

Lexical categories: legacy, lacuna, and opportunity for functionalists and formalists

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1. Introduction

The term ‘lexical category’ is generally used to describe the categories of noun, verb, adjective, and possibly certain others (e.g. Haspelmath 2012:110). For many, ‘part of speech’ is a synonym, although Croft draws a distinction (see sections 2.2.2 and 3.2.1 below.) Lexical categories contrast with phrasal categories such as noun phrase, determiner phrase, clause, etc.: lexical categories are units that consist of words rather than structured combinations of words. Lexical categories also contrast with functional categories such as case, complementizer, determiner, etc.: lexical categories express what can loosely be called “semantic content”, while functional categories (including affixes) express semantic operators or can even be semantically empty. We leave the lexical category/ functional category contrast vague here, concentrating on core cases of lexical categories.

The fundamental importance of lexical categories is uncontroversial within both formal and functional approaches to grammatical analysis. Indeed, this is asserted in introductory linguistics textbooks in both traditions; compare, for example, O’Grady, Dobrovolsky and Aronoff (1997:164) with Finegan (2006: 35). The nature of lexical categories has also been the subject of theoretical analysis and debates in both formal and functional traditions—including by the authors of this article (Croft 2001; Baker 2003).

But despite the familiarity of this topic and its foundational nature for grammatical description and analysis, it is paradoxically *not* among the best studied or understood topics from either the functionalist or formalist perspectives. Both schools of linguistic theory have inherited their basic assumptions and instincts about lexical categories from the structuralist practice of earlier 20th century linguistics. This was built around the idea that lexical categories are revealed by a rather superficial distributional analysis: if two items are used in the same range of grammatical constructions within a particular language, then they belong to the same lexical category; if one item can be used in grammatical constructions that another item cannot be used in, then they potentially belong to different lexical categories. “Grammatical constructions” here can be defined either morphologically, by the sorts of derivational and inflectional affixes that a word can combine with, or syntactically, by the ways that a word can combine with other words to make phrases of different types, or by a combination of the two. Both functionalist and formalist approaches have built on this structuralist legacy in their characteristic ways—and this is a natural, perhaps inevitable starting point. However, neither tradition has done as much as it might to circle back and reflect more deeply on this common practice and why it works the way it does in the light of what linguists have learned over the last 50+ years. Thus, we find it too rare for linguists from either perspective to ask *why* the distributional tests give the kinds of results that they so often do, both within and across languages, and *what this means* about the nature of the lexical categories. We consider the opportunity to ask these questions afresh, and to pursue deeper answers to them, to be a major growth area for linguistics going forward.

We organize this article, then, around the theme of showing how recent work on lexical categories has made use of the legacy of structuralist-style distributional analysis, and what limitations remain from this. We begin by providing a brief survey of approaches to the various lexical categories, with emphasis on major leading ideas and their recent developments. We then comment on a few issues of strategic value that arise from these approaches, including the importance of clearly distinguishing roots, stems, words, and syntactic units when it comes to issues of lexical categories, the importance of recognizing when distributional tests are (not identical but) *similar* across languages in principled ways, and the need for the choice of distributional tests to be informed by theoretical hypotheses.

2. A survey of actively pursued approaches to lexical categories.

The topic of lexical categories has generally been higher on the research agenda of functionalist linguists than on that of formalist researchers. Functionalist approaches to lexical categories can be divided into two broad groups, one associated primarily with cognitive linguistics and the other associated primarily with typology, although there is considerable overlap. The cognitive linguistic approach can be considered as essentially a reassessment of the traditional (pre-structuralist) notional definitions of the parts of speech, while the typological approach includes a reassessment of the structuralist distributional definition. Many of the major theories emerged in the 1980s, but debate and reassessment of them has re-emerged in the early 21st century. We begin with approaches that focus on semantic definitions but apparently presuppose a distributional definition of word class membership, then consider approaches that also include semantic definitions but explicitly address the issue of distributional definitions of lexical category membership, and finally turn to the modest generative research tradition on this topic.

2.1 Cognitive Semantically oriented approaches

2.1.1 Conceptual semantic approaches with discrete categories

Prior to the advent of structuralist notions of categories, the widespread view was that the lexical categories were defined notionally, by something like the idea that nouns express things, verbs express actions, and adjectives express properties. These traditional notional definitions of the lexical categories came to be deemed inadequate because, for example, words that count as nouns can in fact denote properties (*health*) and actions (*collapse*) as well as objects (*cat*). Cognitive linguistic approaches however have revived notional definitions, as a consequence of the rise of a conceptual approach to semantics. In a conceptual semantic approach, a particular experience that a speaker wishes to verbalize (Chafe 1977) can be conceptualized or construed in different ways by that speaker. The linguistic expression used to describe that experience is actually describing it as it is conceptualized by the cognizer. The semantic contrast in the linguistic expressions, including the lexical category that is used, reflects that conceptualization, not the “objective” properties of the entities being described. Therefore, this class of theories posits relatively sharp conceptual distinctions between semantically defined major lexical categories.

Bolinger (1967, 1980a,b) and Wierzbicka (1986, 1995) examine boundary cases in which seemingly the same or similar concepts are expressed by words in different lexical categories (for example, *The man/*male kept shouting*), in order to identify subtle semantic differences between the two. They hypothesize that these differences are indicative of the conceptual semantics of the respective lexical categories. For example, they argue that the conceptual semantic difference between nouns and adjectives is that nouns *categorize*—they place the referent in a class with a holistic set of properties—while adjectives *describe*—they simply add a single property to the characterization of the referent. Similarly, Wierzbicka (1995) compares verbal and adjectival expression of emotions (*John envies Mary/John is jealous of Mary*) and argues that the verb represents a more active or dynamic emotion, while the adjective construes the emotion as a stative property of the experiencer.

