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Book Review: Elisabeth O. Selkirk, *The syntax of words*

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Introduction

The *Syntax of Words* provides a new insight into the study of the structure of words and the system for generating that structure. This treatment is a firm departure from the hitherto traditional notion in the study of morphology which considers words as part of a language's syntax or grammar and not having its own syntax. But as the author argues, the categories involved in word structure are distinct from those of syntactic structure, and that these two types of structures combine in significant ways. This study thus focuses on the word structure rules along with the structures they define. She presents a general theory of word structure which she exemplifies and defends by the

application of facts about compounding and affixation. Her analysis centres solely on English.

Book Summary

In chapter one, the author begins by making a categorical statement that word structure has the same formal properties as syntactic structure and that it can be generated by the same rule system. She proposes that in order to identify the constituents of the word structure, a context – free constituent rewriting system should be adopted whereby word structure rules are assigned labelled tree (structural description) to every word of the language. The reasons are that this kind of constituent grammar not only captures the intuition of the native speakers that show that words have internal constituent structure which may be assigned different categories. The context – free grammar is also capable of generating all the words of a language and also shows that affixes, which are members of a certain class of morphemes, display idiosyncratic properties which are part of its lexical entry. These properties include its category, sub categorization, meaning and phonological representation. For instance, the suffix *-ity*, attaches only to an adjective, e.g. *obese*, and with it forms a noun *obesity* or the suffix *-ify*, which always constitutes a verb along with a sister adjective or noun e.g. *codify* or *purify*. To capture these distributional peculiarities within a context – free rewriting system would mean introducing each affix directly by a specific rule to it which in effect means positing a separate rule for every affix of the language:

1. $N \rightarrow A -ity$
 $V \rightarrow N -ify$
 $V \rightarrow A -ify$

Such a rule system requires rules rewriting the pre-terminal category N with elements of the terminal vocabulary. For instance:

2. $N \rightarrow code$
 $A \rightarrow pure$

However, this treatment is inadequate because it fails to assign affixes a categorical status and to capture generalizations about possible word structures in a direct way. Selkirk, therefore, proposes using the idiosyncratic properties of affixes which are listed as part of its lexical entry for the rule system generating word structure. Her treatment of affixes is analogous to the *Aspects* treatment of verbs and their distribution in the S – structure. It embodies the claim that morphological structures are labelled trees with possible self-embedding and that affixes belong to a morphological category.

She proceeds to show that certain fundamental notions of the \bar{X} theory of phrase structure (i.e. S – structure) can be extended to the theory of W – structure.

Drawing similar insights from Chomsky's (1970) \bar{X} theory of Syntax; she proposes \bar{X} theory in Word syntax which she bases on the claim that certain notions of the \bar{X} theory, a theory of S – structure are required for an insightful characterization of W – structure. The two basic ideas of the \bar{X} theory is that a syntactic category is a pair $(n, \{f_i, f_j, \dots\})$ consisting of a category type or level specification n and a feature specification $\{f_i, f_j, \dots\}$, where f_i is a syntactic or morphological feature. She calls the feature specification the category *name*. Therefore, in \bar{X} theory of Word, the symbol X is a variable standing for a set of categories names e.g. Adjective (A), Noun (N), Verb (V), etc. The subscript integer (i.e. the number of 'bars') defines the level or type of category. The second idea of the \bar{X} theory, which is related to the first, is that the phrase structures of language conform to certain restrictive patterns, the characterization of which requires the \bar{X} theory of categories. Chomsky's (1970) theory states that phrase structure rules conform in general to this schema:

$$3. X^n \rightarrow \dots X^{n-1} \dots$$

That is, every syntactic category dominates a category bearing the same, but one level down in the \bar{X} hierarchy which amounts to the claim that all S – structures have a head. In her theory of Word syntax, Selkirk extends these two basic ideas to the domain of W – syntax.

She hypothesizes that all W – syntactic categories, be they the type Word or 'lower' than word are in the \bar{X} hierarchy which makes it possible that word structure rules may be formulated in terms of these different types. But this theory only is not sufficiently differentiated to allow for the expression of a fair array of linguistic generalizations in various languages while a limited application or extension of the theory of morphological category types do provide a means of expressing them. Therefore, in her Word analysis, she makes use of both the syntactic category features ($[+ \text{Noun}]$, $[+ \text{Verb}]$) and the diacritic features $[+ \text{past}]$ for tense, $[+ \text{feminine}]$ for gender, etc. These diacritic features include those relevant to the particulars of inflectional and derivational morphology. Such features are associated with affixes which prove that affixes have a categorical status.

