 2011: 95). The set typically consists of some variation of the following: Noun, Verb, Adjective, Adverb, Pronoun, Adposition, Conjunction, Numeral, and Interjection (Haspelmath2001). This set has its origins in the *Τέχνη Γραμματική* / *Tékhnē Grammatiké* ('The art of grammar') of the 2nd century B.C.E. grammarian Dionysius Thrax. The *Tékhnē* synthesizes the work of Dionysius' predecessors, describing eight parts of speech for Ancient Greek. These parts of speech were based largely on morphological (especially inflectional) criteria (Rauh2010). The *Tékhnē* was then translated and its model applied to Latin in the *Ars Grammatica* of Remnius Palaemon. The *Ars Grammatica* initiated a tradition wherein the languages of Europe and eventually the world (e.g. Mandarin [McDonald 2013]) were described using both Dionysius' categories (with occasionally additions / subtractions) as well as his method of identifying those categories on the basis of morphological criteria (Rauh2010).

Implicit in the Classical method is the assumption that lexical categories are universal in the sense of being instantiated in all languages. However, as European scholars began to encounter non-Indo-European languages (or even non-Romance languages) in both Europe and abroad, this assumption was challenged, as early as the first grammatical descriptions of Irish in the 7th century. At first, these languages either had Classical grammar imposed upon them

or were deemed grammatically deficient (Suarez1983). Nonetheless, missionary linguists in the early colonial era were indeed aware of the significant grammatical differences between these languages and Latin, and made their best attempts at describing them (Suarez1983). It is also important to realize that the project of describing the languages in the Americas and other zones of colonial influence was partially contemporaneous with the publication of the first grammars of the vernacular languages of Europe, as illustrated in Figure 2.1 (the data for which are shown in Table 2.1). Between 1524 and 1572, over 100 catechisms, manuals for confession, collections of sermons, grammars, and vocabularies were written in or about ten languages within the Viceroyalty of New Spain alone (an area smaller than present-day Mexico), mostly by Spanish Franciscan and Jesuit missionaries (Suarez1983). The task of converting the indigenous peoples to Christianity via the medium of their own languages was so important to the Spanish crown that the first bishop of Mexico, Francisco de Zumárraga, brought a printing press to Mexico in 1534 (just 15 years after the arrival of the first Spaniards in Mexico in 1519). The first book printed in Mexico was a Spanish-Nahuatl catechism by Alonso de Molina (Suarez1983). All this is merely to illustrate that language scholars in the colonial era were wrestling with the lexical categories of non-Indo-European languages—and therefore aware of the challenges these languages posed to Classical theories—at a very early stage.

Table 2.1: Some first grammatical descriptions of European vs. American languages

Language	Year	Title	Author
Irish	600s	<i>Auraicept na n-Éces</i> 'The scholars' primer'	Longarad
Occitan	1327	<i>Leys d'amors</i> 'Laws of love'	Guilhèm Molinièr
Welsh	1382–1410	<i>Llyfr Coch Hergest</i> 'Red book of Hergest'	unknown
Tuscan	1437–1441	<i>Grammatica della lingua toscana</i> 'Grammar of the Tuscan language'	Leon Battista Alberti

Table 2.1: Some first grammatical descriptions of European vs. American languages

Language	Year	Title	Author
Castilian	1492	<i>Gramática de la lengua castellana</i> 'Grammar of the Castilian language'	Antonio de Nebrija
French	1530	<i>L'Éclaircissement de la langue fran- coyse</i> 'Explication of the French language'	John Palsgrave
German	1534	<i>Ein Teutsche Grammatica</i> 'A German grammar'	Valentin Ickelsamer
Basque	1545	<i>Linguæ Vasconum Primitiæ</i> 'First fruits of the Basque language'	Bernard Etxepare
Totonac	1539–1554	<i>Arte de la lengua totonaca</i> 'Grammar of the Totonac language'	Andrés de Olmos
Nahuatl	1547	<i>Arte para aprender la lengua mexicana</i> 'Grammar for learning the Mexican language'	Andrés de Olmos
Tarascan	1558	<i>Arte de la lengua tarasca de Michoacán</i> 'Grammar of the Tarascan language of Michoacán'	Maturino Gilberti
Dutch	1559	<i>Den schat der Duytsscher Talen</i> 'The treasure of the Dutch language'	John III van de Werve
Quechua	1560	<i>Grammatica o arte de la lengua gen- eral de los Indios de los Reynos del Peru</i> 'Grammar or Art of the General Lan- guage of the Indians of the Royalty of Peru'	Domingo de Santo Tomás
Tzeltal Maya	1571	<i>Ars Tzeldaica</i> 'Tzeltal Grammar'	Fray Domingo de Hara
Zapotec	1578	<i>Arte en lengua Zapoteca</i> 'Grammar in the Zapotec language'	Juan de Córdova
English	1586	<i>Pamphlet for Grammar</i>	William Bullokar
Mixtec	1593	<i>Arte de lengua Mixteca</i> 'Grammar of the Mixtec language'	Antonio de los Reyes
Timucua	1614	<i>Gramatica de la lengua Timuquana de Florida</i> 'Grammar of the Timucua language of Florida'	Francisco Pareja
Narragansett	1643	<i>A key into the language of America</i>	Roger Williams

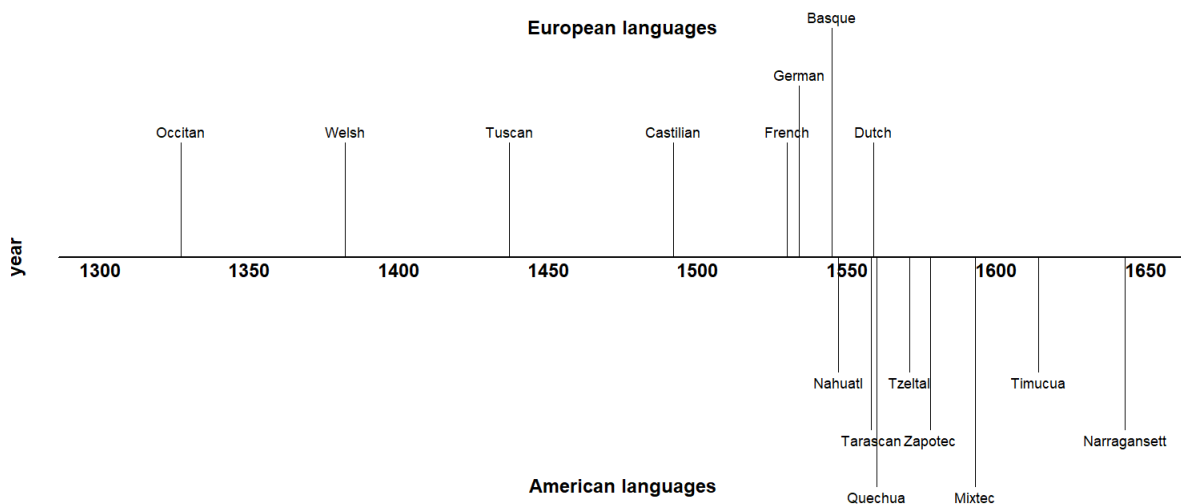


Figure 2.1: Approximate date of some of the first grammatical descriptions of European vs. American languages