The most detailed conceptual semantic theory of parts of speech is found in Cognitive Grammar (Langacker 1987a,b, 2008a). Langacker's definitions consist solely of mental operations on stimuli. Langacker considers four to be essential for defining parts of speech: grouping, reification, apprehending relationships, and tracking relationships through time (Langacker 2008a:104). Langacker's term for the noun conceptual schema is *thing*: a thing is a reified group of interconnected entities. Grouping is essentially the same concept as a gestalt in gestalt psychology: a mental process that structures our experience. Reification is the 'capacity to manipulate a group as a unitary entity for higher-order cognitive purposes' (Langacker 2008a:105).

Langacker's term for the verb conceptual schema is *process*: 'a complex relationship that develops through conceived time and is scanned sequentially along this axis' (Langacker 2008a:112). What makes a concept a complex relationship is that the interconnections are profiled; the profiled concept is relational. In distinguishing verbs from nouns, Langacker defines two ways in which experiences can be temporally processed by the mind. In sequential scanning, the cognizer mentally tracks the event as it unfolds over time. In summary scanning, states of experience over time are cumulatively experienced and 'form a single gestalt' (Langacker 2008a:111). Verbs represent experiences that are sequentially scanned; nouns in contrast represent experiences that are summarily scanned, forming a single gestalt.

Langacker's notion of scanning has been challenged, however. Broccias and Hollmann (2007) question Langacker's analysis of nonfinite verbal forms. They also question whether there is psycholinguistic evidence supporting alternative scanning modes (see Langacker 2008b for a response). One can conclude that the profiling of the temporal dimension is necessary to being construed as a process, without necessarily analyzing temporal profiling in terms of a mode of scanning.

2.1.2 Semantic approaches emphasizing a crosslinguistic continuum

The conceptual semantic analyses of lexical categories identify major parts of speech with a single conceptual semantic property or combination of properties. In contrast, more typologically-oriented functionalists have argued instead for a continuum of finer-grained semantic categories ranging from the most "nouny" to the most "verby". The continuum is intended to capture the fact that lexical category membership varies across languages in systematic ways linked to lexical semantic class.

A commonly used dimension for this purpose is time-stability (Givón 1979:320-22, 2001:chapter 2). Time-stability is described as a single semantic dimension that ranges continuously from permanent or inherent states on one end to transitory processes on the other end, with transitory states in between. The permanent end is identified with nouns, the transitory end with verbs, and the middle of the dimension with adjectives. The boundaries between lexical categories are taken to vary across languages, thereby accounting for crosslinguistic variation in the size of the adjective class in particular. However, Taylor (2002:177) argues that otherwise typical nouns such as *explosion* and *flash* are not time-stable in Givón's sense.

Variation in lexical category membership is greatest among property concepts. A number of scholars have divided property concepts into subclasses to provide a finer-grained ranking along the parts of speech continuum (Dixon 1977, 2010:chapter 12; Wetzer 1996:242; Stassen 1997:168-9; Pustet 2003; Rogers 2016). The semantic ranking in (1) is from Stassen:

- (1) Human propensity < physical property < dimension, color < value, age, form < material, gender

The leftmost categories in the hierarchy are most likely to be expressed as verbs, the rightmost most likely to be expressed as nouns, and if the language has a lexical category of adjectives, it will include concepts in the middle of the hierarchy.

The semantic continuum analysis appears to be inconsistent with conceptual semantic analyses. The conceptual semantic analyses do not capture the crosslinguistic variation in lexical class membership. The continuum analyses do not use conceptual definitions of semantic classes. However, Stassen, Wetzer and Pustet also observe systematic semantic contrasts if the same word is expressed in multiple lexical categories in one language: for example, a stative concept may be more transitory when expressed as a verb, but more permanent when expressed as an adjective. These semantic contrasts echo Weirzbicka's and Bolinger's analyses described above.

Both the cognitive semantic and the semantic continuum approaches to lexical categories presuppose that nouns, verbs and adjectives have been defined grammatically. These approaches appear to assume that distributional criteria have been used to define the lexical categories, and then propose a semantic basis for the lexical categories so defined. As such, they leave unexamined an important part of characterizing lexical categories. In the next section, approaches that address distributional as well as semantic criteria are described.

2.2 Functional-Typological approaches blending semantics and distributional analysis

2.2.1 Views in which lexical categories are crosslinguistic categories

Functional-typological linguists refer more explicitly to distributional criteria used to identify major lexical categories in different languages. In many cases (Givón 2001:chapters 2-3; Dixon 2010:chapters 12-13), traditional structuralist distributional criteria are listed, with an acknowledgement that various of them may be irrelevant to a particular language. It is also commonly assumed that lexical categories identified by

language-specific distributional criteria can be identified as nouns, verbs and adjectives—that these lexical categories are crosslinguistically valid categories. However, few analyses focus on the constructions actually used to identify lexical categories.

An important early typological analysis is Hopper and Thompson's (1984). Hopper and Thompson presuppose the identification of major lexical categories in languages by certain distributional criteria. They refer simply to the 'full possible range' of nominal and verbal 'trappings' (1984:710). Reading between the lines, they treat as nominal and verbal 'trappings' the typical inflectional or syntactic behavior of these lexical categories: number and definiteness/referentiality for nouns, tense-aspect-mood and person indexation (agreement) for verbs, and so on.

Hopper and Thompson found that crosslinguistically nouns in incorporation constructions, compounding, predicate nominals, and within the scope of negation, as well as anaphors and body part terms, are less likely to be typical nouns in a given language. Conversely, verbs in attribution (modification) constructions, existential clauses, copula clauses, irrealis and negative clauses, serial verb constructions, compound verbs and dependent forms (nominalizations, relative clauses, purpose clauses, chaining constructions, complements) are less likely to be typical verbs in a given language.

Hopper and Thompson explain the partial or total loss of noun and verb 'trappings' in these constructions in discourse terms rather than lexical semantic terms. A prototypical noun expresses a discourse-manipulable participant, and a prototypical verb expresses a reported event. The aforementioned constructions are used for discourse functions other than manipulating a participant or reporting an event, so the word's nominal or verbal characteristics are correspondingly reduced. Hopper and Thompson's chief contribution to the debate is to identify crosslinguistic universals in the interaction of those constructions with the other constructions described above.

