Abstract

This paper discusses the problem how to account for regularities in the interpretation of complex words. It will be shown that in some cases the interpretation of a complex word is not completely determined by its morphological structure, but is the result of an interaction between linguistic structure and non-linguistic information. The consequences of this 'pragmatic' approach to the semantics of word formation processes for the theory of morphology will be discussed.

1. Introduction

One of the salient features of natural languages is that they show structural parallelisms between form and meaning on two levels, the level of the word and the level of the sentence. Therefore, an adequate grammar of a language must specify how and how far (i) the syntactic structure of a sentence determines the interpretation of that sentence, and (ii) the morphological structure of a complex word determines the interpretation of that complex word. I will call a representation of the structurally determined semantic aspects of a linguistic expression (a sentence, a word, etc.) the logical form of that expression.¹

The structures of complex words are specified by Word Formation Rules (WFRs, cf. Aronoff, 1976) that create complex words from existing or possible words (cf. Booij, 1977; Roeper and Siegel, 1978).² For example, the following two WFRs can be assumed for Dutch:

(1) $[x]_N \rightarrow [\text{be } # [x]_N] \forall$
(2) $[x]_\Lambda \rightarrow [[x]_\Lambda + \text{iteit}]_N$

where $x$ stands for a sequence of phonological segments and boundaries. These rules create e.g. bedijk ‘to provide with a dike’ from dijk ‘dike’ and absurditeit ‘absurdity’ from absurd ‘absurd’.
WFRs are sometimes called 'category-changing rules', e.g. by Wasow (1977), because they introduce a new category symbol. Note, however, that this does not necessarily mean that the original category is erased. In the rules (1) and (2) the category symbols that are mentioned to the left of the arrows, 'are part of the structures mentioned to the right of the arrows. Thus this formulation of the WFRs embodies the well-known hypothesis of internal labelled bracketing for complex words. In this way, the morphological derivational history of a word is reflected by its structure.3

As can be inferred from the rules (1) and (2), I assume that every affix is associated with a boundary symbol, a weak boundary '+' or a strong boundary '#'; cf. Booij (1977) for a motivation of this distinction between two types of boundaries by means of data from Dutch.

The structural parallelism between form and meaning of complex words implies that the meaning of a complex word is, at least in principle, a compositional function of the meaning of the base word and the meaning contribution of the WFR. The meaning contribution of WFR (1) can be circumscribed as 'to provide with x' where x is the meaning of the base word. Note that the claim that WFRs contribute to the meanings of complex words correctly implies that the bound morpheme be- has no independent meaning: one cannot say anything about the meaning of be- in isolation, regardless of the word structure in which it occurs (cf. Reichling, 1967: 347).

However, not every WFR has only one meaning correlate. Some WFRs have more than one, as was pointed out by Jackendoff for the English suffixes -ion, -ment and -al (Jackendoff, 1975: 650). Moreover, some WFRs have only very vague meaning correlates. In section 2 I will give an example of a WFR with a well-defined, specific meaning correlate, in order to show how such a meaning correlate can be accounted for. In section 3, I will discuss some WFRs with very vague meaning correlates, and the implications of this vagueness for linguistic theory.

2. The semantic correlate of the agentive suffix -er

In generative grammar it is often assumed that the meaning of a sentence is the product of the interaction of the functional structure of that sentence and the meanings of the words occurring in that sentence (cf. Fodor, 1977: 4). This hypothesis is worked out by Bresnan (1978) in the following way: she assumes that a verb such as to hit is specified as follows in the lexicon:

(3) hit, V, [___ NP] NP1 HIT NP2
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‘NP₁ HIT NP₂’ is the lexical functional structure of to hit. It specifies the relation between syntactic and logical form. NP₁ indicates the grammatical function of subject, and NP₂ indicates the grammatical function of object. The grammatical function of a constituent is defined configurationally, i.e. by its position in syntactic structure. For instance, the NP that is dominated directly by the node S has the function of subject, and the NP that is dominated directly by the VP node, has the function of object.