Selkirk states that the rules of word structure form part of what may be called the lexicon which contains a variety of components such as the dictionary, the extended dictionary and the word structure rules. The dictionary contains a list of freely occurring lexical items (the lexicon) while the extended dictionary contains a list of bound morphemes of the language. The third component includes the set of rules characterizing possible morphological structures of a language. She points out that the word structure rules along with the structures they define are her central concern. She posits that because the meaning of a word is totally unpredictable, a word and its (idiosyncratic) meaning must be paired in a list – a dictionary.

According to Selkirk, speakers have intuitions about the structure of existing words of their language which is presumed to be based on the knowledge of the word structure rules of the language. However, word structure rules do not generate words anew each time they are used. It would, therefore, be appropriate to view the word structure rule as redundancy rules or well – formedness condition on the lexical items. She imposes this condition: on every word of the language. There must exist a derivation via the word structure rules of the language.

In chapter two, the author argues for a simple context – free grammar for generating compound structures and proceeds to examine the issues of headedness of compounds. By her definition, compounds in English are a type of word structure made up of two constituents, each belonging to one of the categories Noun, Adjective, Verb or Preposition but the compound itself may belong to the category Noun, Verb or Adjective. She begins by examining the structure of noun, adjective and verb compounds all of which can be generated by the following set of rewriting rules:

4.

$$N \rightarrow \left\{ \begin{matrix} N \\ A \\ V \\ P \end{matrix} \right. N \qquad A \rightarrow \left\{ \begin{matrix} N \\ A \\ P \end{matrix} \right. A \qquad V \rightarrow \left\{ \begin{matrix} P \\ V \end{matrix} \right. V$$

5.

N	A	V
NN → <i>apron string</i>	NA → <i>head strong</i>	NV → <i>(none)</i>
AN → <i>high school</i>	AA → <i>icy cold</i>	AV → <i>(none)</i>
VN → <i>swear word</i>	VN → <i>under privilege</i>	PV → <i>out live</i>
PN → <i>over dose</i>	PN → <i>(none)</i>	VV → <i>(none)</i>

Selkirk states that this paradigm is capable of generating a range of possible compound types. Although, there are gaps to be found (as seen above), they do not stem from universal principles. Thus, the grammar of English must encode them. This means that the grammar of the compound must explicitly mention the combinatorial possibilities of categories within the compounds belonging to the different categories of Nouns, Adjective and Verb. In other words, the rules of the system must be formulated in terms of specific category names.

The head is, intuitively speaking, the nucleus of the compound. It can be identified using the Right – hand Head Rule (RHR) (Williams 1981). She revises this definition to be the rightmost category in X^n with the feature complex X:

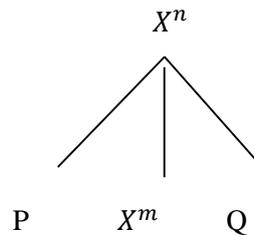


Figure 1

Where X stands for a syntactic feature complex and where Q contains no category with the feature complex X, X^m is the head of X. By doing so, she accounts for cases of right – headed compounds as well as the left – headed ones. The RHR must therefore be stated as part of the grammar of English, a parameter which is set for the language.

The head of the constituent plays a crucial role in the description of the distribution of the diacritic features related to both inflectional and derivational morphology. Specifically, a general well – formedness condition on syntactic representation commonly referred to as percolation ensures that a constituent and its head have the same feature complex (Williams, 1981).

