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We have at any moment only those thoughts for the words which we have to hand. —Nietzsche

Introduction

Word formations, the building blocks in the cognitive architecture through which we express inferences, seem to follow predetermined structural formulas and semantic patterns. As we have previously discussed (in Part 1: The Nature of Syntax and Morphology), prior to Chomsky's publication of Aspects of the Theory of the Syntax (1965), henceforth referred to as Aspects, these morphological formulas and patterns were commonly accepted as being subcomponents of syntax. Identifying and analyzing morphologies, from their most complex syntactical computations to their simplest phonemes, was exemplified in Ferdinand de Saussure's posthumous publication of A Course in General Linguistics (1916/1959). The impetus of Saussure's work was "to determine the forces that are permanently and universally at work in all languages, and to deduce the general laws to which all specific historical phenomena can be reduced." What emerged from these pursuits in the first half of the 20th century became known as Structuralism. The methodology that arose under this rubric primarily sought to observe, to record and to classify the disparate elements in the structures of all the known natural languages. Furthermore, Structuralism assessed the natural languages in terms of their social features, which exist in the collective mind of a given language community. In this view, the morphology of words in a language community was seen to be held as a subcomponent of its particular syntax. In Aspects, Chomsky first considered the notion of a prescribed...
model of grammar consisting of discrete linguistic levels, which included a lexicon distinct from the operation of syntax. Followed up by Remarks on Nominalization (1970), henceforth referred to as Remarks, Chomsky first suggested that ‘word systems’ may require a separate system of generation, as opposed to the ‘phrase system’ produced in syntax. He observed that Derived Nominalizations (DNs), originating from verbs, do not appear to have the phrasal properties of the verbs from which they are derived. For example, let’s examine DNs contrasted with comparable gerunds:

(1) a. *her stupid refusing the offer
   b. her stupidly refusing the offer
   c. her stupid refusal of the offer
   d. *her stupidly refutation of the offer

Clearly, we can observe that the gerund in (1a) is not grammatically equivalent to the DN in (1c). Unlike the DN in (1d), the gerund in (1b) is modifiable by an adverb. While the verbal character of gerunds has never been called into question, the verbal nature of the DNs appears suspect. Chomsky suggested that while-ing gerunds appear to be obviously nominalized in the syntax, other types of DNs, such as refutation in (1d) and refusal in (1c), are perhaps transformed morphologically in the lexicon, from the base verb refuse. The problem that Chomsky observed was that if we suppose the DNs and gerunds are both derived from syntactical components in the same way, the disparity in their equivalence would seem unexpected. Chomsky concluded that transformations of DNs like refusal and refutation are demonstrably different from gerunds like refusing. Therefore, there must be some form of an undetermined lexical transformation between nouns and verbs. It would appear that gerund phrases have a similar structure to that of verbal phrases, whereas DNs have the structure of noun phrases. Thus, DNs appear to pose an enigmatic obstacle to the notion of verb transformations being exclusively syntactic, the implication being that a DN like refusal, unlike the gerund refusing, is not derived syntactically, but rather lexically.

While the nominalization of gerunds is clearly a product of syntactic transformations (the affixing of -ing), after the publication of Remarks, it became difficult to view DNs as having synonymous properties. Subsequent publications gravitated toward a hypothesis where base verbs like refuse and DN nouns like refusal share a different lexical category, which is separate and distinct from syntactic transformations. For the most part these lexical approaches were not meant to deny syntactic affixations, but rather an attempt to explain the uniform mechanisms of structural case assignment (i.e. true nominalizations).

Discussion

In response to Remarks, efforts to establish linguistic levels for word morphology emerged, in which syntactic transformations have no accessibility to insert, delete, modify, or supplant the sub-elements of words. One of the first, and perhaps most rudimentary, was Halle’s Prolegomena to a Theory of Word Formation (1973). Halle proposed that the syntactic component has direct access to a limited linguistic level, which he termed “the dictionary.” By this he deemed that syntactical transformations can only take place on wholly formed words, rather than from the sub-elements of a word’s morphemes. Halle viewed words and sentences as operating in fundamentally different linguistic environments. “In general, one uses familiar words, words one has heard and used before, and one does not expect to use or encounter new words, whereas one rarely uses sentences that one has encountered before” (p.16). Halle postulated a lexicon model which consisted of linear strings of morphemes without internal structure. In Halle’s model, words emerge as [STEM + AFFIX] or [AFFIX + STEM] to create words like: [serendip + i + ty] or [be + lieve].