The syntactic context in which a verb can occur, is indicated by a subcategorization feature, in the case of hit the feature [___ NP] that means that the verb hit can occur before a sister-NP. Bresnan (1978: 21) remarks that ‘the syntactic contexts appear to be redundant—that is, predictable from the functional structures’. However, she does not formulate such redundancy rules.

Furthermore, Bresnan proposes that (optionally) transitive verbs such as to eat have two specifications in the lexicon:

(4) eat, V
   (i) [___ NP] NP₁ EAT NP₂
   (ii) [___] (3y) NP₁ EAT y

That is, the logical object variable of to eat can be bound by an existential quantifier. Consequently, the semantic representation of a sentence with to eat will be well formed, although there is no specified direct object, because there are no free variables. Variables always need to be interpreted in order to get well-formed expressions (Tarski, 1964: 77). This can be done by (i) assigning the value of a constant to that variable, or (ii) binding the variable by means of a quantifier, or (iii) binding the variable by means of a sentential function.

The interpretation of a sentence such as John hits Mary with the structure [[John]NP [[hit]V [Mary]NP]VP]S is now derived as follows: first, we apply the configurational definitions of the grammatical functions to the NPs in this sentence: John = subject, Mary = object, and assign indices to these NPs. Secondly, we substitute these indices into the appropriate argument positions in the lexical functional structure of the verb:

(5) a. NP₁ HIT NP₂
    NP₁: John = i
    NP₂: Mary = j

b. John = i, Mary = j
   i HIT j

(5ii) is the interpretation of the sentence John hits Mary. ⁴)

The lexical functional structure of the verb to hit can be seen as an abbreviation for:

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This reformulation of the lexical functional structure of *to hit* is useful for the formulation of the meaning correlates of word structures.

2.1 *The logical form of deverbal agent nouns*

Let us now, given the theoretical framework above, turn to a specific type of word construction, the formation of deverbal agent nouns in Dutch, in order to illustrate how we can account for the structurally determined semantic correlate of a word construction. A representative list of deverbal agent nouns is given in (7):

(7) *Intransitive verb:*

<table>
<thead>
<tr>
<th>Intransitive verb</th>
<th>Noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>zwem (to swim)</td>
<td>zwemmer (swimmer)</td>
</tr>
<tr>
<td>fiets (to cycle)</td>
<td>fietser (cyclist)</td>
</tr>
</tbody>
</table>

*Transitive verb:*

<table>
<thead>
<tr>
<th>Transitive verb</th>
<th>Agent noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>koop (to buy)</td>
<td>koper (buyer)</td>
</tr>
<tr>
<td>bewerk (to adapt)</td>
<td>bewerker (adapter)</td>
</tr>
<tr>
<td>vertel (to tell)</td>
<td>verteller (narrator)</td>
</tr>
<tr>
<td>eet (to eat)</td>
<td>eter (eater)</td>
</tr>
</tbody>
</table>

The noun must be assumed to have the morphological structure \([x_v + e_r]_N\). The meaning correlate of this word structure can be circumscribed as 'someone who Vs'. That is, the logical form of a deverbal agent noun is:

(8) \(x [\text{sentential function expressed by the verb}]\)

Once we have added the logical correlate of a determiner to an expression of this type, such an expression is a well-formed interpreted argument, since the free variable \(x\) is bound by a sentential function. The logical form of e.g. *zwemmer* is \(\langle x [x \text{ SWIM}]\rangle\). The value assignment of the variable \(x\) in the functional structure of the verb, \(x = \langle NP_1\rangle\) is not transferred to the corresponding agent noun, because \(x\) is already bound by the sentential function.