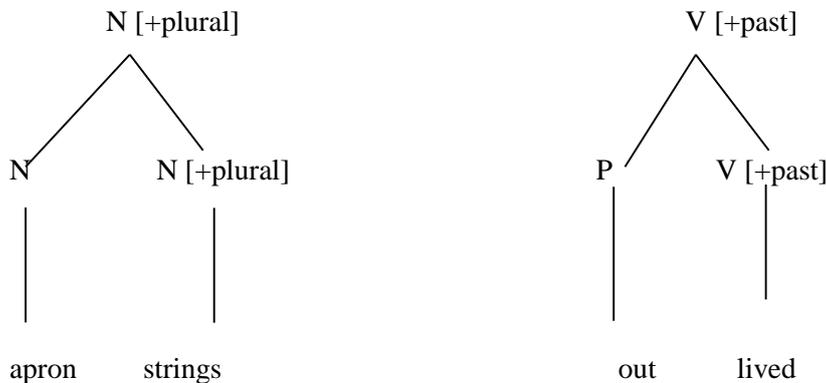


Figure 2

The notion ‘head’ is crucial in characterizing the semantics of compounds. The semantic relation obtaining between the head constituent and its sister non-head constituent can vary considerably and a general characterization of the relation is probably impossible. However, she proceeds to examine the subclass of compounds which she termed verbal compounds. She uses the term to designate endocentric adjective or noun compounds whose head adjective or noun (respectively) is morphologically complex, having being derived from a verb, and whose non-head

constituent is interpreted as an argument of the head adjective or noun. By argument, she means an element bearing a thematic relation such as Agent, Theme, Goal, Source, Instrument, etc., to the head. The author notes that these compounds display a rather specific and grammatically characterizable range of semantic interpretations. The following are examples of verbal compounds which have been grouped according to the suffix which, together with a verb base, makes up the head noun or adjective of the compound:

6.

Nouns	Adjectives
<i>-er</i>	<i>-en</i>
time-saver	hand woven
cake baker	timeworn
<i>-ing</i>	<i>-ing</i>
house cleaning	eye-catching
tin mining	nice-sounding
<i>-ance</i>	<i>-ent</i>
slum clearance	water-repellant
surface adherence	germ resistant

In compounds, a non-head constituent may qualify as an argument of the head noun or adjective just as a constituent that complement to a head noun, adjective, or verb in a phrase structure configuration will qualify as an argument of that head. The semantic relation between *cake* and *baker* in *cake baker* is the same as the relation between *cakes* and *baker* in the phrasal collection *a baker of cakes*:

cake (s) is the Theme of *baker*.

In her treatment of non-right-headed compounds, she proposes that non-head configurations are generated by the set of rules given in 4 but that they are interpreted by semantic rules specific to them. For instance, *cutthroat* does not designate a throat, but rather someone who cuts throats. Such a compound is exocentric which is contrary to the general Right – hand Head Rule.

In giving a non-transformational account of verbal compounds, she assumes that both verbal and nonverbal compounds are generated by the context – free rewriting

rules for compounds as identified in 4. For instance, a *tree eater* which is classed as a nonverbal compound would have the following structure:

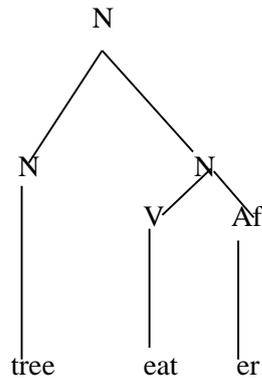
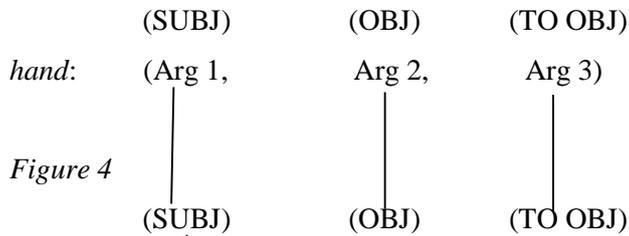


Figure 3

In developing an analysis of the interpretation of verbal compounds, she adopts the theoretical framework presented in Bresnan (1982) which has been given the name Lexical – Functional Grammar (LFG). Within this theory, the argument structure of lexical categories plays a crucial role in grammatical description and, thus, adopts her framework. This is to demonstrate that a reasonable account of the semantics of verbal compounds can be given within the framework of word syntax where compound structures are “base – generated”.

