

ROEPER AND SIEGEL'S THEORY OF VERBAL COMPOUNDING:  
A CRITICAL APPRAISAL

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1. Introduction

This paper presents a critical appraisal of the theory of verbal compounding proposed recently by Roeper and Siegel (1978).<sup>(1)</sup> This theory was proposed within the general framework of a lexicalist approach to morphology/word-formation. It will be assumed that the reader is familiar with the general tenets of this approach as instantiated by the work of Aronoff (1976).<sup>(2)</sup>

This discussion is organized into four main sections. In §2 the outlines of Roeper and Siegel's theory are sketched. In §3 the basic flaws in this theory are critically examined. The final section, §4, briefly summarizes the major findings of the preceding sections.

Before proceeding to the outlines of Roeper and Siegel's theory, a few terminological points require clarification. The term synthetic compound has conventionally been used to denote complex morphological forms such as the following:

- |     |                      |                      |
|-----|----------------------|----------------------|
| (1) | <u>truck-driver</u>  | <u>arms shipment</u> |
|     | <u>grain-storage</u> | <u>tax evasion</u>   |
|     | <u>mail-delivery</u> | <u>peace-making</u>  |

In traditional terms, synthetic compounds have been characterized as derivatives based on word groups or syntactic constructions.<sup>(3)</sup> Synthetic compounds of which the second or right constituent is deverbal have been called verbal compounds or verbal-nexus compounds.<sup>(4)</sup> Synthetic compounds are conventionally distinguished from root compounds or primary compounds such as the following:<sup>(5)</sup>

- |     |                     |                     |
|-----|---------------------|---------------------|
| (2) | <u>truck-man</u>    | <u>arms factory</u> |
|     | <u>grain-market</u> | <u>tax-form</u>     |
|     | <u>mail-bag</u>     | <u>peace corps</u>  |

A superficial difference between synthetic and root/primary compounds is that, whereas the second constituent of the former compounds contains an affix, the second constituent of the latter compounds does not.

## 2. Outlines

### 2.1 Fundamental assumptions

Roeper and Siegel (1978) present their theory of verbal compounding within the general framework of Aronoff's theory of word-formation. Since the general assumptions of the latter theory are well-known, they are not repeated here. Roeper and Siegel base their theory on an analysis of verbal compounds involving the suffixes -er, -ing, and -ed alone.

- |     |                     |                         |                      |
|-----|---------------------|-------------------------|----------------------|
| (3) | <u>oven-cleaner</u> | <u>checker-playing</u>  | <u>expert-tested</u> |
|     | <u>law-breaker</u>  | <u>strange-sounding</u> | <u>well-built</u>    |
|     | <u>late-bloomer</u> | <u>fast-acting</u>      | <u>pan-fried</u>     |

What follows below are the general outlines of Roeper and Siegel's theory of the formation of such verbal compounds. Specific features will be dealt with in the critical appraisal of this theory.

A fundamental observation underlying Roeper and Siegel's theory (1978:208) is that permissible and impermissible verbal compounds correspond exactly to grammatical and ungrammatical sentences. The (a) compounds and corresponding (b) sentences in (4) are presented to illustrate this observation.

- |     |     |                           |     |                           |
|-----|-----|---------------------------|-----|---------------------------|
| (4) | (a) | <u>*peace-thinking</u>    | (b) | <u>*She thinks peace</u>  |
|     |     | <u>peace-making</u>       |     | <u>She makes peace</u>    |
|     |     | <u>*quick-making</u>      |     | <u>*She makes quickly</u> |
|     |     | <u>quick(ly)-thinking</u> |     | <u>She thinks quickly</u> |

<u>*life-falling (snow)</u>	<u>*It falls life</u>
<u>fast-falling (snow)</u>	<u>It falls fast</u>
<u>*fast-supporting (snow)</u>	<u>*It supports fast</u>
<u>life-supporting (trees)</u>	<u>It supports life</u>

A central aim of Roeper and Siegel's theory of verbal compounding is to account for the correspondence illustrated in (4) above. To achieve this aim, they propose two basic hypotheses, of which one is general and the other more specific.