As documentary linguistics turned its attention to North American (as opposed to Mesoamerican) languages, lexical flexibility in particular became a more prominent issue. In fact, even the first comprehensive survey of North American languages contains an entire section on “Conversion of nouns into verbs” (Gallatin1836), in which Gallatin depicts lexical flexibility as a rampant feature of all languages on the continent:

It is the substantive [i.e. copula / auxiliary] verb which we [speakers of Indo-European languages] conjugate; whilst the [Native American] conjugates what we call the adjective and even the noun itself, in the same manner as [s/he] does other intransitive verbs. [...] I believe it must appear sufficiently obvious, that this general if not universal character of the [Native American] languages, the conversion into verbs and the conjugation, through all the persons, tense, and moods, of almost all the adjectives and of every noun which, without a palpable absurdity, is susceptible of it, is entirely due to the absence of the substantive verb. (Gallatin1836)

As evidenced by the above passage, increasing familiarity with non-Indo-European languages prompted some writers to abandon the universalist commitment. However, categorial universalism is still a widely-held position today, either in the sense of a) being universally instantiated in all languages (commonly assumed by most generative frameworks; although see Culicover [Culicover1999]), or b) being available to all languages, but only instantiated in

some (sometimes called the “grab bag” approach, as exemplified by Dixon’s Basic Linguistic Theory framework [Dixon2010a; b; c]; [Hieber 2013: ???Croft]).

2.2.2 Relativism

American ethnographers in the tradition of Franz Boas questioned the univernalist assumption in a programmatic and comprehensive way. Writing on grammatical categories, Boas1911 states, “Grammarians who have studied the languages of Europe and western Asia have developed a system of categories which we are inclined to look for in every language” (Boas1911). He concludes that this endeavor is a folly, and that “in a discussion of the characteristics of various languages **different fundamental categories** will be found” (Boas1911). Boas’ students all adopted his grammatical relativism, and it became a foundational principle of the American linguistics tradition. His student Edward Sapir, writing on lexical categories specifically, makes one of the best-known and strongest statements of this position in his influential textbook *Language*: “[N]o logical scheme of the parts of speech—their number, nature, and necessary confines—is of the slightest interest to the linguist. Each language has its own scheme. Everything depends on the formal demarcations which it recognizes.” (Sapir1921).

Many linguists today hold to Boas’ grammatical relativism in some fashion or another. Textbooks and typological surveys commonly state that languages have varying numbers of lexical categories, though usually with the caveat that all languages seem to differentiate at least noun and noun (e.g. Velupillai 2012: §6.2). Some researchers, especially those working in typology, argue that linguists are still not rigorous *enough* in their application of grammatical relativism; they criticize certain kinds of crosslinguistic comparisons for imposing the categories of one language onto another (Croft 2001Haspelmath2010LaPolla2016) (CITE: You could probably cite your 2013 article for this too.). This position is discussed further in §2.4.

2.2.3 Structuralism

Developing alongside the early anthropological linguistics of Boas was the linguistic structuralism of Ferdinand de Saussure. His work informed both the Prague school under Nikolay Trubetzkoy and Roman Jakobson, and the distributional method of Leonard Bloomfield. The term *structuralism* has any number of uses (Matthews2001); here I refer to the idea that “language is a [...] self-contained, self-regulating system, whose elements are defined by their relationship to other elements” (Matthews2014). In particular, I am referring to the positivistic flavor of structuralism as practiced by Bloomfield, which focused on the structural relations between elements and establishing a set of rigorous scientific discovery procedures for linguistic structures (Bloomfield1933). Bloomfield saw lexical categories as something to be empirically discovered in the different syntactic distributions of words, rather than imposed on a language a priori (Rauh2010). Zellig Harris later refined and expanded on this methodology (Harris1951), which in turn was incorporated into Noam Chomsky’s early Phrase Structure Grammar.

The signature methodological feature of this form of structuralism is the *distributional method*, a procedure for defining categories in terms of the set of contexts in which its words can appear—that is, their distributions (Harris19512001: 11). As an illustration of distributional analysis applied to lexical categories, Croft (1991: 11–12) considers the distributions of the English words *cold*, *happy*, *dance*, and *sing* in two constructions: in the Predicate construction after *be*, and in the 3rd Person Singular Present Tense (-s) construction. Example data are shown below.

- (11) a. Jack is cold.
b. *Jack colds.
- (12) a. Jack is happy.
b. *Jack happies.
- (13) a. *Jack is dance.
b. Jack dances.

- (14) a. *Jack is sing.
b. Jack sings.

We can see that *cold* and *happy* have the same distributions in these tests (both may appear in the Predicate construction but not the Person-Tense inflection construction), while *dance* and *sing* have the same distribution (the inverse situation as *cold* and *happy*). The results of these two distributional tests are summarized in Table 2.2.