(2) a. serendip + i + ty vac + ant tot + al bro + ther hand + some be + lieve

(Halle, 1973: 10)
Thus, each word emerges not only assigned to the appropriate lexical category, \([\text{serendip} + i + \text{ty}]\) as a noun, whereas \([\text{be} + \text{lieve}]\) as a verb, but they must also provide semantic and syntactic information about the word, in the manner it interacts with other words. From this perspective of performance, the function of the rules of syntax and phonology differ fundamentally from the function of word formation. Halle also postulated that all phonological rules that apply in word formation are also subject to reapplication in syntactic rules. Thus, phonological components require two distinct divisions of labor. First they are constrained below the surface, before words emerge out of morphemes into the dictionary, and then are once again constrained in the surface forms of sentence construction.

Jackendoff (1975, 1997) presented a well-developed model in which all words, both the morphologically simple and the complex, are encompassed in a separate lexicon. This model stipulated that syntax, phonology and semantics, while independent of each other, are connected by interfacing systems. Thus, the lexicon contains overlapping or redundant components that can also be found in the syntax. He sought to “determine the amount of independent information added to the lexicon by introducing a single new lexical entry” (Jackendoff, 1975, p.643). The method he proposed for discerning what parts of these interfacing were separate and operate independent of each other was the implementation of redundancy rules. He sought to “determine the amount of independent information added to the lexicon by introducing a single new lexical entry”. The method he proposed for discerning what parts of these interfacing were separate and operate independent of each other was the implementation of redundancy rules. He sought to “determine the amount of independent information added to the lexicon by introducing a single new lexical entry”. The method he proposed for discerning what parts of these interfacing were separate and operate independent of each other was the implementation of redundancy rules. He sought to “determine the amount of independent information added to the lexicon by introducing a single new lexical entry”. The method he proposed for discerning what parts of these interfacing were separate and operate independent of each other was the implementation of redundancy rules. He sought to “determine the amount of independent information added to the lexicon by introducing a single new lexical entry”.

The role of morphology in Jackendoff’s system is twofold. First, the redundancy rules have a static role, which is to describe morphological patterns in the language, and thus to account for word-structures. In addition to this primary role, morphology also assumes a secondary role, in the sense that it can be used to produce new words or to analyze words that are not present in the lexicon. In this respect, Jackendoff (1975, p.668) notes, “lexical redundancy rules are learned forms or generalizations that are observed in previously acquired lexical items. Once learned, they make it easier to learn new lexical items.” In other words, redundancy rules can also function as word formation rules.

By separating morphological and semantic redundancy rules, form-based relations can be distinguished from their semantic overlap. Consider the following example:

(3) a. Semantics: [CAT] b. Semantics: [PLUR ([CAT])]
   Syntax: N  Syntax: [Npl N, pl]
   Phonology: /kæt/  Phonology: /kæt/ /s/

(4) a. Semantics: [SHEEP] b. Semantics: [PLUR ([SHEEP])]
   Syntax: N  Syntax: [Npl N, pl]
   Phonology: /ʃiːp/  Phonology: /ʃiːp/ /s/

As we observe above, the semantic, syntactic and phonological interfaces in (3a) and (4a) overlap, however, the phonological interfaces in (3b) and (4b) are divergent. It does not follow that if syntax interface requires [Npl N, pl] that the phonological interface must require /.../ /s/. Thus, Jackendoff’s model of redundancy rules justifies the claim that disassociations between syntax, phonology, and semantics can exist.