Roeper and Siegel's (1978:208) general hypothesis is that both sentences and verbal compounds are formed from subcategorization frames associated with verbs. They illustrate this hypothesis with reference to the subcategorization frames associated with support and fall:

- (5) (a) support [<sub>NP</sub>] ([<sub>Adv</sub>]) etc.  
 (b) fall ([<sub>Adv</sub>]) etc.

A theory incorporating the general hypothesis under consideration predicts the ungrammaticalness of both the sentence \*It falls life and the corresponding impermissible verbal compound \*life-falling. Both these expressions are derived from an impossible subcategorization frame:

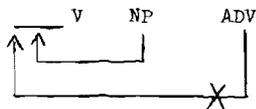
- (6) \*fall [<sub>NP</sub> ]

That is, \*life-falling is impermissible as a verbal compound since the sentential source underlying it cannot be generated.

The second, more specific, hypothesis referred to above is Roeper and Siegel's (1978:208) First Sister (FS) Principle. This principle states that all verbal compounds are formed by the incorporation of a word in the first sister position (immediately to the right) of the verb. They (1978:209) in fact call the First Sister Principle "the central claim around which our system is built". Specifically, they propose that nouns, adjectives, adverbs and (perhaps) particles which occur in FS position can be compounded with the verb (plus affix). The FS Principle provides the basis for their explanation of

~~why, for example, peace-making~~, in contrast to \*quick(ly)-making, is permissible. The basis for their explanation is schematically presented as follows by Roeper and Siegel (1978:208):

(7) She makes peace quickly



The NP peace occurs in the FS position of make(s), hence the permissible verbal compound peace-making can be formed. The adverb quickly, by contrast, does not occur in FS position in (7). Consequently, the FS Principle rules out \*quickly-making as an impermissible verbal compound.

## 2.2 Formal devices

This brings us to the formal devices Roeper and Siegel use to express the two hypotheses under consideration and to generate English verbal compounds. Central among these formal devices are four lexical rules: Affixation, Subcategorization Insertion, Variable Deletion, and the Compound Rule. The Compound Rule is claimed to "reflect" the FS Principle and constitutes the crucial device in Roeper and Siegel's theory. It will be shown below that this rule is a movement rule and is considered to be a "lexical transformation" by Roeper and Siegel. The first three rules are so-called "adjustment rules" which jointly create the structures to which the Compound Rule applies. For -ed compounds an additional obligatory rule, Subcategorization Adjustment/Deletion, is required. But let us briefly consider these rules separately in the order in which they apply in the derivation of -ed compounds.

Affixation, also called "the Affix Rule" by Roeper and Siegel (1978:210), is the first rule that applies in order to create structures to which the Compound Rule ultimately applies. The function of the Affix Rule is to "supply" an affix to the right and an empty frame to the left of the verb which constitutes the core of the verbal compound. Roeper and Siegel (1978:210), in fact, postulate three affix rules, one for each of

the suffixes -ed, -ing, and -er. With reference to the Affix Rule for -ed, the function and form of Affixation may be illustrated as follows:

(8) Affixation

$$[\text{verb}] W \Rightarrow [[\text{empty}] + \text{verb} + \text{ed}]_{\text{Adj}} W$$

where W ranges over subcategorization frames

An important feature of Roeper and Siegel's theory is that it draws a distinction between "compound" affix rules and "simple" or "noncompound" affix rules. Thus, their theory provides for two rules of -ed affixation: for the compound -ed rule (8) which plays a role in the formation of verbal compounds such as expert-tested, well-built and pan-fried, and for a separate noncompound -ed rule required for the generation of simple derivatives such as tested, built and fried. In §3.4 below Roeper and Siegel's motivation for drawing this distinction between compound and noncompound affix rules will be subjected to critical scrutiny.