According to the theory represented by Bresnan (1982), each word has associated with it a lexical form. A lexical form consists of a predicate argument structure (“an abstract characterization of those arguments of a semantic predicate that are open to grammatical interpretation) and a designation of the grammatical function (e.g. subject, object, *to*-object, etc.) that is associated with each argument. The argument structure is the thematic relations for that predicate. In LFG, the arguments are simply identified by number. For instance, the lexical for *hand* as it appears in *Fred handed a toy to the baby* is represented thus:



She also explains that a word with a particular lexical form will be able to appear in a sentence only if, somewhat loosely speaking, for any argument *a*, which has an associated grammatical function *f*, there is, in the appropriate domain of the sentence, a syntactic phrase which has been assigned the grammatical function.

However, in interpreting verbal compounds, she proposes a set of rules (a context – free grammar) specifying the structural and morphological well – formedness of the compounds and, disjoint from this, a system of rules for defining the syntactic well – formedness of phrases. The objects generated by these autonomous rule systems have in common the property of being built out of words. These words have the same lexical form, regardless of whether appear in word structure or syntactic structure. With their predicate argument structure and associated grammatical functions, they provide the basis of the interpretation of the larger structures containing them, whether syntactic or morphological.

In her examination of deverbal nouns and adjectives, Selkirk holds that the lexical form of the deverbal noun or adjective head of the verbal compound determines the range of interpretations of the verbal compound. A very regular relation holds between the lexical form of a verb and the lexical form of an affixed constituent built on the base of that verb. Within the LFG framework, this relation will be presented in the form of lexical rule or rules which have the power of lexical forms and in particular the assignment of grammatical functions to arguments in lexical forms. For example Bresnan’s (1982) analysis of the active – passive relation, the pairing for the passive – *en* is as follows:

- en_{pass} (i) OBJ →SUBJ
- (ii) SUBJ →BY OBJ/∅

Figure 6

She considers the case of adjectives in *-able*. The transitive verb *train* must have the lexical form to allow for *The teachers trained the children*.



Figure 7

However, the lexical form of the *-able* adjective as in *The children were trainable* based on it must be:



Figure 8

Here, the teacher receives an Agent interpretation for it is in this form that it is associated with the non – SUBJ argument and may be satisfied in a compound. But in Figure 7, the meaning based on the lexical form of the verb *train* would obtain the Theme interpretation of *teacher*, given that Theme is the non – SUBJ argument of the verb.

Selkirk establishes that, first, a compound and its constituents are of the same category level and, second, that it is the categories of level Word that are involved. This is based on the assumption that it predicts the correct array of possible compound structures. It is also important in describing the distribution of derivational affixes in English; for every affix, the grammar must specify the level of the category to which it “adjoins”. Thus, the suffix *-hood*, has the sub categorization frame [N^n ____] where n is the particular level and N indicates that *-hood* attaches to a nominal constituent.

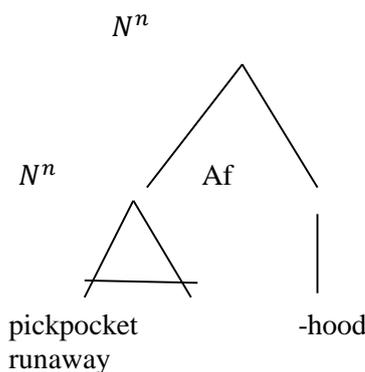


Figure 9

She also establishes that the level of the category that is sister to *-hood* and other derivational affixes in English is the same as the level of the category dominating it. Given this, along with the claim that a compound and its constituents are the same level, it is expected to find compounds containing constituents which themselves contain the *-hood* suffix.

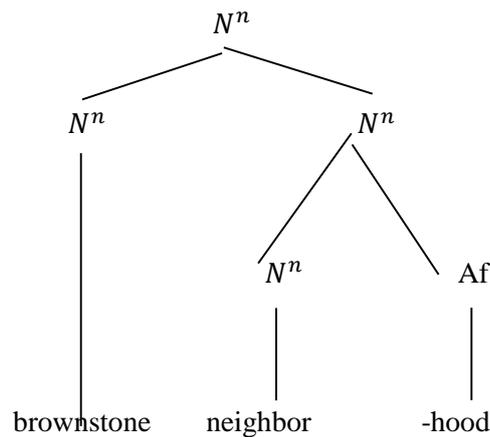


Figure 10

To determine which category type or level is involved in compounding, she claims that the category type involved in compounding is the Word. Therefore, the crucial facts she considers involve the distribution of the inflectional affixes for number, in the case of nouns, and number and tense in the case of verbs. She posits that given the assumption that an inflectional affix such as the plural marker is immediately dominated by a category of the type Word, along with the facts that (i) a plural – affixed unit appears internal to a compound and (ii) all constituents involved in compounds are of the same level, she concludes that (native) compounds in English have the general structure:

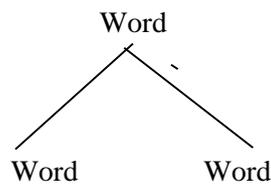


Figure 11

The affix must be associated with the compound node itself and that the affix must therefore have a word – level category as its sister, as in:

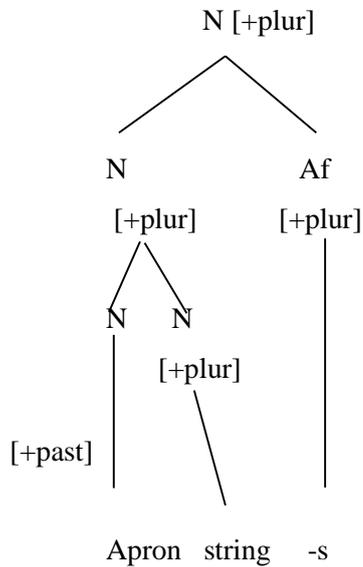


Figure 12a

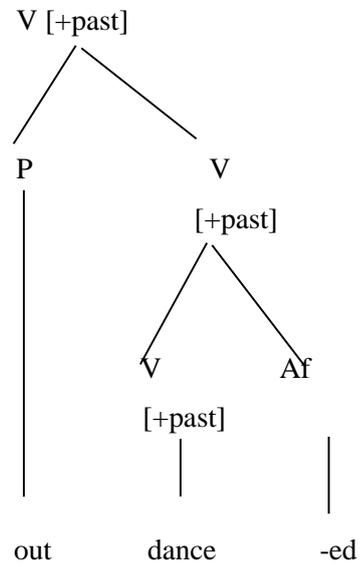


Figure 12b

Thus, Selkirk shows that a compound and its internal constituents are all of the same category level or type, and that this type is the Word, and that inflectional affixes in English are sister to a category type (inflectional) stem in English. She concludes this chapter by saying that the word structure rules generating compounds are of a different type from those generating phrase structures as words and phrases are objects demanding their own autonomous principles of combination.

In chapter three, which deals with the issue of affixation, Selkirk focuses on the structure of derived and inflected words, which involves affixation, and on the system of word structure rules for generation them. She categorically states that any theory of affixation must allow for grammars that represent explicitly and perspicuously the grammatically relevant information that is idiosyncratically associated with a particular affix item. Furthermore, she posits that the rules of affixation and the rules of compounding have the same formal properties. Her evidence for this lies in the fact that affixes “intermingle” with compounds in the word structures of English. That is to say that affixes – both derivational and inflectional – are to be found both ‘inside’ and ‘outside’ compounds. Thus, if compounds are generated by a context – free writing system, then it follows that affixed forms must be generated in the same way as well.

She identifies affixes as lexical items that can be assigned to a category and has a lexical entry like any other unbound morpheme or morphologically complex item.

The information that makes up its lexical entry can be syntactic, semantic and phonological. A particular affix displays two “syntactic” properties. The first includes the name (feature bundle) and type (\bar{X} level) of the affix’s sister category, and whether the affix is suffixed or prefixed to it. The second syntactic property of an affix is the name of the category which dominates the affix and its sister. The first property is expressed as the sub-categorization frame of the affix while the second could be expressed as the contextual feature with a sub-categorization frame. So assigning an affix a particular syntactic category may in effect also give information about the syntactic category dominating that affix in word structure.

By adopting the theory of headedness in affixed words, she makes the prediction that Percolation, the convention regarding the distribution of category features in a syntactic representation will play a role in such words and that it can be shown that the diacritic features associated with affixes, which are heads in this theory, are “induced” on the parent node domination of the affix. The distribution of diacritic features is correctly described by treating derivational affixes as heads. This is consistent with the approach that the syntactic category features [\pm Noun, \pm Verb] be allowed to form part of the feature complexes of the category Affix as well.