Finally, Hopper and Thompson argue for a dissociation between lexical stems and noun/verb membership. They write: 'We should like to conclude, however, by suggesting that linguistic forms are in principle to be considered as LACKING CATEGORIALITY completely unless nounhood or verbhood is forced on them by their discourse functions' (Hopper and Thompson 1984:747). There is an interesting parallel between this view and how roots are treated in formal accounts using Distributed Morphology, which we return to below.

Hengeveld and collaborators (Hengeveld 1992, Hengeveld et al. 2004, Hengeveld and Mackenzie 2008:225) present a theory of parts of speech that directly addresses the criteria used to define those parts of speech, unlike Hopper and Thompson. Hengeveld defines four classes of predicates, defined by four discourse functions (Hengeveld 1992:58):

- (2) a. A *verbal* predicate is a predicate which, without further measures being taken, has a predicative use *only*.
- b. A *nominal* predicate is a predicate which, without further measures being taken, can be used as the head of a term [referring expression—WAC].
- c. An *adjectival* predicate is a predicate which, without further measures being taken, can be used as a modifier of a nominal head.
- d. An *adverbial* predicate is a predicate which, without further measures being taken, can be used as a modifier of a non-nominal head.

‘Further measure being taken’ refers to overt coding, either overt derivational morphology or an independent word, to express the item in the relevant function.

Hengeveld then distinguishes three types of parts of speech systems. In the *specialized* (later called *differentiated*) type, ‘every category of predicates specializes in a particular function’ (Hengeveld 1992:63); English is an example. In the *flexible* type, a predicate may be used in more than one function without any additional morphology (see also Rijkhoff and Van Lier 2013). Thus, predicates satisfy the definition of two or more of (2b-d); the statement of (2a) precludes this possibility. Finally, in the *rigid* type, one (or more) of the classes defined in (2a-d) does not exist in the language. For example, all modifiers of nominals in Mandarin Chinese require an overt morpheme, *de*; so there are no adjectival predicates as defined in (2c).

From this typological classification, Hengeveld argues that flexible and rigid languages conform to the following hierarchy: Verb > Noun > Adjective > Adverb. That is, flexible languages either make no distinctions at all, or they distinguish just Verb, or they distinguish both Verb and Noun. Rigid languages lack just the Adverb category, or they lack Adverb and Adjective, or they lack Adverb, Adjective and Verb.

Hengeveld’s theory, like Hopper and Thompson’s, uses certain distributional criteria and proposes crosslinguistic universals about how lexical categories are defined by them. Croft (2000, 2001, 2005) questions the validity of Hengeveld’s flexible type because analyses in this tradition do not account for the fact that lexical stems that occur flexibly in multiple functions often undergo major semantic shifts, both systematic and idiosyncratic, in the process (see also Chung 2012 who raises this issue from a formal perspective).

2.2.2 Views in which lexical categories are language-specific, but parts of speech are universal

The approaches reviewed in the preceding section all assume that lexical categories are defined by language-specific distributional criteria but the categories that are discovered in this way are crosslinguistic categories: that is, nouns, verbs and adjectives can be recognized across languages. More recently, it has been argued that *lexical categories* are language-specific, and crosslinguistic universals about *parts of speech* are not defined in terms of lexical categories per se (note the distinction drawn here).

Croft (1991, 2000, 2001, 2004, 2005, 2007, 2009, 2010a, Croft and Van Lier 2012) addresses how the distributional method for identifying lexical categories is used. He argues against using a selection of distributional criteria (that is, constructions) in a particular language as evidence for a universal (i.e., crosslinguistically valid) category such as noun or verb. Croft calls the arbitrary selection of different distributional criteria across languages *methodological opportunism* (Croft 2001:30), and argues that this prevents us from identifying language-specific categories with universal parts of speech categories. In other words, lexical categories are language-specific. This position is parallel to, and conceptually related to, one previously advocated for grammatical relations by Dryer (1997); Haspelmath (2007, 2010a,b, 2012) argues for a similar position for the major lexical categories.

Croft further argues that this is not simply an issue with identifying parts of speech such as noun and verb crosslinguistically. Even within a language, there are disagreements about what lexical categories a given language has, because different scholars use different criteria to identify the lexical categories (Croft 2001; Haspelmath 2012). Croft argues that there are no a priori principles that indicate which criteria (constructions) should be used to identify lexical categories. Instead, scholars opportunistically use the constructions that identify the lexical categories that they expect to find, categories which differ from one scholar to the next. In general, if one uses the whole repertoire of available constructions, then one ends up with a very large number of very small classes—in the limit, classes consisting of just one word each (Gross 1979:859-60; Croft 2001:36; Haspelmath 2012:118). Croft ultimately argues that the problem here is not with the distributional criteria per se, but with the assumption that there exist lexical categories, universal or language-specific, independent of the constructions that define them. Linguistic properties claimed to be associated with a particular lexical category are actually properties of the construction(s) used to define the category. Lexical categories are thus construction-specific, not just language-specific. This critique applies not only to theories proposed by formalist linguists (Croft 2007, 2009, Croft and Van Lier 2012; Haspelmath 2012) but also those proposed by typological linguists (Croft 2000, 2005, 2010; Haspelmath 2012).

Croft (1984, 1991, 2001, 2005, 2007) proposes that noun, verb and adjective do represent language universals, but they are universals governing the occurrence of word classes in a specific subset of constructions. Following a long tradition in typology (Greenberg 1966; Keenan and Comrie 1977; Stassen 1985), Croft defines both word classes and constructions in functional terms for crosslinguistic comparison: word classes in terms of lexical semantic classes, and constructions in terms of the propositional act functions of reference, predication and modification (Croft 1991, 2001; compare Hengeveld's analysis described above), and the grammatical semantic categories associated with them (compare Hopper and Thompson's discourse motivations for the use of those constructions).