Table 2.2: Distribution of English Verbs and Adjectives (adapted from Croft [2001: 12])

	Predicate Construction	Inflectional Construction
Adjective: <i>cold, happy</i> , etc.	✓	✗
Verb: <i>sing, dance</i> , etc.	✗	✓

As applied in practice, however, the distributional method suffers from one serious drawback when used to argue for large, traditional categories like noun, verb, and adjective: distributional tests yield conflicting and overlapping results. Perhaps no two lexical items behave the same in every distributional test. Each new test that is introduced therefore partitions the lexicon into smaller and smaller classes. This fact has been demonstrated empirically for French verbs (Gross1979), Russian numerals (Corbett1978), and English adjectives vs. adverbs (Crystal 1967: 54). Distributional tables like that in Table 2.2 from each of these studies are reproduced in Table ??, Table ??, and Table ?? respectively. It is clear from these studies that distributional analysis does *not* lead to large, unified categories like noun, verb, and adjective, but rather a myriad of small constructions (Croft 2005: 434). This fact is the motivation underlying constructional approaches to language.

add distributional tables

Many scholars nonetheless choose to retain lexical categories as a necessary component of their linguistic theories or descriptions, at the expense of consistent application of the distributional method. Rather than considering all possible distributional contexts for a word,

these scholars instead treat certain constructions as definitional of the category. Other distributional tests which yield cross-cutting results are either ignored, or treated as evidence of subcategories instead of categories. Many researchers even prefer the term *syntactic categories* over *lexical categories* for this reason, focusing on just the syntactic evidence for categories (CITE: Baker 2003; Rauh 2010). A severe methodological problem for this approach is that there are no generally agreed-upon principles for determining which distributional tests should be considered definitional. In this regard, Schachter & Shopen (2007: 4) note, “there may be considerable arbitrariness in the identification of distinct parts of speech rather than subclasses”. Different scholars choose or prioritize different kinds of evidence for lexical categories over others on the basis of their theoretical commitments. This is the reason, as stated in Section 1.1, that disagreements about the existence of particular lexical categories in particular languages are typically *not* about the empirical facts. The results of a given distributional analysis are not usually controversial; the choice of distributional tests used to support one’s analysis are. Unsurprisingly, then, debates over how to analyze lexical categories in various languages have been largely unproductive and unresolved (Croft 2005: 435). The problem only worsens when scholars attempt to apply the same criteria across languages. Distributions of words with similar meanings vary drastically across languages (Croft 2001: §1.4.1).

The real methodological problem here is *not* that we have yet to ascertain the correct principles for selecting the right distributional tests. The problem is being selective regarding which tests to apply in the first place. If we take the distributional method seriously, then we must apply it consistently, without ignoring distributional evidence that contradicts our theoretical or pretheoretical assumptions. To do otherwise is a kind of *methodological opportunism* (CITE: Croft 1991: 10–15, 41 (check these pages); Croft 2001: ???).

add a section on mixed / hybrid categories (including Lois, Malouf, Nikolaeva)

Partly in response to these problems, a growing cadre of linguists in the last 30 years have adopted one of various *flexible* approaches to word classes. Flexible analyses of word classes

come in many flavors, some of which arguably still commit methodological opportunism, and others of which introduce new difficulties. These flexible approaches are reviewed in the following section.

2.3 Flexible approaches

In this section I summarize the key concepts (§2.3.1), findings (§2.3.2), and criticisms (§2.3.2) of lexical flexibility research. [Section 2.3.1](#) surveys the wide variety of definitions and theoretical perspectives on lexical flexibility. This review of the literature reveals that there is very little consensus as to what exactly constitutes “lexical flexibility”; as such, there are numerous alternative terms for the phenomenon. Despite these incongruities, a few important findings do consistently surface across the empirical research. These findings are summarized in [Section 2.3.2](#). [Section 2.3.3](#) then looks at the arguments and evidence that researchers have presented against the notion of lexical flexibility.

2.3.1 Key concepts

It is only a small exaggeration to say that there are as many definitions and terms for what I am here calling “lexical flexibility” as there are scholars who research it. I use the term *lexical flexibility* in this thesis merely because it is the most widely recognized of the cluster of terms that are used, not because it is necessarily the most precise or accurate. My own choice would be *functional expansion*, for reasons discussed below. The analytical or theoretical perspective adopted by each researcher generally determines their choice of terminology. The remainder of this section is devoted to explaining these perspectives in more detail.

Generally speaking, there are two ways to analyze flexible words. The first method assigns flexible words to members of specific categories in a language, whether those language-categories are the canonical four major classes (Noun, Verb, Adjective, Adverb), or a new large supercategory subsuming multiple discourse functions (e.g. contentives, non-verbs,

flexibles), or a smaller subcategory of an existing major lexical category (e.g. adjective verbs, verbonominals). The second method of analysis assumes that words are uncategorized at some level (root, stem, or inflected word), and that words receive their categorial assignment from context. Different researchers posit different mechanisms for how words receive their categorization in context. The traditional approaches to lexical flexibility summarized in [Section 2.2](#) are all instances of the former method of analysis, while the flexible approaches outlined in this section are a mix of categorial and non-categorial analyses.

2.3.1.1 Lexical flexibility

Though awareness of lexical flexibility can be traced back to at least Gallatin 1836 if not earlier, the term *lexical flexibility* itself seems to have originated with Hengeveld 1992. This publication, perhaps because it was the first to assign a technical term to the concept, marks a shift in how scholars frame the concept of lexical flexibility. Previously, the issue was framed in terms of whether particular languages (especially those of the Pacific Northwest) distinguished noun from verb (Kuipers 1968; Jacobsen, Jr. 1979; Hébert 1983; Kinkade 1983; van Eijk & Hess 1986; Jelinek & Demers 1994). After this point, an increasing number of publications began to ask whether lexemes were *flexible* instead. Though the difference in emphasis seems subtle, this change constitutes a turning point because it fostered an increased interest in lexical flexibility as a grammatical phenomenon in its own right instead of just a problem for traditional categorization schemes.

Hengeveld 1992's Hengeveld 1992 typology of parts-of-speech systems is a whole-language typology wherein languages are either *specialized*, with one morphosyntactic category for each of the functions of reference (Noun), predication (Verb), referent modification (Adjective), and predicate modification (Adverb¹), or *non-specialized*. Non-specialized languages deviate from the four-category canon in one of two ways: one part of speech may assume more than one function with no additional morphosyntactic marking, in which case the lan-

¹Note that Hengeveld's typology only includes manner adverbs, not other semantic types of adverbs.

guage is considered *flexible*; or the language may lack a dedicated part of speech for that function entirely and use other, marked constructions instead, in which case the language is considered *rigid*.

add examples of flexible vs. rigid languages, with explanations

Hengeveld1992's analysis is of the categorial type discussed at the beginning of [Section 2.3.1](#), specifically the supercategory kind. Each word is assumed to have a category, and new supercategories are introduced for words which have multiple functions: *contentives* for words which perform all four functions, *non-verbs* for words which perform all non-predicating functions, and *modifiers* for words which perform referent modifier and predicate modifier functions.