The (optional) transitivity of verbs is transferred to their corresponding agent nouns, for instance:

(9) a. Jan is de koper (van dit huis).
    John is the buyer (of this house).

b. Jan is de bewerker (van dit boek).
    John is the adapter (of this book).
That is, agent nouns such as *koper* and *bewerker* both have two logical forms:

(10)  

\[
\begin{align*}
\text{koper, N,} & \quad (i) \ x[x \text{ BUY } y & y = \text{NP}_2] \\
\text{bewerker, N,} & \quad (ii) \ x[\exists y \ [x \text{ BUY } y]]
\end{align*}
\]

According to Jackendoff's cross-categorial definitions of 'grammatical object' ( = NP \_2) (Jackendoff, 1977: 71–72), (van) *dit huis* and (van) *dit boek* in (9) will qualify as the grammatical objects of *koper* and *bewerker* respectively. Apparently, the logical form (8) must be reformulated as follows:

(8')  

\[x \ [\text{sentential function expressed by the verb and value assignment of } y]\]

The syntactic transitivity of these agent nouns can now be predicted by a redundancy rule:

(11)  

\[y = \text{NP}_2] \rightarrow [\text{____ NP}]\]

a rule that is also valid for transitive verbs.

This analysis of agent nouns correctly expresses the fact that there is no automatic, complete correspondence between a verb and its agent noun with respect to subcategorization features, as would be expected in a transformational account of this word formation process: the transfer of transitivity from the verb to the noun is expressed explicitly by (8'). Note, for instance, that although the verb *zwem* (to swim) can occur with a directional PP, the corresponding agent noun cannot:

(12)  

a. Degenen die zwemmen naar Giethoorn…  
Those who swim to Giethoorn…

b. *De zwemmers naar Giethoorn.  
The swimmers to Giethoorn.

Of course, a transformationalist theory of word formation could describe these differences between verbs and agent nouns by adding conditions to the relevant transformation, but it does not give an explanation for these differences. On the other hand, the lexicalist theory implies that nearly every correspondence must be stated explicitly, and so we do not expect that, for instance, agent nouns can be followed by a directional PP. Only the intransitivity of agent nouns derived from intransitive verbs is predicted, by rule (11): since there is no logical argument \( y \) present, rule (11) cannot apply, and consequently the subcategorization feature [____ NP] is not assigned to these agent nouns.
The properties of deverbal agent nouns therefore support the lexicalist theory of word formation, and show that some types of word constructions have systematic meaning correlates.

3. Semantic indeterminacies in word constructions

In generative grammar, it is generally assumed that the interpretation of a phrase or sentence is partly determined by the syntactic structure of that phrase or sentence. For instance, in Dutch sentences with a copula, a Theme-Location-relation is established between the subject and the predicate nominal of such sentences (Blom and Daalder, 1977). But this is no exhaustive description of the interpretation of copula-sentences. Other semantic relations between the words and phrases of such sentences may be assumed by the speaker-hearer as well, but the claim is that only the Theme-Location-relation is established by the syntactic structure of these sentences. Every sentence has a certain inherent semantic vagueness that is removed by the context, situation-bound knowledge and general knowledge of the world.

The same semantic indeterminacy can be observed in NPs with the structure [(Det) A N_{NP}]. Such NPs show two possible types of interpretation. The first possibility is that the properties expressed by the adjective are properties of the referent of the head noun of the NP. For instance, a hungry policeman is a policeman who is hungry. This use of adjectives is called referent-modifying (Bolinger, 1967). The second possibility is that the adjective modifies one of the meaning aspects of the head noun. For instance, a rural policeman is not a policeman who is rural, but a policeman who exerts his function in a rural area. Here, the function of being a policeman is modified; Bolinger (1967) calls this the reference-modifying use of adjectives. Some adjectives can be used in both ways, e.g. criminal in a criminal lawyer. Whether both interpretations are possible, depends on the noun and the adjective. For instance, the property of being rural can only be assigned to non-animate entities, and therefore, this adjective can only be interpreted as a modification of the function of policeman. On the other hand, hungry cannot be interpreted as a modification of the function of policeman.

Some types of Dutch complex adjectives are inherently referent-modifying, for instance adjectives in -ig (e.g. vijandig ‘hostile’ from vijand ‘enemy’, groenig ‘greenish’ from groen ‘green’) and adjectives in -achtig (e.g. groenachtig ‘greenish’ from groen ‘green’, katachtig ‘cat-like’ from kat ‘cat’).