In Roeper and Siegel's analysis of -ed compounds, the Affix Rule (8) is obligatorily followed by the rule of Subcategorization Adjustment/Deletion. They (1978:210) represent this rule as follows:

(9) Subcategorization Adjustment/Deletion

$$\begin{array}{ccccccc} \text{verb} + \text{ed} & [NP] & \left\{ \begin{array}{l} [Adj] \\ [NP] \end{array} \right\} & Y & \Rightarrow & \text{verb} + \text{ed} & Y \\ 1 & 2 & 3 & 4 & & 1 & \emptyset \emptyset 4 \end{array}$$

where Y ranges over subcategorization frames

The function of this rule is to delete the two subcategorization frames adjacent to the verb: the direct object frame and the frame for adjectival and nominal complements. Thereby Subcategorization Adjustment/Deletion makes it impossible for direct object NPs, adjectival complements and predicate nominals to occur in FS position. Consequently, the FS Principle correctly predicts the impermissibility of such forms as \*car-driven (in a non-agent reading), \*green-grown, and \*president-elected (on any reading except 'elected by a president') as verbal com-

pounds. If Subcategorization Adjustment/Deletion had not deleted the ~~three above-mentioned frames~~, the FS Principle would have incorrectly predicted these forms to be permissible verbal compounds. Subcategorization Adjustment/Deletion apparently plays no role in the derivation of -er and -ing compounds.

All three affix rules --- for -ed, -er, and -ing --- however, must be followed by Roeper and Siegel's (1978:210) rule of Subcategorization Insertion. This rule inserts a lexical item from the lexical core for each obligatory frame, and it may insert items into optional frames.<sup>(6)</sup> Roeper and Siegel (1978:211) give the following abstract representation of the function and form of this rule:

(10) Subcategorization Insertion

$$[\bar{x} \text{ empty}] \Rightarrow [x \text{ +word}]$$

This rule is formulated in accordance with the condition that WFRs do not "involve" phrases. Thus, by convention, the rule eliminates the phrase brackets from the subcategorization frames. As a result NP becomes N, AdjP becomes Adj, and AdvP becomes Adv.

After Subcategorization Insertion, a further "adjustment rule" has to apply: Variable Deletion. In general terms, the function of the latter rule is to guarantee that the right subcategorization frames appear in FS position. Schematically, this rule is represented as follows by Roeper and Siegel (1978:212):

(11) Variable Deletion

$$\begin{array}{ccccccc} \text{verb } X & [ \text{+word} ] & Y & \Rightarrow & \text{verb } [ \text{+word} ] & Y & \\ 1 & 2 & 3 & & 1 & \emptyset & 3 & 4 \end{array}$$

where X and Y range over empty subcategorization frames

The function of Variable Deletion can be illustrated with respect to the verb build. To Roeper and Siegel (1978:212) "the facts" of (12) "indicate that the verb build allows at least four different subcategorization

frames to be involved in compound formation: adverb, agent, instrument, locative.

- |      |                             |                                |
|------|-----------------------------|--------------------------------|
| (12) | <u>well-built</u>           | <u>hand-built</u>              |
|      | <u>slave-built</u>          | <u>factory-built</u>           |
|      | <u>well-built by slaves</u> | <u>hand-built in a factory</u> |
|      | <u>*slave-built well</u>    | <u>*factory-built by hand</u>  |

The permissibility of well-built by slaves, as opposed to the impermissibility of \*slave-built well, indicates to Roeper and Siegel "that the FS Principle is followed". To illustrate the role of Variable Deletion in the derivation of the compounds of (12), they (1978:212) ask their readers to make three assumptions: (a) that the -ed affix rule has applied, (b) that redundancy rules supply the frames in (13) to build, and (c) that Subcategorization Insertion has filled the Adv frame.

- (13) [ [empty] built ] [ Adv well ] [ Inst ] [ Agent ] [ Loc ]
- 

The expression well-built by slaves is formed "directly" by applying the Compound Rule which effects the movement indicated by the arrow in (13) and by "allowing the subsequent frames after (Adv) to be inherited and filled in the syntactic component". The impossibility of \*slave-built well indicates to Roeper and Siegel that if the Compound Rule "operates on" [ Inst ], the Adv frame cannot be inherited. Therefore, they require a rule which eliminates [ Adv ]. This rule has the effect of putting [ Inst ] in FS position, which makes it possible to derive compounds such as hand-built (in a factory). The function of Variable Deletion, now, is to delete whatever lies between the verb and [ +word ] (what falls to the right of [ +word ] may be inherited). The function of Variable Deletion is illustrated as follows by Roeper and Siegel (1978:212):