Hengeveld1992's parts-of-speech typology and the subsequent research it inspired (DonLier2003Hengeveld & Rijkhoff 2005Lier2006HengeveldLier2010; Luuk 2010LierRijkhoff2013Lier2016) constitute important empirical contributions to the study of lexical flexibility. However, Hengeveld's definition of flexible languages and his parts-of-speech typology still rely on large, language-specific categories of the kind that have been problematized by Croft (CITE: Croft's publications, especially the pages in 1991 where he critiques Hengeveld directly) and van Lier (CroftLier2012), and are therefore subject to the same difficulties as traditional approaches to parts of speech. However, numerous scholars have since adopted Hengeveld's term *lexical flexibility* to describe cases where words serve more than one discourse function, regardless of their particular theoretical commitments or analysis of flexible words. As a convenient cover term, *lexical flexibility* is now well established.

2.3.1.2 Polycategoriality

VapnarskyVeneziano2017 introduce the alternative term *polycategoriality* as their preferred characterization of flexible words. (The term is also used by Carter2006, but he does not give a precise definition for it.) While VapnarskyVeneziano2017 use this term mostly in-

terchangeably with *lexical flexibility*, there are important differences between the two concepts. Hengeveld1992's use of *lexical flexibility* is meant to imply the existence of large, flexible supercategories that subsume multiple discourse functions, whereas Vapnarksy & Veneziano are not committed to any particular schema for parts of speech. Central to their notion of polycategoriality is the idea that lexical categories exist, but that "there are lexical forms that are not specified for lexical category (or are not specified fully, or univocally) on some level of representation." (VapnarksyVeneziano2017). In other words, one word may belong simultaneously to multiple lexical categories. Under this definition, a language could still have all four major lexical categories but nonetheless exhibit rampant polycategoriality; this is not a possibility in Hengeveld1992's framework. Like Hengeveld1992, however, VapnarksyVeneziano2017 are committed to the existence of large lexical categories in particular languages. Their analysis is therefore also of the categorial kind discussed at the beginning of [Section 2.3.1](#).

2.3.1.3 Multifunctionality / Polyfunctionality

Another term for our phenomenon of interest, introduced by (Lier2012), is *multifunctionality*, in which a single lexeme can have multiple discourse functions. An advantage of this analysis is that it takes no theoretical position on the issue of whether words are categorial or non-categorial; it focuses on just their functions. The term *multifunctionality* is meant to stand in contrast with *conversion* or *zero derivation*. Lier2012 takes conversion to be idiosyncratic and unproductive, producing meanings for words in alternate discourse functions that are not predictable (see [section on conversion](#) and [section on item-specific knowledge](#) for further discussion). Multifunctionality is also distinct from zero derivation from a common root. Instead, multifunctional words are those whose semantic interpretation is entirely predictable from context, and its uses in different contexts are productive. Its meaning should be *compositional* (see [section: criteria for flexibility > compositionality](#)). For example: when an action word is used in a referring construction its predicted meaning is that of an *action nom-*

inalization, ‘(the act of) X-ing’; and when an object word is used in a predicate construction its predicted meaning is that of a *predicate nominal*, ‘be an X’. Examples of these predictable,

compositional meanings are shown in EX and EX.

add examples of multifunctionality

However, words used in their non-prototypical functions very frequently do not have predictable meanings. Consider the examples in EX and EX.

add examples of conversion

Add lead-out explaining how the meanings of the latter examples are idiosyncratic and unpredictable.

Lier2012 takes examples like those in *former examples* to be instances of genuine multifunctionality, and those in *latter examples* to be cases of conversion. Others have also adopted a position similar to van Lier’s, in which only the semantically compositional / predictable uses of a word in different discourse functions are considered flexible (Evans & Osada 2005: pages for compositionality criterion) (CITE: Croft 2005? Where he is critical of flexible analyses for ignoring idiosyncratic meanings).

2.3.1.4 Precategoriality / Acategoriality

The various approaches which analyze flexible words as being at some level uncategorized until they receive their interpretation from context may be lumped together under the umbrella terms *precategoriality* or *acategoriality*. Hopper & Thompson’s influential paper 1984 is an early application of the concept of acategoriality to the analysis of flexible words:

[L]inguistic forms are in principle to be considered as *lacking categoriality* completely unless nounhood or verbhood is forced on them by their discourse functions. To the extent that forms can be said to have an apriori existence outside of discourse, they are characterizable as *acategorial*; i.e. their categorial classification is irrelevant. Categoriality-the realization of a form as either a N or a V-is imposed on the form by discourse. (Hopper & Thompson 1984: 747)

The term *precategorial* has become a somewhat more common term for roughly the same

concept (though some researchers use the term in more strictly-delineated ways) (Evans & Osada 2005: 357, 362–364Bisang2008aBisang2008bBisang2013). It is especially preferred by morphological models that presuppose stages of derivation, such that words are precategorial before they reach a certain stage of the derivation (HalleMarantz1993Arad2005) (CITE: chapter from Handbook of morphological theory). VapnarksyVeneziano2017 distinguish polycategoriality from acategoriality by defining acategoriality as implying “no primitive / original categorial marking at all”, and polycategoriality as allowing a form “to be only partially unspecified for category, with possible constraints on the relevant categories”. Languages for which precategorial analyses have been advanced include Cherokee (Haag2017), Gooniyandi (McGregor2013), Kuikuro (FranchettoSantos2017), Mundari (Hengeveld & Rijkhoff 2005), and many others. Pfeiler2006 also presents psycholinguistic evidence that the earliest utterances of L1 learners of Yucatec Maya are acategorial.

A central concern in precategorial approaches is the precise mechanism by which a word receives its categorization in context (HengeveldRijkhoffSiewierska2004). There are two main theories of semantic indeterminacy in flexible words: *underspecificity* (Farrell 2001RijkhoffLier2013) and *vagueness* (Tuggy1993HengeveldRijkhoffSiewierska2004Hengeveld & Rijkhoff 2005). The essential difference is that underspecificity entails semantic minimalism while vagueness is entails semantic maximalism. An underspecified word has a minimal, core meaning, and receives its categorial meaning from the discourse context it appears in; a vague word has a maximal, broad meaning that covers all the possible discourse contexts it appears in. (There is of course quite a deal of variation in the literature as to how scholars use these terms, with many researchers conflating the two.) Hengeveld & Rijkhoff (2005: 414) offer the example of *cousin* as a word that is semantically underspecified for gender, such that the gender of the referent must be understood from context. Denison2018 argues that the English word *long* exhibits adjective ~ adverb underspecification in Old and Middle English.