If an adjective is used reference-modifyingly, certain regularities in the interpretation of the NPs can be observed. Consider the following NPs:
(13) a. a rural policeman = a policeman who exerts his function in a rural area
b. a chemical engineer = an engineer who occupies himself with chemical processes
c. a bad violinist = a violinist who plays the violin badly
d. a good father = a father who takes care of his duties as a father
e. an eager student = a student who is eager to study
f. a historical linguist = a linguist who studies the history of languages

The head nouns in these NPs express a function, and the adjective somehow modifies this function. So the following regularity can be observed:

(14) Given a noun phrase in which an adjective modifies the reference of the head noun that expresses a function, the adjective must be interpreted as modifying somehow the function expressed by the noun.

Note, however, that this rule does not predict the exact semantic interpretation of the NPs because the nature of the somehow is not determined by rule. Miller (1978) calls such rules construal rules. He proposes the following construal rule for NPs with evaluative adjectives such as good, excellent, bad and awful:

Given a noun phrase in which a positive (negative) evaluative adjective modifies the noun, the combination is to be construed as meaning that the entity denoted by the noun has in greater (lesser) than average degree those properties required for the expected activity, use or appearance of such objects. (Miller, 1978: 104).

It will be clear now, that such construal rules do not specify structurally determined meaning correlates, but regularities in the interaction between linguistic structure and non-linguistic knowledge, i.e. pragmatic regularities.

In the next subsections, it will be shown that the same applies to several kinds of word constructions: the regularities in the interpretation of compounds, denominal adjectives and denominal verbs are also pragmatic ones, which has important consequences for morphological theory.

3.1. Compounds

The logical form of compounds, i.e. of complex words with the structure \([Y \neq X]_X\), where X and Y are variables for lexical categories, can be circumscribed as:
(15) \( X_j \) that has some relation \( R \) to \( Y \) or: \( X_j \) modified in some way by \( Y \).

Note that the formalization of the structure of compounds expresses the fact that, normally, the syntactic category of the second part of a compound determines the syntactic category of that compound. Formula (15) claims that the meaning of a compound is a compositional function of the meanings of the words that are combined in that compound, but that the nature of relation \( R \) is not determined by the morphological structure.

This position with respect to the predictability of the meaning of compounds has a certain tradition in linguistics. For instance, Jespersen (1942, volume 6:143) writes that 'the number of possible logical relations between the two elements is endless'. On the other hand, there is a tradition in linguistics, particularly in generative grammar, to claim linguistic systematicity in the possible meaning relations between the two parts of a compound. This latter tradition is embodied in the work of e.g. Lees (1960), Botha (1968), Meys (1975) and Levi (1978). For instance, Levi (1978) claims that compounds are derived from underlying structures with certain semantic predicates that can be deleted in surface structure. The compound \( \text{music clock} \), to give an example, is derived from the complex NP \( \text{clock MAKE music} \) by means of a set of transformations. Levi assumes a class of nine recoverably deletable predicates (RDPs): CAUSE, HAVE, MAKE, USE, BE, IN, FOR, FROM and ABOUT. Moreover, compounds derived from underlying structures with CAUSE, HAVE or MAKE can be derived from either the subject or the direct object of the underlying predicate. Compare e.g. \( \text{tear gas} \) (\( gas \) is subject of CAUSE) to \( \text{drug death} \) (\( death \) is object of CAUSE).

This way of deriving compounds predicts that every compound has 12 possible meanings. According to Levi, this is correct: every new compound is potentially multiply ambiguous, but disambiguated by context or extra-linguistic knowledge. Her claim applies to newly formed, completely regular compounds only. Idiosyncratic compounds are simply listed in the lexicon.

Levi adduces the following arguments for her theory of compounds: Firstly, the formation of compounds is a recursive process, and every speaker of English is capable of creating new compounds (Levi, 1978: 53). It is clear that this argument only implies that the grammar of a language must contain rules for the formation of compounds, it does not imply that these rules are transformations, or that the meanings of newly derived compounds are completely predictable. They can also be considered to be rules in the lexicon. The assumption of a lexicon with word formation rules also explains something that is accidental in Levi's theory, the fact that word formation rules do not interact with (in Levi's theory other)
syntactic transformations (cf. Levi, 1978: 139). A second argument of Levi's is the following:

Moreover, a theory which denies the existence of fundamental regularities in the formation of [compounds] could not explain the fact that speakers freely and frequently create novel [compounds] ... without having to provide explicit definitions for these spontaneous linguistic creations. If there were indeed as little systematicity to the relationships expressed by [compounds] as some linguists have suggested, both listeners and readers in normal communicative situations would have no internal resources with which to interpret such unfamiliar forms. (Levi, 1978: 53).