- (14) [ build ] [ Adv ] [ Inst ] [ +word ] [ Loc ] W ⇒ build [ +word ] [ Loc ] W
- 1            2            3            4            5                    1   6            3            4            5

The operation of Affixation, Subcategorization Adjustment/Deletion (in the case of -ed compounds), Subcategorization Insertion, and Variable Deletion creates an "acceptable input" to Roeper and Siegel's core rule: the Compound Rule. This rule is a "lexical transformation" which moves the word inserted by Subcategorization Insertion into the empty frame supplied by Affixation (given, of course, that Variable Deletion has ensured that this word occurs in FS position). Roeper and Siegel (1978: 209) give the following schematic representation of the Compound Rule:

(15) Compound Rule

$$\begin{array}{cccccccccc}
 [ [\text{empty}] + \text{verb} + \text{affix} ] [ X_{+N} + \text{word} ] W & \Rightarrow & [ [+ \text{word}] + \text{verb} + \text{affix} ] & W \\
 1 & & 2 & 3 & & 4 & 5 & & 4 & 2 & 3 & 5
 \end{array}$$

where W ranges over subcategorization frames and  $X_{+N}$  stands for lexical categories N, A, Adv.

It is pointed out by Roeper and Siegel (1978:213) that the Compound Rule could be stated as three separate rules, one for each of the affixes -ed, -ing, and -er. They have collapsed these three rules since they accept an evaluation metric which "requires that we state rules with maximal formal economy".

This completes the outline of Roeper and Siegel's theory of verbal compounding, an outline from which many details have been omitted. In conclusion, a sample derivation --- Roeper and Siegel's (1978:244) derivation for the verbal compound government-initiated --- may elucidate many of the points presented rather abstractly above.

- (16) initiate  $[_{NP}]$  ( $[_{Adv}]$ ) ( $[_{Inst}]$ ) (by  $[_{NP}]_{Agent}$ )
- (a) initiate  $\xrightarrow{\text{Affix}}$   $[ [\text{empty}] + \text{initiate} + \text{ed} ] [_{NP}]$  ( $[_{Adv}]$ ) etc.
- (b)  $[ [\text{empty}] + \text{initiated} ] [_{NP}]$  ( $[_{Adv}]$ )  $\xrightarrow{\text{Delete}}$   $[ [\text{empty}] \text{initiated} ]$  ( $[_{Adv}]$ )
- (c)  $[ [\text{empty}] \text{initiated} ]$  ( $[_{Adv}]$ ) ( $[_{Inst}]$ ) (by  $[_{NP}]_{Agent}$ )  $\xrightarrow{\text{Insert}}$   
 $[ [\text{empty}] \text{initiated} ]$  ( $[_{Adv}]$ ) ( $[_{Inst}]$ ) by  $[_{N}$  government]

- (d)  $[[\text{empty}] \text{initiated}] ([\text{Adv}] ([\text{Inst}]) \text{ by } [{}_{N} \text{government}]) \xrightarrow{\text{Delete}}$   
 $[[\text{empty}] \text{initiated}] [ \text{government} ]$
- (e)  $[[\text{empty}] \text{initiated}] [{}_{N} \text{government}] \xrightarrow{\text{Compound}}$   
 $[ [ \text{government} ] \text{initiated} ]_{\text{Adj}}$

The rules applying in this derivation are: Affixation in (a), Subcategorization Adjustment/Deletion in (b), Subcategorization Insertion in (c), Variable Deletion in (d), and the Compound Rule in (e). It is clear that these rules are intrinsically ordered and that a derivation is initiated by Affixation since it supplies the empty frame ultimately to be filled by the Compound Rule.

### 3. Appraisal

#### 3.1 General

This section focuses on major defects of Roeper and Siegel's theory of verbal compounding. Some of the most obvious of these shortcomings have been indicated in an informal paper by myself (Botha 1979) and have also been discussed independently and in greater depth by Allen (1978) in her unpublished dissertation.<sup>(7)</sup> Since Allen's work is undoubtedly the better known, I will refer to it where possible, and will use it as a source of illustrative material. The discussion below, however, will materially elaborate on some of the criticisms presented in the two sources mentioned above. Moreover, it will present detailed additional criticisms of a nontrivial nature which are considered in neither of these sources.