In contrast, Aronoff (1976) offered a lexical model that was similar but not identical to Halle’s. A central
feature of this model was that morphological processes
seem to be applicable to words but not their sub
elementary morphemes. In this view morphemes that
may otherwise be meaningless only enter the lexicon
when combined to form meaningful words. This
separation of linguistic levels held that while words
were in the lexicon, affixes were merely parts of the
rules that govern the lexicon, not actual lexical items.
Termed the Unitary Base Hypothesis, this model posited
a Word Formation Rule (WFR) as a type of instruction
that functions to change the category of a base word to
another category. The WFR interfaces phonological
and semantical rules to transform the base word into a
derivation of a new category.

(5)  

Base Word  
|↓|  
Phonological Rules → WFR ← Semantic Rules  
|↓|  
Derived Word

In this model, the interface of the WRFs is
permutation of phonological rules that contribute affixes
and suffixes and semantical rules, which augment
meaning of the base (e.g. noun → adjective). In Arnoff’s
perspective, the conformity of morphological rules is the
determining factor in the production of a language’s
ever growing complexity of words. This model makes
three stipulations: 1. the emergence of base words
occurs at a predetermined lexical, as opposed to
syntactical, level; 2. base words are maintained in a
distinct lexicon; 3. only deviations of base words (not the
emergence of the base words themselves) are
constrained at a syntactic linguistic level.

Arnoff’s model is essentially one concerning the
production of word derivations, which requires firstly a
definitive separation and secondly an interface between
morphology and syntax. A central notion of Arnoff’s
proposal is that the lexicon is composed of wholly-
formed base words, and morphemes exist only as sub
elements of words. Thus, while morphemes are
suggestive of meaning, actual meaning is an exclusive
feature of the lexicon. However, if we attempt to solely
analyze words in terms of their morphemes, we are
often imperiled with isolated strings of impenetrable
meaning. Such arbitrary intersections of phonology and
semantics are clearly observed in the so-called
cranberry-morphs1) in (6a).

(6)  

a. cranberry  huckleberry  
b. strawberry  blackberry

All of the words in (6) refer to types of ‘berries’,
however, by abstracting the unbounded morpheme
berry in (6a) we are left with the independently arbitrary
and meaningless bounded morphemes cran and huckle.
As opposed to (6b) in which the same abstraction retains
the base words straw and black. Furthermore, at the
stem (bounded morpheme) level, if we hold morphemes
to be meaningful lexical items of the natural languages,
we face the conundrum of determining from which
stage in the life of a stem is its actual meaning derivable.
For example let’s consider the decedents of the Proto-
Indo-European etymon -bher.

(7)  

a. X + fer: refer, differ, prefer, transfer  
b. X + ber: gebären, беременная (beremenennaya)

The English stem -fer in (7a), from its Latin root –ferre,
also retains the Proto-Indo-European etymon -bher in
(7b), meaning to carry or to bear. While we may be able
to easily extract the meaning carry in a verb like
transfer, it seems less likely a reduction from the verb
differ would yield a similar conclusion. This would be
made all the more inexplicable with additional affix
derivations such as the noun different. Not to mention
the lineal traits of the stem -bher, in words like the
German verb gebären, meaning to bear, to give birth to
gender, or the Russian noun беременная (beremenennaya),
meaning pregnant. The notion that a single stem is
capable of yielding words with such diverse meanings,
as to differ (7a) or to give birth (7b) lead Arnoff to posit
that the meaning of a word cannot be restricted to the
sum of its morphemes.
Aronoff’s hypothesis, of a word-based morphology as opposed to morpheme based theories of meaning, stipulated that the meaning of words must exist in a lexical category separate from their morphemes. If we were to analyze words exclusively at the linguistic level of morphemes, we would often be left with either isolated strings, from which no meaningful elements can be derived, or words that share a similar stem, but have bifurcated meanings, with little or no synonymous association.

Let us then, propose a tentative hypothesis, that a great many items appear in the lexicon with fixed selection and strict subcategorization features, but with a choice as to the features associated with the lexical categories noun, verb, adjective.