This is, however, no valid argument for the claim that there is linguistic systematicity in the meaning relation between the two parts of a compound. On the contrary, the productivity of compound formation can be explained by the great semantic versatility of this word formation process, since so many meaning relations between two words can be expressed in this way. Of course, a native speaker is normally very well able to determine the meaning relation between the two parts of a compound, but that does not prove that this ability is due to linguistic knowledge.

Thirdly, Levi's theory predicts that many, logically possible meaning relations between the two parts of a compound are linguistically impossible for newly created compounds. However, such impossible meaning relations may, according to Levi, be found in existing compounds formed by means of processes that are no longer productive:

For example, there is a small set of [compounds] ... which seem to have been formed on the pattern of ‘N₂ which reaches just to N₁’; this set includes knee-pants, hip-boots, waistcoat, and breast-rail (=‘the upper part of a balcony’). That this pattern is now unproductive may be seen by the impossibility in contemporary English of coining new forms such as *calf skirt, ceiling ivy, or shoulder hair to express the same relationship. (Levi 1978: 55).

This argument has been refuted by Downing (1977: 827–828), in reply to some previous publications of Levi's. Downing convincingly shows that, although the meaning relations expressed by Levi's RDPs are rather frequent in compounds, they do not exhaust the list of possible meaning relations. For example, a toe web is interpreted by some native speakers as ‘web between toes’, a cowtree as a ‘tree that cows like to rub up against’ and an eggbird as a ‘bird that steals other birds’ eggs’. Downing therefore concludes that the only constraints on compound formation are that, preferably, the meaning relation must be interpretable given a certain context or common knowledge of speaker and addressee, that the information provided by the first part of the compound should not be completely redundant (as is the case in e.g. wind-flag), and that for a
compound to get lexicalized it is necessary that the meaning relation is not temporary or fortuitous. That is, the only constraints are pragmatic constraints that ‘reflect the factors which determine the range of situations in which a given novel form may felicitously be used, and the likelihood that it will be lexicalized’. (Downing, 1977: 840). Downing also points out that Levi’s RDPs are very vague, in order to subsume as many meaning relations as possible under the nine predicates that can be deleted, and that extra-linguistic knowledge is necessary anyway for a proper interpretation of a novel compound, as Levi herself admits. Levi (1978: 99) mentions, for instance, two diametrically opposed interpretations of compounds with the RDP ‘FOR’:

(16) a. fertility pills = pills for fertility [to increase it]  
    headache pills = pills for headaches [to decrease them]  
    b. bug spray = spray for bugs [to harm them]  
    pet spray = spray for pets [to help them]

Apart from the specific objections against Levi’s theory raised above, any transformationalist theory of compounds has some serious disadvantages. Firstly, the transformationalist theory forces us to make an absolute distinction between regular and irregular compounds. The regular compounds are derived by means of transformations, the irregular ones are listed in the lexicon. That is, partial regularities cannot be expressed. Secondly, the transformationalist theory causes a proliferation of recoverably deletable predicates and will therefore impede the formulation of a restrictive theory of possible deletions in natural language (cf. Booij, 1977).

The analysis of compounds defended here also confirms the following claim by Chomsky (1979: 147):

The actual reference of linguistic expressions in real life involves the interaction of cognitive systems. And grammar is only one of these.

Carrol and Tanenhaus (1975: 58) came to the same conclusion with respect to compounds, and state their theoretical position as follows: ‘We allow that knowledge and skills of various sorts mentally interact to predict linguistic intuitions and other language behavior.’