Croft identifies crosslinguistic universals based on formal properties of the constructions used with different lexical semantic classes. He compares the constructions used for different lexical semantic classes in terms of *structural coding*, the presence or absence of an overt morpheme encoding the constructional function (Croft 2003:91-95; compare Hengeveld's 'further measures being taken'), and *behavioral potential*, the presence or absence of inflectional or syntactic contrasts in grammatical semantic categories associated with the function (Croft 2003:95-99; compare Hopper and Thompson's 'trappings'). Asymmetries in structural coding and behavioral potential result in typologically universal correlations between the lexical semantic classes of objects, properties and actions and the constructional functions of reference, modification and predication, respectively. For example, a robust implicational universal is that overt coding of property predication (a copula) implies overt coding of object predication (Croft 1991, Wetzler 1996, Stassen 1997, Pustet 2002).

Croft argues that the conceptual semantic and discourse-functional definitions given above actually describe the semantics of the constructions for reference, modification and predication, not the semantics of the lexical categories that participate in those constructions. However, the lexical semantic classes with the least structural

coding and the greatest behavioral potential form the typologically unmarked prototype members of those functionally-defined constructions.

2.3 Formal Syntactic approaches

As mentioned above, the topic of lexical categories has generally been lower on the research agenda for formal linguists than for functional linguists. The formal approaches may also give at least the appearance of constituting a more unified project, because generative linguists generally try to maintain consistency with a shared body of work that provides their background assumptions, except when some other assumption is important for the task at hand (as it often is). Formal research certainly has had much to say about the topic of lexical categories implicitly and indirectly, inasmuch as lexical categories and their properties play a role in virtually every analysis, but only rather occasionally does the topic take center stage, and the generative linguists have often been more interested in functional categories than lexical categories.

2.3.1 Chomsky 1970 and the use of formal features

The starting point for lexical categories in most generativists' minds is Chomsky 1970. This work is best-known for bringing X-bar theory into the generative framework (adopted from Zelig Harris's structuralism), but alongside this Chomsky sketched a system of binary feature distinctions that are claimed to underlie the traditional lexical categories: nouns have the features [+N, -V], verbs are [-N, +V], and adjectives are [+N, +V]. Jackendoff (1977) later extended the system in a natural way, claiming that adpositions are [-N, -V]. Chomsky was primarily concerned with characterizing the relationship between a sentence like (3a) and a derived nominal like (3b); the relationship between (3a) and the derived adjectival construction in (3c) is analogous.

- (3) a. This indicates Mary's sincerity.
- b. The indication of Mary's sincerity (reassured the board).
- c. This is indicative of Mary's sincerity.

While Chomsky's (1970) focus—and that of many generative linguists after him—was more on what (3a-c) have in common in terms of gross structure and word order, his feature system also provided a nascent way of thinking about differences across lexical categories, in terms of principles that refer to one value of a feature +/-N or +/-V as opposed to another value. For example, it is notable that the complements of nouns and adjectives in a paradigm like (3) need to be introduced by an adposition, here the nearly meaningless preposition *of*, whereas the complements of verbs and adpositions do not need to be. In the government-binding era (Chomsky 1981, Stowell 1981), this was attributed to the claim that -N categories (V and P) could assign structural case values (e.g. accusative, possibly covert) to nearby NPs, but +N categories (N and A) could not. Therefore, a dummy P needs to be included in (3b) and (3c) so that the structure meets general case requirements. Similarly, the fact that adjectival constructions (and nominal constructions) need a copular verb in order to form a finite clause in examples like (3c),

whereas verbal constructions do not ((3a)), can be captured by saying that tense cannot affix to a +N head.

This style of analysis is clearly related to the distributional criteria of the structuralists. However, it aspires to be something more, in that the features +/-N and +/-V are taken to be abstract formal properties that define the lexical categories—not merely properties that are probabilistically associated with instances of the lexical categories. In addition, their relationship to individual observable distributional patterns is taken to be indirect, mediated by other principles and properties that are relevant to those patterns. Hence, +N is not taken to *mean* ‘cannot assign [structural, accusative] case’; rather it is part of the essence of the categories noun and adjective, something that they share with each other but not with verbs. This essence should then play a role in determining their case assigning behavior in particular languages, among other things. Nor do generative linguists take themselves to be at liberty to create new category features like “[+ definite subject]” to go along with new distributional tests that might come to light in particular languages (cf. Chung 2012 on Chamorro). Rather, the project is to deduce the behavior of nouns, verbs, and adjectives with respect to (say) having a definite subject from the small number of category features already available—perhaps recast somewhat, or very slightly increased—in interaction with other principles and properties that do not directly refer to the parts of speech in any crucial way. Chung (2012) is a good recent example of formal generative work on a less-studied language in this tradition. This article taken together with Kaufman (2009) and the commentaries on those two articles provides perhaps the best recent window into what a selection of generativists currently think about the topic of lexical categories.

2.3.1 Distributed Morphology and the question of what has a category

The approach of Distributed Morphology (DM, Marantz 1997) invokes Chomsky (1970) very explicitly in proposing that roots actually do not have intrinsic categories, but rather are inserted into syntactic structures without any category. Roots then (effectively) receive their categorial identity from their syntactic context, in particular, from the quasi-functional heads that they are in construction with (Marantz 1997; see also Borer 2005). This has become the most characteristic idea about lexical categories in recent generative work, distinguishing it from previous stages of the theory. For example, the abstract root $\sqrt{\text{INDICATE}}$ is taken to be present in the syntax of all the examples in (3): in (3b), it is the complement of an n head; in (3c), it is the complement of an a head; in (3a) it is the complement of a v head. The driving force behind positing these extra heads does not come so much from the theory of lexical categories per se, but from the morphological goal of providing a syntactic position for derivational morphemes like *-ion* in (3b), *-ive* in (3c), or *-ize* in *legalize* or *fossilize*, as required by DM’s view that all complex words are formed in the syntax.