#### 3.2 The notion "verbal compound"

It will be argued below that a first major shortcoming of Roeper and Siegel's theory of verbal compounding is that its core notion "verbal compound" is ill-defined in more than one respect. This theory lacks a principled basis for distinguishing verbal compounds from root compounds on the one hand and certain complex derivatives on the other hand. As a consequence, it will be shown that Roeper and Siegel's analysis of verbal compounds is arbitrary in an important respect.

3.2.1 Verbal compounds vs. root compounds

As regards the distinction between verbal and root compounds, Roeper and Siegel clearly realize that it cannot be based solely on the fact that verbal compounds, as opposed to root compounds, are morphologically marked by the presence of an affix. Consequently, they (1978:206) invoke the notions "predictability and compositionality in meaning" and "productivity" to provide a more adequate basis for this distinction: "In contrast [to root compounds --- R.P.B.], verbal compounds are (a) predictable and compositional in meaning and (b) extremely productive".

The meaning criterion alluded to in the (a) part of this quote fails in both directions. Thus, on the one hand, Levi (1978:44ff.) has recently shown that numerous root compounds have predictable, compositional, non-specialized/lexicalized meanings. The following compounds, traditionally considered to be root compounds, illustrate this point:

(17)	<u>N + N</u>	<u>Adj + N</u>
	<u>home-life</u>	<u>marginal note</u>
	<u>salt water</u>	<u>urban transportation</u>
	<u>lemon peel</u>	<u>axial stress</u>
	<u>sugar cube</u>	<u>national exports</u>
	<u>auto mechanic</u>	<u>avian sanctuary</u>

Allen (1978:52), moreover, has argued that "primary compounds are completely specifiable in terms of interacting feature hierarchies, given some general principles of meaning formation of compounds".<sup>(8)</sup>

On the other hand, many verbal compounds have lexicalized meanings and are consequently nonpredictable and noncompositional in meaning. Allen (1978:152) provides examples such as the following:

(18)	<u>windbreaker</u>	<u>life-saver</u>
	<u>jawbreaker</u>	<u>care-taker</u>
	<u>sky-scraper</u>	<u>coffee-maker</u>

Even more telling is the fact that Roeper and Siegel (1978:216) have to

point out, in a later section of their paper, that there are verbal compounds which "have meanings narrower than a strict decomposition would imply". They list the following examples:

- |      |                    |                   |
|------|--------------------|-------------------|
| (19) | <u>truckdriver</u> | <u>icebreaker</u> |
|      | <u>cropduster</u>  | <u>homemaking</u> |

Clearly, then, verbal compounds cannot be distinguished from root compounds on the basis of predictability and compositionality of meaning.

It is less than clear how Roeper and Siegel intend using the notion of productivity --- in the (b) part of the quote given above --- as a basis for drawing a distinction between verbal and root compounding. The obvious interpretation is that, whereas verbal compounding is "extremely productive", root compounding is not. But this claim can be falsified in both directions. On the one hand, not all types of verbal compounds can be formed productively. Thus, in spite of their productivity claim quoted above, Roeper and Siegel (1978:233) have to point out themselves, in a later section of their paper, that certain types of verbal compounds are nonproductive. A case in point is the type which involves the affix -ing and which incorporates adjectives: "The overall productivity of this class of compounds is low. There are no compounds with many of the verbs in (96) [repeated as (20) below --- R.P.B.]. For instance, we do not find & crazy-going or & angry-appearing. We do not know whether these gaps are accidental or follow some unknown principle (perhaps semantic)".

- |      |                         |                       |
|------|-------------------------|-----------------------|
| (20) | <u>smell (fresh)</u>    | <u>become (mad)</u>   |
|      | <u>look (nice)</u>      | <u>appear (angry)</u> |
|      | <u>act (grim)</u>       | <u>go (crazy)</u>     |
|      | <u>seem (strange)</u>   | <u>stay (clean)</u>   |
|      | <u>sound (funny)</u>    | <u>remain (calm)</u>  |
|      | <u>taste (pleasant)</u> | <u>get (ready)</u>    |
|      | <u>turn (red)</u>       | <u>do (wrong)</u>     |

Furthermore, Roeper and Siegel (1978:214) have to point out that there

are some differences in productivity among affixes: "The -er affix is somewhat less productive than -ing or -ed".