The semantic analysis of an affix may simply be the function involving a change in lexical form. In other cases of derivational morphology, it may not be possible to characterize the semantics of an affix fully by lexical rule(s). For instance, -able, a modal operator, whose semantic analysis involves not only a pair of lexical rules but also some characterization of the notion “able to be V-ed”. Still other derivational affixes exist for which no lexical rules appear to be relevant. In all these cases, the appropriate semantic functions can simply be listed as part of the affix’s lexical entry. This will play a role in deriving the appropriate semantic representation of the affixed constituent. However, for inflectional morphology, the grammar must provide a representation of the fact that verbs containing particular inflectional affixes will be assigned particular interpretations in terms of tense or aspect. These semantic properties have typically been seen as diacritic features of the affixes themselves. Specifically, she claims that diacritic inflections for tense, number, person, gender, etc. form part of the category to which an affix is assigned, and that these features are semantically interpreted.

In her consideration of the phonological attributes of the affix, she states that the first and the most obvious property to be represented is information concerning the pronunciation of the affix itself. This will include a distinctive feature matrix representing the underlying segmental composition of the affix as well as the suprasegmental properties such as the organization of its segments into syllables and possibly feet, or its tonal properties. Other idiosyncratic phonological properties of the affix may involve its propensity for attracting or repelling word stress, or its exceptional

behavior with respect to certain rules of the segmental phonology. It may also include their unpredictable effect on the pronunciation of surrounding morphemes.

Selkirk states that a context – free grammar seems to be quite appropriate as the model of the rule system generating the well – formed affixed structures of English, just as it seems to be for compounds. With such a model, she states that there is no limit on the possible length of the sequence of affixes in words.

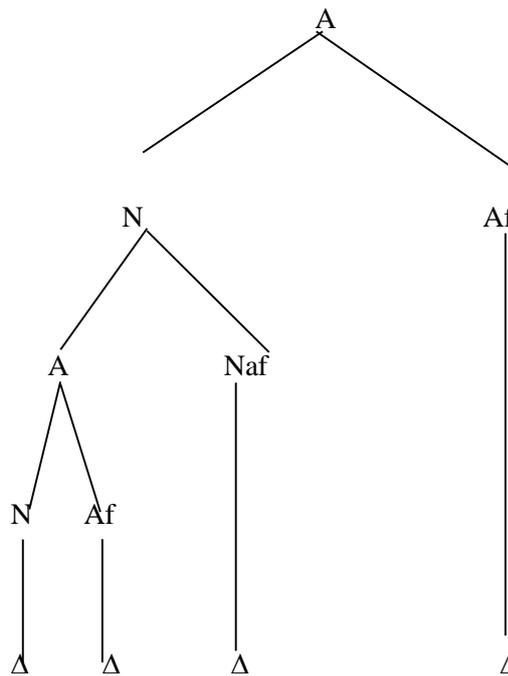


Figure 13

A context – free grammar also has the proper strong generative capacity; it assigns the proper structural description (i.e. trees, labelled bracketing) to the strings that it generates. Evidence that a labelled tree representation is necessary for affixed words is provided not only by intuition of native speakers concerning the internal structure of words but also by the processes which interpret these structures, be they semantic or phonological.

The author rejects the notion that inflectional morphology is introduced by syntactic transformations. Her reason for this lies in the fact that a principles line cannot be drawn between inflection and derivation. Also, inflectionally marked items may appear inside and outside structures involving compounding and that deriving inflected forms via transformations makes it impossible for a grammar to express real

generalizations about their shape. Finally, according to which transformations adjoin inflectional affixes in making words provide no explanation for the fact that S – syntactic transformations do not appear to perform other sorts of operations on words or parts of words, such as deletion or inversion.