Although not universally adopted, this view has become mainstream. One can question its “depth” as a theory of the lexical categories. To a large extent, it simply moves the interesting theoretical question around: now one needs a theory of what ns, vs, and as are, rather than a theory of what nouns, verbs, and adjectives are. No obvious progress is made on the substantive question by this reframing, and many sources use the uncategorized-root-plus-categorizing-head system in noncrucial ways, simply as a matter

of implementation. This view does, however, raise a profound point about the potentially different roles of roots, stems and words when it comes to debates about the status of lexical categories, and there is an interesting resonance between the DM view and Hopper and Thompson's claim mentioned above. We return to this in section 3.1 below.

2.3.3 Baker's effort to deepen and crosspollinate

One sustained research program on the current generative scene that does try to face directly what is the difference between nouns, verbs and adjectives (or ns, vs and as) from a general theoretical point of view is Baker's (2003, 2008, 2015a, 2015b). Baker (2003) proposes that verbs are defined by their ability to have a specifier in syntactic structure, nouns are defined by their ability to bear a referential index, and adjectives are defined by having neither of those positive properties. He proposed this in part to explain very familiar distributional facts about the parts of speech, inherited from structuralism, such as the fact that AP and NP predicates often need copular verbs, but VP predicates do not, and the fact that NPs can be subjects of thematic predicates, but APs and VPs often cannot. But he was just as interested in accounting for more subtle differences discovered by generative investigation, such as the fact that verbs often act like unaccusative predicates whereas analogous adjectives and nouns do not (Perlmutter and Postal 1984, Cinque 1990), and the fact that nouns can antecede anaphors whereas adjectives and verbs cannot (*Italy's criticism of itself*, but **The Italian criticism of itself*, Kayne 1984). His goal was to provide a unified explanation both the obvious "first order" properties of the lexical categories and some striking "second order" properties that were unknown to traditional grammar.

Baker presented his theory as being within the tradition of Chomsky (1970), as spelling out more concretely what it means for a lexical item to be $-N$ (=license a specifier) and what it means to be $-V$ (=bear a referential index), He was seeking a view in which these are not arbitrary features but substantive properties that make a difference in how generative principles apply. Since verbs appear in phrase structures with a different geometry from nouns and adjectives (structures with a specifier as well as a complement), this can make a difference to generative principles that are stated in terms of phrase structure—namely, most of them. Similarly, since nouns bear referential indices, they play a special role in the theory of anaphora/binding, and Baker claims that this also accounts for the special role that they play in movement and thematic role assignment. Baker (2003) also consciously maintains Chomsky's (1970) claim that adjectives are defined by a different combination of the same features that define nouns and verbs (although technically for Baker adjectives are the equivalent of $[-V, -N]$, not $[+V, +N]$). This is attractive in that when adjectives are different from verbs they tend to be formally similar to nouns, and vice versa. For example, when adjectives in English are different from verbs in requiring *of* with their complement, they are patently similar to nouns in that respect (see (3b,c)). Conversely, when adjectives are different from nouns in bearing person agreement inflection in Chamorro, they are similar to verbs (Chung 2012).

At the same time, there are obvious and conscious similarities between Baker's reworking of the formal category features and some of the functional-typological views surveyed above—especially Hengeveld's and Croft's. Thus, when Baker says that only

verbs can license specifiers—i.e., only verbal phrases can take a subject directly—this is parallel to Hengeveld’s claim that a verbal predicate is one that has a predicative use only ((2a)). Moreover, Hengeveld’s notion of ‘further measures being taken’ in (2a) is parallel to Baker’s idea that nominal and adjective constructions become similar to verbal constructions when they combine with a functional category (Pred) that is verb-like in itself licensing a specifier. Similarly, when Baker says that only nouns can bear referential indices, this is parallel to Hengeveld’s claim that a noun is an item that can be used as the head of a ‘term’ ((2b)). And again, Hengeveld’s notion of ‘further measures being taken’ in (2b) is parallel to Baker’s idea that verbal and adjectival constructions become similar to nominal ones when they combine with a functional category (determiner or relative pronoun) that is noun-like in itself bearing a referential index. There is a bigger difference when it comes to adjectives (and adverbs), since Baker does not *define* adjective as a category particularly suited to modifying nominal heads, as Hengeveld does in (2c); rather he tries to derive this from general principles (Baker 2003:ch.4). The formal definitions are not *identical* to the functional-semantic characterizations. For example, the verb *seem* in (4) has a specifier (*it*) even though it is not semantically predicated of anything, and *it* arguably has a referential index even though it does not refer to anything.

(4) Max made [*it seem* [that he was sick and couldn’t go to the party]]

Thus, there is room for debate over which characterization of the lexical categories is the most accurate by looking at cases like these at the margins. But Baker’s formal definitions are in natural homomorphic relationships to the functional-pragmatic-conceptual characterizations, and the way he accounts for the most familiar distributional facts is not markedly different. The question, then, is whether one can build higher if the theory is framed in this formal way, suitable for use within a deductive-hypothetical style of analysis and explanation.

Indeed Baker has sought to build even higher in more recent work, moving on to more inflectional (less obviously syntactic) differences among the lexical categories that show up in many languages. For example, Baker (2008) uses his definition of the lexical categories plus a general theory of agreement to explain why, in many languages, verbs agree with noun phrases in person as well as number and gender, adjectives agree with noun phrases in number and gender but not person, and nouns do not agree syntactically at all. Similarly, Baker (2015a, 2015b) uses his definitions plus a general theory of case assignment to explain why verbal constructions can have both accusative objects and ergative subjects (depending on the language), nominal constructions can have ergative “subjects” (i.e. possessors) but not accusative complements, and adjectival constructions have neither—see again the distribution of *of* in English in (3). This research program has thus been able to accumulate new results over time, including some in which the difference between the proposed formal account and its functionalist analogs might be more pronounced.