3.2. Denominal adjectives

There is a striking correspondence in interpretation between NPs with denominal, reference-modifying adjectives and compounds. The suffix of such adjectives is semantically empty, and its only function is to relate the
meaning of its base noun to the meaning of the head noun of the NP. For instance, the phrase *gemeentelijke verordening* ‘municipal by-law’ is semantically equivalent to the compound *gemeenteverordening* ‘municipal by-law’ with the morphological structure \([gemeente]_N \neq [verordening]_N\). Some other example are:

(17) a. \([[bestuur]_N \_lijke]_A\) functie ‘executive function’ (bestuur = board)
    b. \([[professor]_N \_ale]_A\) verstrooidheid ‘professorial absent-mindedness’
    c. \([[politi]_N \_onele]_A\) actie ‘police action’

The semantic equivalence of compounds and these NPs was also observed by Levi (1978) who uses this observation to defend the hypothesis that NPs such as those in (17) and the corresponding compounds have common underlying syntactic structures. However, in the preceding section we concluded that compounds should not be derived from syntactic structures. Therefore, we must assume that reference-modifying adjectives such as *bestuurlijk*, *professoraal* and *politieel* are derived by means of Word Formation Rules. The structure of such complex adjectives determines the interpretation of NPs in the following way:

(18) In a structure \([(Det)[[N_1] \_ suffix]_A \_ N_2]_NP\), if A is interpreted reference-modifyingly, the NP must be interpreted as ‘\(N_2\) that bears some relation R to \(N_1\)’.

So neither the interpretation of these types of complex adjectives, nor that of the NPs in which they occur, is completely structurally determined. Their interpretation is, like that of compounds, the result of an interaction between linguistic structure and non-linguistic knowledge, since non-linguistic knowledge determines the nature of relation R.

3.3. *Denominal verbs*

Both Dutch and English have a very productive word formation process for the derivation of verbs from nouns without adding phonological material, i.e. by means of so-called implicit transposition. The following Dutch examples illustrate this process:

(19) a. \(N\) 
    tafel ‘table’
    zout ‘salt’
    klei ‘clay’
    water ‘water, urine’

    \(V\) 
    tafel ‘to have a meal’
    zout ‘to salt’
    klei ‘to play with clay’
    water ‘to urinate’
The process is very productive. I noted for instance the following words coined recently that are not recorded in dictionaries of Dutch:

(19) b. N V
dieet ‘diet’ dieet ‘to be on a diet’
bankier ‘banker’ bankier ‘to handle banking affairs’
lift ‘lift’ lift ‘go by lift’
carnaval ‘carnival’ carnival ‘to celebrate carnival’
creche ‘creche’ creche ‘to take care of a creche’
lek ‘leak’ lek ‘to provide secret information’
sjoelbak ‘shovel-board’ sjoelbak ‘to play with a shovel-board’
caravan ‘caravan’ caravan ‘to stay in a caravan’
service ‘service’ service ‘to render service’

Many examples of new English words derived in this way can be found in Clark (1978) and Clark and Clark (1979).

Again, the question turns up whether the meaning of the verb is completely determined by the meaning of the base noun and the meaning contribution of the word formation rule.

Two theoretical positions with respect to this problem are possible, parallel to those, discussed in the previous section with respect to compounds. Bloomfield held the opinion that the meaning correlate of the denominal verb construction is not determined by linguistic principles:

In other groups the semantic relations are not grammatically definable. Thus, we derive a great many verbs from nouns by means of various changes, including a zero-element, but the meanings of these derived verbs in relation to the underlying noun are manyfold: to man, to dog, to beard, to nose, to milk, to tree, to table, to skin, to bottle, to father, to fish, to clown, and so on. (Bloomfield, 1935: 238–239).

On the other hand, Rose (1973) claims that there is a restricted set of possible semantic relations between verb and base noun, and in support of this claim he adduces the same argument that Levi (1973) mentions with respect to compounds:

One obvious explanation for the general interpretability of innovations is that the alternatives are severely limited. That is, a given derived formation might be two ways, or seven ways, or conceivably a hundred ways ambiguous; but it surely must not be infinitely ambiguous. (Rose, 1973: 516).