In contrast, HengeveldRijkhoffSiewierska2004 outline a theory regarding exactly how vagueness operates in the context of lexical flexibility:

[E]ach flexible lexeme has a single (vague) sense. By placing the flexible lexeme in a particular syntactic slot or by providing it with certain morphological markers, the speaker highlights those meaning components of the flexible lexeme that are relevant for a certain lexical (verbal, nominal, etc.) function. Thus we contend that the meaning of a flexible lexeme always remains the same, and that morphosyntactic and other contextual clues signal to the addressee how to interpret this lexeme in an actual utterance. In other words, it is the use of a vague lexeme in a certain context (an actual linguistic expression) that brings out certain parts of its meaning, giving the category-neutral lexeme a particular categorial (verbal, nominal, etc.) flavour. (Hengeveld & Rijkhoff 2005: 541)

(Note that while vagueness implies a certain potential ambiguity, Hengeveld & Rijkhoff reserve the term *ambiguity* for cases of distinct, homophonous words.)

Evans & Osada (2005: 363–364) and Kihm2017 criticize both precategorial approaches for their imprecision, claiming that it would be impossible to formulate a definition for many flexible words that was broad enough to encompass all their uses. Kihm2017 illustrates this difficulty with the various meanings of the Arabic root *s-q-t*, which could arguably be glossed FALL. A selection of stems containing this root are given in (11).

add examples from Kihm (2017: 87)

It is difficult to imagine a single definition of *s-q-t* which could adequately demarcate just this set of meanings. This difficulty could perhaps be overcome, however, by loosening the requirement that the meaning of a word be unitary. Word meanings are *polycentric*, where different senses of a word are related through *meaning chains* rather than all through a single, central member (Taylor 2003: 110). This is sometimes referred to as a *family resemblance* structure for categories. The difference between monocentric and polycentric categories is illustrated schematically in Figure ?? . In both diagrams, each letter A–E represents a sense of a word. In the monocentric case, all the senses of the word are related through its core sense A. In the polycentric case, senses A and E are related only through their intervening connections.

Create a 2-part figure comparing monocentric vs. polycentric categories, with monocentric on the left. The senses in the monocentric case should be arranged circularly around sense A. The senses in the polycentric case should be arranged linearly from A > E.

Recognizing that word meanings are polycentric addresses [Evans & Osada](#) and [Kihm2017](#)'s criticisms of vagueness theory because it shows that the disparate senses of a word can be related without having to share any core component of their meanings. The use of a lexeme in a certain context then profiles one of these senses over others. Kihm himself hints at this solution by referring to the related Arabic stems in [\(11\)](#) as a *lexical family*.

2.3.1.5 Monocategoriality

In the extreme case where all lexical words in a language are precatgorial, the language could be considered *monocategorial*, possessing a single, open syntactic category. This is effectively the same as saying that the language lacks lexical categories altogether, the difference being primarily one of emphasis. David Gil analyzes both Tagalog ([1993Gil1995](#)) and Riau Indonesian ([1994](#)) as being of this extreme monocategorial type. Moreover, he argues that monocategoriality must have been typical of an earlier stage of language evolution in which dedicated morphosyntactic constructions for different discourse functions had yet to evolve ([Gil2005aGil2005Gil2012](#)). He names this abstract language type an *Isolating-Monocategorial-Associational* (IMA) language.

2.3.1.6 Transcategoriality

It is also worth briefly mentioning *transcategoriality*, since the term arises occasionally in connection with lexical flexibility and is potentially easily confused with other terms mentioned above. [Robert2003](#) uses *transcategoriality* to describe the ability for a single form to serve both lexical and grammatical functions. This is common in grammaticalization scenarios in which the original, lexical use of a form continues to exist alongside its newer, functional use. This is commonly referred to in the grammaticalization literature as *divergence* ([Hopper & Traugott 2003](#): 118). Since the focus of lexical flexibility is on *lexical* words and categories rather than *functional* ones, the concept of transcategoriality is not directly relevant to the study of lexical flexibility.

2.3.1.7 Conversion / Zero derivation

Since the literature on conversion and zero derivation is extensive and the concepts are well-established, I will treat them only summarily here, focusing on their relationship to lexical flexibility. *Conversion* is the process whereby a lexical item simply changes its word class with no overt morphological marker of that change (Crystal2008). *Zero derivation* is an alternate analysis of the same phenomenon that posits the presence of a derivational marker with no phonological realization. (CITE: Add citations to either conversion or zero derivation as appropriate: Bauer & Varela 2005; Don 2005; Kerleroux 1996, 2000; Lieber 2006; look at other handbooks of typology, morphology, and word classes) I will refer to this process of unmarked shift from one category to another as *conversion* in this thesis.

The concept of conversion is based on the premise that words are fully categorized for part of speech, meaning that an analysis of lexical flexibility as conversion falls under the categorical (as opposed to non-categorical) analyses of lexical flexibility mentioned at the beginning of Section 2.3.1. Conversion is generally characterized as a kind of word formation, implying that a new word has been created. Therefore, conversion and lexical flexibility are mutually exclusive analyses of multifunctional words; lexical flexibility implies the existence of one polysemous word which can fulfill multiple discourse functions, while conversion implies the existence of two homonymous / heterosemous words with different discourse functions. Remember too from Section 2.3.1.3 that Lier2012 distinguishes conversion from multifunctionality, where conversion is reserved for unproductive / unpredictable derivations. Not all scholars would delimit conversion in this way however.

Conversion also implies directionality. In cases of conversion, one of the two uses of a form is in some way basic or prior to the other (Mithun 2017: 156VapnarksyVeneziano2017). Under a flexible analysis, by contrast, the different functions of a single flexible lexeme have equal theoretical status. If it could be shown that certain seemingly flexible uses of a word were in some way marked in relation to each other, this would therefore constitute potentially disconfirming evidence against a flexible analysis. This is in fact one of the major arguments

presented against flexible analyses, to be discussed in [Section 2.3.3](#). There are at least four ways in which one member of a putatively flexible set of lexical items might be considered more basic than the others: diachronically, in which one sense of the word appears before the others historically; semantically, in which the meaning of the derived word is more semantically complex than that of the basic word; morphologically, in which the more basic word is irregularly inflected but the derived word is regularly inflected; or frequently, in which derived words are used less frequently than their base words (Plag2003). Speakers themselves also have intuitions about which member of a flexible set is basic and which are derived (Mithun 2017: 166). As will be explained in Section ??, the idea that certain uses of a form are marked in relation to each other is also central to Croft's typological markedness theory of lexical categories.