2.3.4 Formal approaches and the universality of the lexical categories

Formal-generative theories are sometimes criticized for having improperly strong universalist tendencies—for example, for assuming that the Chomskian $+/-N$, $+/-V$ features are valid for all languages, and hence that the three-way noun-verb-adjective distinction is valid for all languages. This can be related to charges of bias toward Indo-European culture and languages, and of ignoring or downplaying the extensive crosslinguistic variation revealed by typological investigation.

But this is a misunderstanding. To the extent that generative linguists active in this area believe that the categories of noun, verb, and adjective are universal, they claim this to be an empirical result of their investigations, not a presupposition of their theories. Kaufman's (2009) work on Tagalog illustrates this in a backhanded way, in that he defends an atypical generative view in which all lexical heads in Tagalog are essentially nouns. (See also Johns (1992) for a similar proposal for Inuktitut, to derive its ergativity from a kind of nominalist hypothesis.) None of the responses to Kaufman's proposal criticize it as being incompatible with the generative paradigm; rather, they find the data in favor of his view to be incomplete (Baker 2009), or they bring forward other data pointing toward a different conclusion, either for Tagalog itself (Richards 2009, Sabbaugh 2009) or for other comparable languages (Coon 2009, Koch and Matthewson 2009). Similarly, Chung (2012) shows explicitly how Topping's (1973) proposal of a novel, language-particular two-way category distinction for Chamorro (distinguishing in essence transitive verbs from a second category that includes analogs of English's intransitive verbs, adjectives, and nouns) could perfectly well be implemented within her formal generative assumptions. Nevertheless, she argues empirically that that would not be the best theory, since she in fact finds evidence for the familiar three-way noun-verb-adjective decision in her close analysis of Chamorro.

Chung's results replicate Baker's (2003) view on this matter. He says that the goal of his investigation was not to prove that all languages have the same three-way distinction among lexical categories (if anything, the contrary), but to develop a generative theory of categories to the point that it would become empirically decidable whether they do or not. But then the upshot of his investigation into a range of languages turned out to be that there was a noun-verb-adjective distinction in all of them, including languages like Mohawk, Nahuatl, and Quechua. Similarly, Davis and Matthewson have stated (with some exasperation) that the real debate on whether the familiar lexical category distinctions exist in Salishan languages is essentially over; all working Salishanists now accept that they do (compare also Evans and Osada (2005) on Mundari, from a functionalist perspective). Of course, there are plenty of languages in which adequate work on this topic remains to be done, but looking at these trends generativists do not seem to themselves to be crazy in extrapolating to the possibility that a three-way category distinction will turn out to be universal, as better evidence accumulates.

Somewhat neglected in our survey are non-Chomskian generative frameworks such as LFG and HPSG. However, these frameworks are not generally known as having any distinctive characteristic view about the lexical categories. The most interesting HPSG work that we are aware of for a theory of lexical categories is Malouf (2000), who analyzes gerunds in English as being simultaneously nouns and verbs within HPSG's characteristic type hierarchy.

3. Strategic issues going forward

So far we have surveyed briefly those views of the lexical categories that have strong historical roots and are relevant on the current linguistic scene. Now we bring the article to a more synthetic conclusion by commenting on two issues whose general importance seems to be growing clearer, and which a better understanding of may help the field to advance along both formal and functional lines.

3.1 Parts of speech and different linguistic units

One positive consequence of Distributed Morphology's view about categories, mentioned above, is that it calls attention to a deep-looking issue regarding the nature and universality of the lexical categories. This is the issue of precisely what sort of linguistic unit are claims about these matters about. When we ask "is there a discrete difference between nouns and verbs?" or "do all languages have adjectives?" are we asking about roots (or other morphemes), or stems (words minus their inflection), or fully-inflected words, or the atomic units in a syntactic representation? These are logically different questions, and they could have very different answers. DM's category-neutral root hypothesis raises this issue by clearly distinguishing roots from words (which it takes to be larger syntactic constructs), thereby inviting debate about which units are the ones out of which a syntactic representation is formed.

With this in mind, Baker (2015b) reflects that perhaps there is a discrete and universal difference between nouns, verbs and adjectives qua the atoms of syntactic representation, but a continuous and probabilistic difference between roots as to whether they are likely to be inserted into noun, verb or adjective positions. In contrast, the question doesn't even properly arise for complex words, which may be made up of several units, each with its own syntactic category. It stands to reason, then, that to make progress on questions about the nature of the lexical categories, linguists will need to be very clear about what linguistic units their claims are about.

The DM distinctions concerning root and word have also facilitated works like Arad (2003) and Chung (2012), which draw a distinction between roots that are truly neutral between (say) noun and verb and roots that are intrinsically nouns but can be converted into verbs without overt affixation. If these two possibilities are in fact distinct, this could have great importance for clarifying controversies about the status of lexical categories in many languages, as Chung (2012) emphasizes. Instances of converting a word from one category to another should not be confused with instances of a language not distinguishing categories (see also Evans and Osada 2005). This is essentially the same as Croft's (2000, 2001, 2005) point, challenging the validity of Hengeveld's flexible type of category system, that linguists must take into account the fact that lexical stems that occur in multiple functions often undergo major semantic shifts when they do so.

The DM focus on the distinction between root, stem and word also leads us to re-examine what sort of grammatical unit Croft's theory of parts of speech, as an example of a typological theory, is actually about. Croft uses both structural coding and behavioral potential to uncover crosslinguistic universals about parts of speech. Structural coding can be expressed syntactically, for example by copulas in predication constructions, or by derivational morphology, for example by nominalizing affixes in referring constructions.

Hence structural coding applies essentially to roots. Behavioral potential can be expressed syntactically as well, for example by articles for definiteness in referring constructions, or inflectionally, for example by tense-aspect inflections in predication. Hence behavioral potential applies essentially to stems. The theory as a whole is best described as applying to words, but requiring examination of their internal morphological structure as well as their syntactic combinatorics. Finally, Croft's theory draws the same contrast that Baker does between parts of speech as discrete categories, defined by distribution in the propositional act constructions, but a lexical (semantic) continuum with respect to the occurrence of lexical items into propositional act constructions with minimal structural coding and maximum behavioral potential.