She posits that the morphological component of a language must be able to specify the distribution of diacritic features within a word. She hypothesizes that this is done in part by the word structure rules themselves. For instance the following are word structure rules corresponding to each of the noun types:

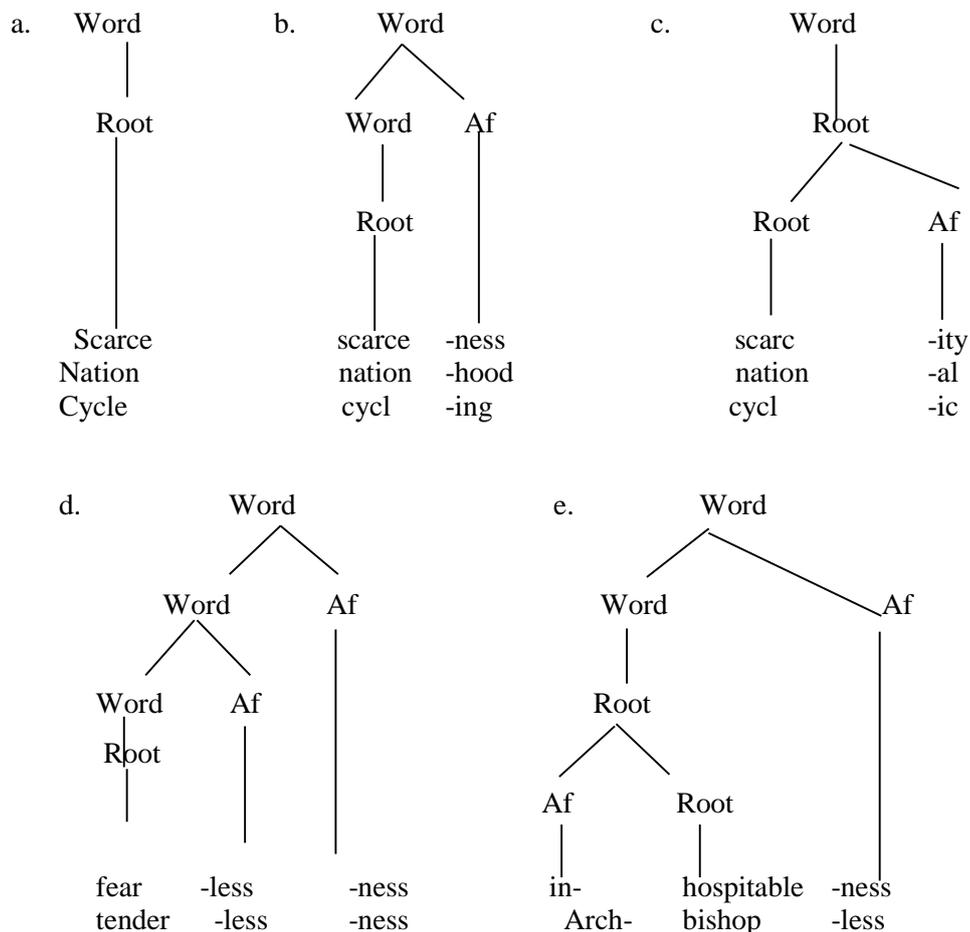
7.
 - a. N[Noun Af]N
 m case
 m plural
 m gender
 - b. N[Noun Af Af]N
 m gender m case
 m plural
 - c. N[Noun Af Af]N
 m gender m case
 m plural
 - d. N[Noun Af Af Af]N
 m gender m plural m case

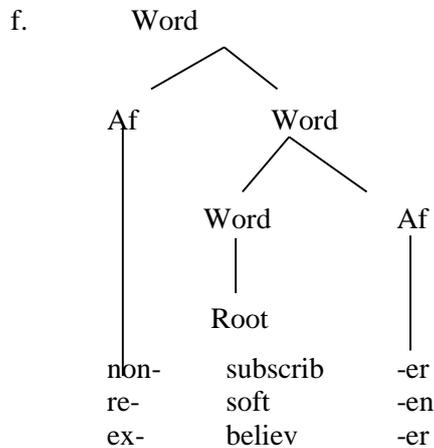
These word structure rules could be rewritten as follows:

8.
 - a. N → N Af
 m case
 m plural
 m gender
 - b. N → N Af Af m case
 m gender m plur
 - c. N → N Af AF m case
 m gender m plural

A Root (class I) affix will never appear “outside” a Word (class II) affix, for the simple reason that the former will always be generated “below” the latter. Selkirk proposes that the English word structure displays a three – way category type distinction among Root, Stem and Word. The term Root is chosen for the category type lower than the word partly in order to reserve for the term Stem its more or less traditional association with a level relevant to inflectional morphology. The Root/Stem distinction was proposed to capture the Class I/Class II affix distribution, while the Stem/Word distinction was thought to be necessary for a description of inflectional morphology and compounding. But she opines that not only is such a distinction unnecessary but that such distinction makes incorrect predictions about the facts as well. The following are some structures of English affixed words:

10.