2.3.1.8 Functional shift / Functional expansion

Especially in the American context, another common term for conversion is *functional shift* (Cannon 1985). In most research, the term is used essentially interchangeably with *conversion* or *zero derivation*. However, functional shift can be usefully distinguished from conversion by its emphasis on function over than category, paralleling the distinction between polycategoriality (implying language-specific categories) and polyfunctionality (with no such implication). In its literal interpretation, the term suggests a shift in the meaning of a word from one discourse function to another, an analysis amenable to a constructional approach, and one that is not committed to the existence of language-particular categories. A slight improvement on this term would be *functional expansion*, since it emphasizes the expansion of a linguistic form into new functions / contexts as opposed to the wholesale shift from one function to another implied by *functional shift*.

2.3.2 Key findings

The emergence of lexical flexibility as an object of study has led to a number of edited collections or journal volumes focused on flexibility and word classes more generally (VogelComrie2000, Evans & Osada 2005 (target article), Ansaldopfau2010, LoisVapnarsky2010, RijkhoffLier2013, Simone2014, BlaszczakKlimekJankowskaMigdalski2015, VapnarskyVeneziano2017, Lier2017 (target article), CuyckensHeyvaertHartmann2019), plus any number of individual articles (see especially Farrell [2001], Rijkhoff [2007], Lier2012, and Mithun2018). Out of these collections have emerged several recurring findings, each of which is summarized in this section.

2.3.2.1 Parts-of-speech hierarchy

In addition to laying out a theory of flexible categories, Hengeveld1992 also presents the results of a 30-language survey of parts of speech in which he finds that the categories which are most likely to occur as an independent class in a language are subject to an implicational hierarchy, shown in (16), which Hengeveld refers to as the *parts-of-speech hierarchy*.

(15) Verb > Noun > Adjective > Adverb

Categories to the left of the hierarchy are more like to occur as a distinct part of speech than categories to the right. Applying this hierarchy to Hengeveld1992's flexible vs. rigid distinction yields the parts-of-speech typology in Figure ?? (adapted from Hengeveld1992 and Rijkhoff [2007: 718]). The terms for the different categories in flexible languages are from HengeveldRijkhoffSiewierska2004. Hengeveld1992 points out that this is not a strict classification scheme; languages may sit at the boundaries between types and exhibit exceptions.

parts of speech typology from Hengeveld & Rijkhoff 2005: 407

As mentioned in Section 2.3.1.1, Hengeveld1992's typology could be criticized for its reliance on large, language-specific lexical categories instead of constructions. One could however reframe Hengeveld1992's implicational hierarchy in terms of functions rather than cat-

gories, as in (16). I call this the *hierarchy of discourse functions*.

(16) predicate > referent > predicate modifier > referent modifier

In (16), functions to the left of the hierarchy are more likely to have dedicated morphosyntactic constructions than those to the right. This reformulation avoids a commitment to any language-particular categories while still capturing the important implicational trend observed by Hengeveld.

This hierarchy of discourse functions has proven to be a fairly robust finding in the literature on lexical flexibility, now supported by a number of subsequent studies (CITE: all the various sources that apply and extend the hierarchy of discourse functions).

2.3.2.2 Reference-predication asymmetries

The hierarchy of discourse functions also hints at another important feature of lexical categories: there is something privileged about the predicating function. A survey of the literature on lexical flexibility reveals patterned asymmetries in the behavior of lexical items with regard to predication vs. reference, even in very flexible cases. For starters, while it is quite common for languages to freely allow object words to be used as predicates with no special marking, the reverse case is much less likely Hopper & Thompson (1984: 745). The functional expansion of a word's uses from predication into reference always seems to be more marked (or at least as marked) as the shift from a referring function to a predicating function.

This fact has been observed independently by numerous researchers. For example, Stevick 1968 and Marchand 1969 both observe that conversion from noun to verb in English has always been more common than from verb to noun, and Kastovsky (1996: 98) points out that English does not even have a native noun > verb derivational suffix—any affixes of this type are borrowed from Romance languages. Central Alaskan Yup'ik is another example of a language with very many nominalizers but few verbalizers (Mithun 2017: 158).

Flexibility itself is frequently *unidirectional*, meaning that any object word may be used for predication, but that action words used for reference are marked (Croft 2001: 69) (CITE:

Beck's works on unidirectional flexibility; Evans & Osada on bidirectionality). Nakayama2003

frames flexibility in Nuuchahnulth in terms of a word's ability to predicate, reporting that "all inflectional stems are potentially predicative", but the reverse is not true. Discussing Classical Nahuatl, Launey (1994; 2004) introduces the term *omnipredicativity* to describe languages in which all words are potentially predicative, but no corresponding term *omnireferentiality* has appeared in the literature. That said, languages which have undergone *insubordination* (in which subordinate, usually nominalized clauses are reanalyzed as main clauses, and the nominal inflectional marking of the subordinate clause is reinterpreted as verbal inflectional marking) (CITE: Mithun's 2008 article; Evans' original article; introduction to Evans' edited volume) do exhibit noun-oriented flexibility in the sense that verbal inflection mirrors nominal inflection. This famously led to the claim that all words in Eskimo languages are fundamentally nominal in nature (CITE: Sadock's nominalist theory of Eskimo). However, cases of insubordination do not constitute counterexamples to the predicating tendency in language. Even in these languages, the use of action words for reference is still less marked than the use of object words for predication; this includes Eskimo, as mentioned for Central Alaskan Yup'ik above.

Kastovsky (1996) argues that this asymmetry arises from the fact that "deverbal nouns have a much more diversified semantics than denominal verbs" (Kastovsky 1996: 96), meaning that the range of possible meanings for a deverbal noun (a noun derived from a verb) is significantly broader than for a denominal verb (a verb derived from a noun). Examining data from English, Kastovsky shows that when an object word is used to predicate, its possible meanings are limited to combinations of BE, BE LIKE, BE IN, BECOME, HAVE, DO, DO WITH, and CAUSE. When an action word is used as a predicate, however, the range of meanings include any abstract representation of the event itself (an action nominalization), or any one of the arguments associated with the verb, which come in a variety of semantic roles.

A similar, cognitively-oriented explanation for reference-predication asymmetries is given by Hopper & Thompson (1984: 745):

[A] nominalization names an event taken as an entity; however, a “verbalization” does not name an “entity taken as an event”, but simply names an event associated with some entity. In other words, a nominalization still names an event, albeit one which is being referred to rather than reported on in the discourse; it is, accordingly, still in part a [verb], and not a *bona fide* [noun]. However, a denominal [verb] no longer names an entity at all, and thus has no nominal “stains” to prevent its being a *bona fide* [verb]. (Hopper & Thompson 1984: 745)

Hopper & Thompson (1984: 746) analyze nominalizations as a kind of metaphor following Lakoff & Johnson 1980, in which an abstract event is conceptualized as a concrete object. However, no such metaphor exists for verbalizations, explaining the asymmetry in the directionality of lexical flexibility.