(Chomsky, 1970, p.190)

At Chomsky’s prompting, two schools of thought in respect to distinguishing a lexicon which precedes syntax emerged. The first, led by Halle (1973) would contend that morphology and syntax are completely distinct linguistic levels. Those linguists assessing that both derivation and inflection belong to a category (termed the lexicon) separate from syntax, would became known as The Strong Lexicalist Hypothesis (cf. Jackendoff 1975, Lieber 1980; Williams 1981; Kiparsky 1982; Selkirk 1982; Levin & Rappaport Hovav 1986; Di Sciullo & Williams 1987). The second group, known as the Weak Lexicalist Hypothesis, followed the more mixed approach of Aronoff (1976). The premise behind this hypothesis assumes, while there is separation between word formation and syntax, there is nonetheless an interface amid morphology (derivations of the lexicon) and inflections of syntax (cf. Wasow 1977; Anderson 1982; Baker 1988; Booij 1996; Dubinsky & Simango 1996).

In reaction to both the Strong and Weak Lexicalist Hypotheses, Distributed Morphology (DM) (cf. Halle & Marantz 1993; Harley & Noyer 1999; Marantz 1997, 2001; Embick & Noyer 2007; Siddiqi 2009), proposed that there is no separate or distinct lexicon, but rather that morphemes are distributed in part pre-syntactically and in part post-syntactically.

Two central features of DM included: 1. Late Insertion, which refers to the hypothesis that the phonological expressions of syntax are purely abstract with no pre-phonological content, which instead occur post-syntactically. Only after syntactic mappings are applied to phonological forms is phonological “Output” identifiable. We will henceforth refer to these mappings as terminals (i.e. the point where expression originate and terminate). 2. Syntactical Structures All the Way Down, which alludes to the notion that compositions of grammar and word formation occur both above and below the linguistic level of syntax. DM focuses attention on the syntactic relationship between phonology, semantics, and morphology.

(8) Generic Architecture of DM

Derivations of Syntactic Interface
Phonology                  Semantics
           \                                  /
Morphology                   Output
                     \                             /
                      Morphantsm

In DM the derivation of words, from the simple to the more complex, is a syntactic process involving abstract phonological forms and general semantic principles. The resultant output is the product of morphological syntax. A key measure of this morphology, conceived of as the mapping from syntax of unitary morphemes to phonological forms, is the pairing of semantical terminals with phonological representations (i.e. word derivations). Each morpheme represents a unit of complex phonological and semantic features.

The theory of DM strove to illustrate that words are not occupants of any exceptional linguistic level. A primary goal of DM was to expose the notion of a lexicon, as a second generative system distinct from syntax, to be a redundant violation of Occam’s razor. Making special assumptions about the atomic nature of words requires additional assumptions about a particular
linguistic level, which could be explained with a less complex description. DM was an attempt to make the unassuming explanation for the existence and the derivations of words—mainly, morphological structures are simply syntactical structures. If this theory is true, then there is actually no interface between morphology and syntax; there is only syntax all the way down. Furthermore, the internal structure of words is just another linguistic level of syntax.

Conclusion

The hypothesis of an objective lexicon posits, more than just perceptual sub-units of meaning residing in a syntactical string, words are demonstrable entities that belong to a distinct lexical order. The central contention of DM is that there is no divide between the derivation of words and the emergence of sentences. Syntax is a single overarching generative engine; phonological forms, semantics and morphological functions do not exist or operate in separate realms.

Whereas, a lexical view assumes that sub elemental morphemes comprise meaningful atomic structures classified as words, a DM framework assumes that morphemes are merely the building blocks of syntax. This approach challenges the traditional notion of the lexicon as a category where derived words are formed and idiosyncratic word-meanings are deposited. In DM there is no distinctive Lexicon, pursuant to the formation of words, but rather principles ascribed to the Lexicon are distributed among the other components of grammar. A more detailed analysis of these differences is still forthcoming. However, as noted above, a theory with one component is generally preferable to an explanation that requires two. While the Lexical Hypothesis is a reasonable attempt to explain the origin of words, its need for complexity increases the likelihood that future theories will undermine its central principles.

Notes

1) The term cranberry morpheme was coined by Leonard Bloomfield in An Introduction into the Study of Language (1933).

References