In this system, the status of an item as a root does not imply that it is bound (that is not free to appear alone in a word and hence in a sentence, unassociated with a sister in some word structure). Here every monomorphemic nonaffix morpheme is redundantly a root, and in principle may also be a word.

However, certain types of affixes may belong to both Classes I and II. For instance, Noun prefixes are either class I/II or II and, hence, noun prefixes which are Class I (also II) may appear outside strictly Class II prefixes. She suggests a reanalysis of words as roots has permitted the affixation of nonneutral affixes. Her analysis of English compounds and derivational affixes predicts that Word affixes (class II) should be able to attach to (appear “outside of”) compound words and that Root affixes (Class II) should not be able to do so. This is given that the rules of compounding are of the general form *Word* → *Word Word* and *Word* → *Affix Word*,

It is predicted that affixes may appear outside compounds. E.g.

- Un-easygoing
- Ex-football coach
- Non-light sensitive
- Arch-war criminal

It is also predicted that only affixes which are in themselves subcategorized for sisters of type Word (i.e., Class II affixes) will be able to appear in such configurations. However, a diacritic analysis is able to account for affixes that are members of both Class I and Class II. The affixes of the two classes would have to differ in two ways: first, they would be differently (oppositely) specified for some arbitrarily chosen diacritic feature, say [\pm L]; and second, they would demand different specifications for this particular feature in the subcategorization frames. See below:

<i>Category</i>	<i>Subcategorization Frame</i>	
	<i>Prefix</i>	<i>Suffix</i>
Class I {Af; α , +L, ...}	[____ β] [+L]	or [β ____] [+L]
Class II {Af; α , -L, ...}	[____ β] [\pm L]	or [β ____] [\pm L]

(where α, β stand for a specification in terms of the syntactic category features [\pm Noun], [\pm Verb])

This is the diacritic analysis which is able to capture the basic facts concerning the distributional possibilities of affixes from the two classes. The class I affixes are assigned the feature [+L] (i.e., belonging to the category [+L]). Thus, if a class I affix is the head of the constituent, that higher constituent will also be [+L], by percolation. This analysis also specifies that Class I affixes subcategorize for sister constituents that are [+L]; that is they may attach to constituents that have a [+L] affix as head. However, they will not attach to constituents containing a head which is a class II affix; the latter are [-L], with the result that the constituent of which they are head are also [-L] and thus would not satisfy the Class I subcategorization frame. The Class II affixes, on this analysis are specified, as [-L] (and hence would not, if heads, appear inside a [+L] affix), but they are given subcategorization frames which permit them to adjoin to either [+L] or [-L] constituents; therefore, they may attach to monomorphemic bases, or bases containing either a class I or Class II affix as head.

In her final conclusion, she posits that affixes have two properties that distinguish it from the categories Word and Root. First, the category Affix seems to be pre-terminal and, secondly, it is always sister to a non-affix category type in the Word structure.

Discussion

Selkirk's analysis is based solely on the English language. She did not examine other languages upon which comparative studies may be made especially as she makes the observation that the cases of gaps in the English compound paradigms do not derive from universal principles as the compound types missing in English do occur in other languages. At this point, she stops short of giving illustration to substantiate her point.

She also posits that the English word structure can be "properly characterized solely in terms of context-free grammar". However, this does not mean that analysis or characterization cannot be done on 'context-based grammar' especially as context

– based grammar may also capture the intuition of the native speaker. For instance, context in S – syntax is needed to distinguish between the irregular verbs that do not change their forms at all to signify tense (e.g., cut → cut). Perhaps an equal examination of these grammars would be helpful to yield results for more comparative studies.

On the whole, *The Syntax of Words* offers an innovative approach to our understanding of the structure of words. She adequately formalizes rules accounting for all observed arrangements of data and explains them. Her use of diacritic features ensure that her descriptions are as detailed as possible. By drawing our attention to the syntactic structure of words, we have come to realize that words are not merely an extension of syntactic structure rather that the Word itself has a structure and a rule system which generates it. This publication would be most valuable to any linguist interested in the study of language structure as the principles advanced in this book can be readily applied in the study of other languages.

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