2.3.2.3 Locus of categoriality

The grammatical level at which a language exhibits flexibility—the root, the stem, or the fully-inflected word—differs from one language to the next. In some languages, roots are strongly associated with a particular discourse function, but stems are flexible; in other languages, the reverse is true. I refer to the linguistic level at which a language associates different discourse functions as its *locus of categoriality*. Some linguistic theories include a premise that the locus of categoriality in every language always sits at a certain level (Halle & Marantz 1993; Baker 2003; Baker 2015; Booij 2018; Audring 2018; Siddiqi 2018), but the evidence from research on lexical flexibility gives strong empirical support to the position that locus of categoriality varies from language to language. In contrast, Blaszczak, Klimek, Jankowska & Migdalski 2015 argue that category information is distributed across different levels of representation.

As one illustration of how flexibility depends on grammatical level, we have seen that roots in Central Alaskan Yup’ik are generally categorial—except for 12% of roots, they are typically strongly associated with just one discourse function, and derivational affixes select for roots of a particular category (Mithun 2017: 162–167). While many derived stems are also strictly associated with just one discourse function, a large but indeterminate number have both referential and predicative uses. Some examples of categorial derived stems are in EX

and examples of flexible stems are in EX. See also the examples in (7) in Section 1.1.

add examples of from Mithun (2017: 167–168)

Fully-inflected words in Central Alaskan Yup'ik, however, never exhibit flexibility (Mithun2019). So Central Alaskan Yup'ik displays partial flexibility at the root and stem level but not the inflected word level.

As another example, in Mandinka all stems are flexible. No Mandinka stem except for *săa* 'die' is used in just one discourse function (Creissels 2017: 46). At the level of the inflected word, however, lexical items in Mandinka belong unambiguously to one category or another (Creissels 2017: 37). Mandinka therefore shows complete flexibility at the stem level but complete rigidity at the inflected word level. (Creissels does not include an analysis of roots in his discussion.)

Surprisingly, some languages display flexibility even at the level of the fully-inflected word. In many North American languages, it is common for fully morphological verbs to function as referents (Hieber forthcoming), as shown in the following examples.

add examples of flexibility at the word level from p. 20 of your word classes chapter: Cayuga, Chitimacha, Navajo

Each of these flexible uses of a morphological verb sits somewhere on a continuum between being fully lexicalized as a referent, so that its predicating use is no longer available, to being a fully productive predicate, with both predicative and referential uses (Mithun 2000: 413).

The reason that words may exhibit flexibility at one level of analysis but not another is because “*categorical* shift is often not *categorical*” (Mithun2019). When a word expands its use into new contexts, not all the morphological, syntactic, and semantic properties of the word shift to accommodate that new use at the same time. It takes some time before the morphosyntactic properties of a word adjust to reflect its new use, a process referred to as *actualization* in the grammaticalization literature (DeSmet2012) and *post-constructionalization constructional changes* in the framework of diachronic construction grammar (Hopper & Traugott 2003: 27).

It is because the locus of categoriality can vary from language to language that I have used the vague and overloaded terms *word* and *lexical item* throughout this thesis. Both are intended to be convenient cover terms for root, stem, or inflected word.

2.3.2.4 Item-specificity

A final significant finding to emerge from the empirical research on lexical flexibility is the fact that flexibility is item-specific and even sense-specific. Individual lexical items or even individual senses of an item differ in their flexibility. To say that lexical flexibility is *item-specific* is to say that two words that are otherwise very similar in their meanings and morphosyntactic behavior can nonetheless differ in terms of their flexibility.

This fact is very nicely illustrated by both Mithun's study of lexical flexibility in Central Alaskan Yup'ik and Creissels's study of Mandinka. Mithun (2017: 163–164), for example, considers roots for meteorological concepts, and shows that even within this small semantic domain, roots vary as to whether they exhibit flexibility. In EX the meteorological roots have predicative counterparts but in EX the meteorological roots do not.

add examples from Mithun (2017: 163)

Mithun provides similar data for the domains of clothing and instruments:

add examples from Mithun (2017: 164)

On the basis of data like these, Mithun observes, “Speakers simply know whether a given root functions as a noun and what its meaning is, and whether it functions as a verb and what its meaning is. Gaps are not predictable[.]” (Mithun 2017: 163). These gaps also vary from dialect to dialect. While the dialect in the above examples has no predicative counterpart for *taituk* ‘fog’, the Nunivak Island dialect has a pair of roots *nugu* ‘fog’ and *nungu-* ‘be foggy’.

Creissels's (2017) study of Mandinka is another good illustration of the item-specific nature of flexibility. While Mandinka has nominal and verbal constructions that allow the predicative and referring functions of words to be distinguished unambiguously, it is not as easy

to separate word stems themselves into similar classes. In Mandinka, all items are flexible, but the way in which items are flexible varies. Stems in Mandinka may be divided into three classes on the basis of their semantic behavior with regards to flexibility:

- *verbal* lexemes are those whose meaning is predictable when used to refer and therefore analyzable as a case of “morphologically unmarked nominalization”; these are always event nominalizations
- *verbo-nominal* lexemes are those whose meaning in referring constructions is idiosyncratic and therefore not predictable
- *nominal* lexemes are those whose meaning when used as predicates is predictable and limited to ‘provide someone with X’

In Mandinka, therefore, flexibility must be considered on an item-by-item basis, since the behavior of each item with regard to flexibility may differ.

In fact, flexible behavior in Mandinka is not just item-specific, but it is sense-specific as well. [Creissels \(2017: 54\)](#) reports that polysemous lexemes may show different behavior for their different senses. The word *dín*, for example, has two senses: ‘child, young (of an animal)’ and ‘fruit’. However, only the ‘fruit’ sense is available for predication; when used as an intransitive verb, *dín* may only mean ‘bear fruit’, not ‘give birth’, even though ‘give birth’ is a perfectly conceivable meaning of this word in predication. In the sense of ‘child, young (of an animal)’, *dín* behaves as a nominal lexeme, but in the sense of ‘fruit’ it behaves as a verbo-nominal lexeme. When lexical items undergo functional expansion into new discourse functions, it is also only specific senses that do so, not every sense of the word. More evidence for this comes from the diachronic development of the word *run* in English: though the word *run* when used as a predicate has numerous senses, the earliest attestations of *run* used referentially are by and large with just the sense of ‘fast pedestrian motion’ (the exceptions to this stemming from just one corpus file) ([Gries2009](#)). Other referential uses of *run* did not develop until later.