But Rose’s explanation of the general interpretability of new formations is not obvious at all, and it is even absurd to assume that a word could be a hundred ways ambiguous. The general interpretability of denominal verbs can simply be assumed to be due to the ability of the native speaker to
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assume some plausible relation between the verb and its base noun that is in accordance with his general and situation-bound knowledge and the context in which the verb is used.

Rose claims that with respect to denominal verbs four regular basic relationships to their base nouns must be distinguished:

(i) CAUSE N GO TO object (e.g. water the lawn)
(ii) CAUSE N COME FROM object (e.g. peel an orange)
(iii) CAUSE object BE + LOC N (e.g. crate books)
(iv) BE (LIKE) N TO object (e.g. mother a child)

These semantic relations are very vaguely formulated, however, and therefore extra-linguistic knowledge has to play a role anyway. Moreover, many denominal verbs are not adequately characterized by one of these four relationships, e.g. to hammer, to bike, to button, to campaign etc. (cf. Marchand, 1969: 368–371 for many other examples). The same holds for Dutch denominal verbs, witness the verbs diëet, carnaval, crèche, sjoelbak and service listed in (19b). Apparently, the only regularity that can be observed is that the verb expresses an activity in which the entity mentioned by the noun plays a role. But the exact nature of this role is not determined by linguistic principles. The interpretation of such denominal verbs depends on (i) our systems of knowledge and belief, and (ii) on the context in which the verb is used. De Vries (1975:163), for instance, points out with respect to (i) that the difference between huis ‘to live in a house’ and beitel ‘to chisel’, derived from huis ‘house’ and beitel ‘chisel’ respectively, is caused by the fact that houses are not used as instruments, in contrast to chisels, and with respect to (ii) that the verb punt in Ik punt een potlood ‘I sharpen a pencil’ differs in meaning from punt in Ik punt mijn haar ‘I remove dead ends from my hair’. The data reported in Clark (1979), Clark and Clark (1979) and Karius (1977) also show that the interpretation of denominal verbs depends on general, cultural knowledge, situation-bound knowledge and/or the context.

Miller (1978: 104) suggests that certain regularities with respect to the meanings of these denominal verbs (or, as he puts it, ‘nouns used as verbs’) do exist: ‘When nouns of type M are used as verbs, the meaning of x Ms y is to be construed as ‘x covers the surface of y with M’. Type M nouns are, according to Miller (a subcategory of?) the mass nouns. For instance, given the mass noun paint, the verb to paint means ‘to cover with paint’. Miller admits, however, that ‘Without an independent criterion to determine which nouns are of type M, the rule is relatively weak’ (Miller, 1978: 104–105). However, it appears that the definition of type M nouns involves knowledge of the conventional use of nouns: ‘It is difficult to characterize most type M nouns without describing their use for covering
things' (Miller, 1978: 105). That is, there is no purely linguistic definition of type M nouns. Moreover, not every mass noun 'used as a verb' is used in accordance with Miller's construal rule, witness the examples in (20b):

(20) a. N V

<table>
<thead>
<tr>
<th>N</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>verf 'paint'</td>
<td>verf 'to paint'</td>
</tr>
<tr>
<td>olie 'oil'</td>
<td>olie 'to oil'</td>
</tr>
<tr>
<td>teer 'tar'</td>
<td>teer 'to tar'</td>
</tr>
<tr>
<td>vernis 'varnish'</td>
<td>vernis 'to varnish'</td>
</tr>
</tbody>
</table>

b. kaas 'cheese'
<table>
<thead>
<tr>
<th>N</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>kaas 'cheese'</td>
<td>kaas 'to make cheese'</td>
</tr>
<tr>
<td>klei 'clay'</td>
<td>klei 'to play with clay'</td>
</tr>
<tr>
<td>melk 'milk'</td>
<td>melk 'to milk'</td>
</tr>
<tr>
<td>koek 'cake'</td>
<td>koek 'to coagulate'</td>
</tr>
<tr>
<td>modder 'mud'</td>
<td>modder 'to have trouble'</td>
</tr>
</tbody>
</table>

Although the nouns in (20b) are mass nouns, and could in principle be used to cover something, the corresponding verbs do not have the meaning 'to cover with N', because we know that the material referred to by the noun, is not used for covering. A third problem for Miller's construal rule is, that the activity expressed by a denominal verb can be performed without making use of the entity mentioned by its base noun. For instance, one can hammer with a shoe, but also oil with syrup, paint with mud, etc. Therefore, a construal rule for denominal verbs should be formulated more generally, as follows:

(21) When nouns are used as verbs, the meaning of $xN$ is to be construed as 'x performs the activity in which N is normally involved'.