3.2 Parts of speech and understanding distributional criteria

One unifying theme across the various theories we have reviewed is that both functionalist and formalist works build on the structuralist tradition of identifying lexical categories on the basis of distributional tests. Indeed, it is not clear that either research tradition has gone very far in productively rethinking this legacy. And there is some reason to advance further, we believe. In principle, every construction in every language can count as a distributional test for the elements that are included in that construction. Therefore, there are many many potential distributional criteria that could be used, and intrinsically different ones in different languages. The question arises, then, how to decide in a principled way which distributional tests to base one's theory of lexical categories on from this apparent wealth of material. This is the challenge to avoid "methodological opportunism", posed by Croft and Haspelmath in work reviewed in section 2.2.2. The general problem has two logically distinct aspects. One is the problem of meaningful comparison across languages, given that it is in principle impossible to apply the same tests in different languages, distributional tests being intrinsically language-specific. The other is which distributional criteria to build on in a single language, when different criteria can (and often do) suggest categories that may substantially overlap, but are not identical. We believe that these challenges show that there must be more to a theory of lexical categories than just a list of distributional criteria, shallowly understood. Rather, there must be a deepening theoretical understanding of the constructions used as tests and how they relate to the categories, as well as the categories themselves, which can be used to guide the research. To flesh this out, we discuss the two subchallenges in turn.

3.2.1 Cross-language comparison

Distributional tests are inherently language-specific, because they are defined by the distributions of particular items in particular languages. As such, there is no such thing as applying the same distributional test in two different languages. But if the distributional tests are language-specific, then it seems like the category distinctions that they bring to light must be language-specific as well. What sense, then, can it make to say that (for example) the same noun-verb-adjective distinction exists in two different languages, much less a strong universalist claim that it exists in all languages?

A way forward on this, we suggest, is to think not in terms of using the *same* distributional tests in all languages (which is impossible), nor in terms of using *entirely different* tests in different languages (which makes the languages technically incommensurable), but to think in terms of using *similar* distributional tests in different languages. Here the notion of a similar distributional test should be based on something more than the subjective impressions of individual researchers; rather it should be a kind of more or less objectively measured similarity, undergirded by one's linguistic theory of choice. Functionalists and formalists may proceed a bit differently at this point, but they need to make similar moves.

For functionalists, it is natural to get the necessary notion of crosslinguistic similarity of constructions out of lexical semantics and pragmatic function, since these are central to the functionalist theoretical enterprise. Most functional-typological linguists use semantic and pragmatic translation equivalence for crosslinguistic comparison. In addition, Haspelmath (2010a,b) proposes that there exist comparative concepts which are crosslinguistically valid but not purely semantic. Some comparative concepts are defined by a combination of semantic and morphosyntactic traits, where the morphosyntactic traits must be defined in crosslinguistically valid terms, e.g. zero vs. overt coding of a semantic category. Croft (2014, 2016) adopts Haspelmath's proposal and suggests that two types of "hybrid" comparative concepts are useful in typology and universals: *constructions*, namely all linguistic forms across all languages that encode a specific meaning or function; and *strategies*, namely a subset of linguistic forms across languages that share not only a specific meaning but also certain formal traits (e.g. an overt copula in predication; cf. Keenan and Comrie 1977; Givón 1979; Stassen 1985, 1997).

Croft's and Haspelmath's positions appear to completely dissociate lexical categories of particular languages and their constructions from the traditional notion of crosslinguistic part of speech categories. However, universal concepts for noun, verb and adjective are derived from crosslinguistic comparison of the distribution of words denoting various lexical semantic classes in propositional act constructions that differ in their morphosyntactic strategy (zero vs. overt coding, etc.). The crosslinguistic comparison of language-specific lexical categories uses the semantic map model (Croft 2001, 2010c; Croft and Poole 2008; Haspelmath 1997, 2003 and references therein; Regier, Kheterpal and Majid 2013).

The semantic map model maps distributionally defined grammatical categories within and across languages into a conceptual space of the meanings expressed by the linguistic forms. For example, Rogers (2016) compares the variation in distribution of 49 object, property and action concept words across the propositional act and grammatical semantic category constructions found in eleven languages, using multidimensional scaling. His study confirms the ranking of property concepts given in (1). Rogers also shows that the object and action concepts cluster much more tightly than the property concepts with respect to their nominal and verbal distributional properties, though there is also a clear pattern among object concepts, such that concepts higher in the animacy hierarchy are more prototypically nouns in their distribution.

Comparative concepts provide the basis for identifying similar constructions across languages, and similar formal properties of those constructions. By holding semantics and pragmatics fixed in crosslinguistic comparison, the consequence is that the language-specific lexical categories defined by functionally similar constructions vary,

sometimes considerably. However, the variation is constrained in such a way that Croft is able to posit the—in fact commonsensical and widely assumed—typologically unmarked distribution of lexical semantic class in propositional act constructions. Much remains to be done to provide explicit definitions of comparable constructions across languages, and thus much remains to be done in discovering patterns in the distribution of lexical items in those constructions; but doing so will allow functional-typological linguists to develop theories of the major parts of speech as well as other lexical categories.

Like functionalists, formalists can also use lexical semantics to identify categories across languages, at least to some extent: it is reasonable to say that category A in language 1 revealed by tests {a, b, c, ...} is the same as category B in language 2 revealed by tests {x, y, z, ...} if the natural translations of many words in category A in language 1 are in category B in language 2; see Chung 2012 for a recent example. But formalists might also worry that the subtleties of lexical semantic meaning in a given language are as hard to establish as anything else, and they might try to get a similarity metric for constructions on more syntactic grounds. Within the generative idiom, test A in language 1 would be similar to test B in language 2 if test A is the result of a set of theoretical principle(s) X applied to characteristic structures of language 1 and test B is the result of applying the same set of theoretical principle(s) X to characteristic structures of language 2. If tests that are similar in this sense give similar partitions of words into categories, it could make sense to equate the categories across the languages, without necessarily making crucial reference to lexical semantics or pragmatic function. This in turn might be enough to ground serious claims about the universality of parts of speech systems.