The existence of dialectal differences for flexibility as well as the unpredictable meanings of lexical items when used in various discourse functions show that the development of flexi-

bility depends on conventionalization—whether a given form has assumed a conventionalized meaning in its role for a specific discourse function. These conventionalizations are language, dialect, item, and even sense-specific (Croft 2000: 97). Speakers can and do playfully use existing lexical items for new discourse functions, but it is not until that combination of form and discourse function is conventionalized with a specific meaning in a community of speakers that we can say the word has undergone functional expansion. An excellent illustration of this is the word *friend* in English. Prior to the public availability of the social networking site Facebook in 2006, the use of *friend* as a predicate had not been widely conventionalized. The growth of social networking then led to the very specific use of *friend* to mean ‘add as a connection on a social networking site’. Note that it does *not* have the more general sense of ‘be a friend’ or ‘befriend’. Like with Yup’ik and Mandinka, this shows not just that flexibility is item-specific, but that the meaning of flexible uses is often item-specific as well; in many cases it is unpredictable and must be memorized by speakers.

2.3.3 Problems & critiques

Despite the robust findings in Section 2.3.2, researchers have challenged the very possibility of lexical flexibility and its presence in various languages. Some of these challenges stem from the fact that certain conceptions of lexical flexibility are based on traditional ideas about the existence of large, language-specific parts of speech, and therefore subject to the same set of criticisms. Other challenges stem from precisely the facts presented in the previous section, especially that both flexibility and the meaning of flexible words are item-specific and often unpredictable, such that these words are not truly “flexible”. Moreover, languages must indicate the discourse function of their words *somehow*—this is basic to our ability to communicate. So in a certain sense, the idea that there are words which are fully ambiguous as to their discourse function is doomed at the outset. The question is really where these indications of pragmatic function live—the root, the stem, the inflected word, or the clausal context. This section summarizes the main criticisms that scholars have raised against flex-

ible analyses. In [Section 2.4](#), we then look at alternative theories of word classes and their approach to lexical flexibility.

2.3.3.1 Methodological opportunism

A methodological problem with certain theories of flexible words is that they, like traditional theories, commit the fallacy of *methodological opportunism* (CITE: canonical references for this; borrow them from where you introduce the term above) presented in [Section 2.2.3](#). They do not apply the distributional method consistently. Instead, the criteria which separate words into categories are determined on the basis of additional theoretical commitments. [Croft \(2001: Sec. 2.2.2\)](#) criticizes Hengeveld’s parts-of-speech typology on this basis, noting that Hengeveld ignores distributional evidence for classes smaller than the ones he posits in his typology (noun, contentive, etc.). [Evans & Osada \(2005\)](#) raise similar concerns for Hengeveld’s theory as applied to Mundari. They state that in order for two lexical items to be members of the same lexical class, they must have *equivalent combinatorics*, which is to say that their distributions should be identical ([Evans & Osada 2005: 366](#)). [Evans & Osada](#) also state that in order for a language to be flexible, that flexibility must be *exhaustive* in the sense that all members of a putatively flexible class must show equal degrees of flexibility and *bidirectional* in the sense that nouns may be used as verbs and vice versa. Both these criteria are merely different ways of reframing the broader principle that words in a class should share the same distributions ([Croft 2005: 434](#)). [Evans & Osada](#) proceed to show various ways in which these criteria are not applicable to Mundari, and that Mundari is therefore not a flexible language. At the same time, however, [Evans & Osada](#) use these facts to argue for the existence of the equally problematic categories of Noun and Verb in Mundari, using just a “canonical subset of distributional facts” ([Evans & Osada 2005: 434, fn. 17](#)). [Croft’s \(2005\)](#) commentary on [Evans & Osada’s](#) target article is partially devoted to critiquing them on this point. The problem of methodological opportunism is present for any analysis which assumes that languages have a small set of large lexical categories—whether that analysis is flexible or traditional.

2.3.3.2 Semantic shift

2.4 Functional approaches

2.4.1 Prototype theory

2.4.2 Typological markedness theory

2.5 Lexical flexibility: A functional definition

Chapter 3

Data & Methods

This chapter describes the data used for this study, and how those data were analyzed. It covers the selection criteria for languages and lexemes, which corpora were used, and how the data were obtained and formatted. I also describe the methods used to annotate the data, and factors that influenced how the data were coded. I present and explain a measure of corpus dispersion that is used partly in place of, and partly as a complement to, raw frequencies of lexemes. Lastly, I set forth a procedure for operationalizing and quantifying lexical flexibility in a crosslinguistically comparable way. The formulation of this lexical flexibility measure is a key methodological contribution of this thesis.

Chapter 4

Results

This chapter details the findings of the procedures described in Chapter 3: Data & Methods. I begin with a brief examination of several representative lexical items from English and Nuuchahnulth, and explain to the reader how to interpret the ternary plots used to present results in this thesis. I then take an aggregate look at the behavior of lexical flexibility in English and Nuuchahnulth, first individually and then in comparison ([R1](#)). Next, I present the results of the investigation of the relationship between degree of lexical flexibility and frequency / dispersion ([R2](#)). Finally, I discuss the behavior of flexible items with respect to their semantics ([R3](#)).

Chapter 5

Conclusion

This chapter summarizes the methods and main findings of this study, and the considers the implications of those results for theories of lexical categories. I argue that the data provide compelling evidence in favor of functional approaches to lexical categorization, most especially cognitive prototype theory and Croft's theory of lexical categories as typological markedness patterns. I also argue for a reversal of the canonical position on parts of speech: instead of working from the default assumption that all languages have clearly-defined or even loosely-defined parts of speech, we should begin from the understanding that dedicated referring, predicating, or modifying constructions develop diachronically, and that even when they do, they do not do so for the entire lexicon, or in all areas of the grammar equally. Even languages like English whose lexemes pattern strongly with the standard prototypes of noun, verb, and adjectives nonetheless exhibit varying degrees of flexibility for different lexemes. Lexical categories are not a given in grammar. I conclude by discussing some limitations of the present study and avenues for future research, followed by closing remarks.

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