This construal rule covers the cases listed in (20a), but also accounts for the interpretation of denominal verbs derived from non-mass nouns:

(22) N V

<table>
<thead>
<tr>
<th>N</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>knikker 'marble'</td>
<td>knikker 'to play marbles'</td>
</tr>
<tr>
<td>voetbal 'football'</td>
<td>voetbal 'to play football'</td>
</tr>
<tr>
<td>koelie 'coolie'</td>
<td>koelie 'to toil'</td>
</tr>
<tr>
<td>slaaf 'slave'</td>
<td>slaaf 'to toil'</td>
</tr>
</tbody>
</table>

Of course, construal rule (21) only applies, if there is some characteristic activity associated with the base noun. Since this is not the case for the nouns listed in (20b), the construal rule does not apply to the verbs listed in (20b). Moreover, construal rule (21) does not apply, if situation-bound knowledge or a specific context determines the interpretation of the denominal verb. That is, construal rules express pragmatic regularities in the interpretation of complex words, but they do not constrain these word formation processes.
4. Conclusions

In this paper I discussed the problem what kind of regularities can be observed in the interpretation of complex words. For certain types of complex words, e.g. deverbal agentive nouns, a specific semantic correlate of the morphological structure can be formulated. But the interpretation of compounds, reference-modifying denominal adjectives and denominal verbs is only partly determined by morphological structure: it is the result of an interaction between linguistic structure and non-linguistic knowledge. Such an ‘interactionist’ approach to word formation processes makes it possible to formulate a restrictive theory of word formation. The enormous productivity of compounds, reference-modifying denominal adjectives and denominal verbs is explained by the semantic versatility they possess due to the absence of specific semantic correlates.

Relating these conclusions to the theoretical framework of the Extended Standard Theory as outlined in Chomsky and Lasnik (1977), we claim that the semantic interpretation of complex words is derived in two steps: rules such as (15) and (18) derive Semantic Interpretation-I (the logical form), and rules such as (21) derive Semantic Interpretation-II from Semantic Interpretation-I.

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Notes

1. This is in accordance with the use of this term in the Extended Standard Theory: ‘I used all semantic properties that are strictly determined by linguistic rules’ (Chomsky, 1979: 145).

2. This does not necessarily mean that the element to the right of the arrow is a word. In languages such as Latin we will perhaps have to assume stems as word forming elements. Nevertheless, such stems will also be assigned a syntactic category symbol.

3. There is an alternative to the hypothesis of labelled bracketing. One could assume WFRs of the following type:

   (1') \([x]_N \rightarrow [b \neq x]_V\)
   
   (2') \([x]_A \rightarrow [x + \text{iteit}]_N\)

   These rules do not produce internal labelled brackets. Therefore, it remains to be investigated whether such internal labelled brackets are really necessary. Dell and
Selkirk (1978) suggest that the structural description of their Learned Backing Rule for French has to make use of internal labelled bracketing in complex words in order to ensure that their rule applies to the correct class of words. Siegel's (1977) adjacency condition for morphology also presupposes internal labelled bracketing in complex words. However, I will leave this question open here, because it does not crucially interfere with the problem of how to account for meaning regularities in complex words.

4. In my opinion, (5b), the interpretation of the sentence *John hits Mary* is only a first, rather provisional approach to the complete interpretation of the sentence. The formula ‘i HIT j’ does not express the thematic functions of i and j. These functions could be expressed by adding subscripts to the grammatical functions, for instance NP<sub>1-source</sub> HIT NP<sub>2-theme</sub>, parallel to what Jackendoff (1972: 38) proposed with respect to the lexical functional structure of verbs.

References

Semantic regularities in word formation