As a possible example of this style of thinking, consider Chung's (2012) recent study of lexical categories in Chamorro. She takes the prudent neo-structuralist path of using Chamorro-specific tests to identify lexical categories, without trying to relate those tests to other languages or to derive them from general theoretical considerations. This is a sound starting point. But some of her language-specific tests look decidedly familiar from a crosslinguistic perspective. For example, Chung shows that a distinction between nouns and adjectives shows up in Chamorro in incorporation structures of a particular kind. From the point of view of Baker's (2003) study, this is not surprising: incorporation structures also reveal a noun-adjective distinction in languages like Nahuatl and Greenlandic, and a theory of why incorporation structures should reveal a difference is available by combining existing theories of lexical categories, functional categories, and incorporation (see Baker 2003:177-179). Incorporation structures in Chamorro are certainly not identical to incorporation structures in Nahuatl or Greenlandic: for example, incorporation in Chamorro is limited to existential and possessive verbs, whereas in Greenlandic it happens with a large but closed set of "postbase" verbs, and in Nahuatl it happens with an open class of verb roots via productive compounding. But even though the distributional tests of incorporation are not the same in these three languages, they are not unrelated either: they are similar distributional tests in the precise way that they are all partially explained (Baker claims) by a general theory of incorporation. A similar point can be made about Chung's agreement test for the distinction between nouns and other categories: agreement in Chamorro is not the same as agreement in any other language, but it might be similar enough to ground identifying categories across languages inasmuch as it falls under a general theory of agreement, such as Baker's

(2008). However, as for the functionalist, the formalist still has much to do to understand and map out exactly which constructions across languages are similar to each other in this way—for example, it is not clear how Chung’s definiteness test for verbs as opposed to adjectives and nouns relates to known phenomena in other languages, so as to justify its use in a general theory of lexical categories.

3.2.2 Choosing from the “wealth” of tests

Finally, we turn to the other side of the challenge to avoid “methodological opportunism”: the concern that if every construction in every language defines one or more lexical categories, and if those categories do not in general match up exactly, the topic of lexical categories fragments and trivializes. Therefore, one must select among the various distribution criteria, and one must do so in a way that is principled, not ad hoc. What this means, we believe, is that one must have a theoretical basis for choosing the distributional criteria that define lexical categories, and apply those criteria consistently across languages. Here again, the type of theory used to do this will vary between formalist and functionalist approaches, and between different scholars within each approach. Here we briefly describe how our respective theories would approach this, as examples.

For the formal linguist, the need for an overarching theory to guide one’s particular analytical choices in a partly top-down fashion is not very controversial, but part of normal practice. Suppose that one discovers two possible tests for an adjective-verb distinction in a given language, X and Y, and they give slightly different partitions of the lexicon. Which does one trust? In terms of Baker’s (2003) theory, one might ask whether X or Y relates more directly to the property of a lexical item taking a specifier, his defining difference between verbs and adjectives. If whether a word has a specifier or not has clear relevance to construction X according to a chain of theoretical-deductive reasoning, but there is no obvious connection between having a specifier and construction Y, then one uses construction X, not Y. In short, one lets the theory decide. (And ideally one figures out what Y hinges on too, hopefully some other theoretical distinction, either in whole or in part.)

“Letting the theory decide” might be a less familiar tactic within functionalist approaches, but Croft shows how it can be done. His theory of parts of speech is based on the function of the propositional act constructions. For him, the theory of parts of speech is a theory of propositional acts and of how lexical concepts of different types are used in different propositional acts. In this theory, the lexical categories of interest are those defined by their distribution in referring, predication and modification constructions. If a language has more than one such construction for a propositional act function, they are compared by their strategy: overt vs. zero coding of predication, etc. In addition, the distribution of lexical items in grammatical semantic constructions (number, definiteness, indexation/agreement, tense, aspect, modality) is also considered relevant to parts of speech in Croft’s theory, applying to the behavioral potential of words in their respective propositional act constructions. The lexical categories defined by similar constructions across languages vary from language to language. However, the crosslinguistic evidence indicates that they are constrained by the principles described in section 2.2.2. The constraints lead to a universal model of the relationship between lexical semantic class

and propositional act constructions that makes reference to noun, verb and adjective prototypes. In other words, the empirical evidence indicates that there is a universal theory of parts of speech in terms of the relationship of lexical concepts to propositional acts, although the lexical categories in particular languages vary.

4. Conclusion

Parts of speech theories can be empirically tested by examining and comparing distributions of lexical items across constructions (tests) within and across languages. This comparison can be fruitful where guided by a theory of parts of speech, formalist or functionalist, that determines which tests or constructions among the many possible are relevant to evaluating the theory. Through careful analysis of the relevant tests or constructions, one can imagine discovering that the same fundamental category distinctions between noun, verb, and adjective might be found in all natural human languages. Although we are a long way from being able to carry this out in total, we can see beginnings of it in existing work, and one can be optimistic that it will lead somewhere. Croft (2001) and Baker (2003) both see this as a real possibility, despite their extensive differences in methodology and conception.

This then is a future direction for work related to lexical categories, in whatever framework. We suggest deeper thought/research into the nature of the distributional tests that form the evidence source for essentially all work on lexical categories. As we understand more about the nature of these tests, including which particular ones are similar to others in principled ways, and which ones shed more light on the nature of parts of speech, it is to be hoped that we will understand the parts of speech themselves better, and that some of the seemingly never-ending controversies that have beset this topic will come to be empirical questions indeed—questions which our increasing empirical knowledge of the diverse languages of the world will resolve.

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