Even more important is that Roeper and Siegel restrict their analysis to the three affixes which are the most productively involved in verbal compounding, viz. -ing, -ed, and -er. Other affixes involved in verbal compounding are much less productive, e.g. -ance, -al, -ment, -ion, -ure, and  $\emptyset$  (zero). Verbal compounds such as the following are formed by means of these affixes according to Marchand (1969:19):

- |      |                          |                      |
|------|--------------------------|----------------------|
| (21) | <u>car insurance</u>     | <u>tax evasion</u>   |
|      | <u>snow removal</u>      | <u>power failure</u> |
|      | <u>strike settlement</u> | <u>oil output</u>    |

Marchand explicitly calls these "types" of verbal compounds "less productive".<sup>(9)</sup>

On the other hand, as has been noted in many studies of root compounding, some types of root compounds are extremely productive. Compound nouns formed on the basis of two other nouns, i.e., Noun + Noun  $\rightarrow$  Compound Noun, is a case in point. Linguists such as Jackendoff (1975:667-668), Levi (1978:8-9, 54-56), and Allen (1978:133) have all remarked on the extreme productivity of certain types of root compounding. For instance, Allen (1978:133) states that "there are few limits on the formation of productive compounds". In sum: how Roeper and Siegel can distinguish verbal compounds from root compounds on the basis of differential productivity is all but clear.<sup>(10)</sup>

Roeper and Siegel, thus, cannot draw a principled distinction between verbal and root compounds.<sup>(11)</sup> The obvious question is how this inability bears on the adequacy of their theory of verbal compounding. In the absence of a principled distinction between verbal and root compounds, it becomes possible to make two related claims.

- (22) (a) Verbal compounds and root compounds instantiate the same fundamental type of morphologically complex word.
- (b) Verbal compounds and root compounds must receive fundamentally equivalent linguistic analyses.

Allen (1978:151ff.) in fact makes these two claims (or ones closely related to them). In terms of the (b) claim, which derives from the (a) claim, the morphological structure assigned to verbal compounds must be of essentially the same kind as the structure assigned to root compounds. One possible unitary structure for both root and verbal compounds is indicated in (23) below.

(23)	(a)	<u>Root Compounds</u>	(b)	<u>Verbal Compounds</u>
		[[truck] <sub>N</sub> [man] <sub>N</sub> ] <sub>N</sub>		[[truck] <sub>N</sub> [driver] <sub>N</sub> ] <sub>N</sub>
		[[grain] <sub>N</sub> [market] <sub>N</sub> ] <sub>N</sub>		[[grain] <sub>N</sub> [storage] <sub>N</sub> ] <sub>N</sub>
		[[mail] <sub>N</sub> [bag] <sub>N</sub> ] <sub>N</sub>		[[mail] <sub>N</sub> [delivery] <sub>N</sub> ] <sub>N</sub>

In terms of the analysis (23) both verbal compounds and root compounds are formed by a simple adjunction operation: two nouns are adjoined to form a more complex noun.<sup>(12)</sup>

Now, in order to justify their theory of verbal compounding Roeper and Siegel must show, *inter alia*, that it is more adequate than an alternative theory incorporating the claims (22)(a) and (b). By implication, they must argue that the type of morphological structure assigned to verbal compounds in (23)(b) is incorrect. But this implies that they are able to differentiate between verbal and root compounds in a principled manner. And we have seen that they have no basis for doing this. Consequently, Roeper and Siegel's theory of verbal compounding is arbitrary in the sense that it does not, on a principled basis, rule out the possibility that verbal compounds must be analyzed (in the same way) as root compounds.

Roeper and Siegel may argue that they do have a principled basis for drawing a distinction between root compounds and a certain subset of verbal compounds. This subset would include verbal compounds such as those of (24) (which for the sake of the discussion below are presented in terms of an adjunction-type bracketing).

(24) [ [sword]<sub>N</sub> [swallower]<sub>N</sub> ]<sub>N</sub>

[ [heart]<sub>N</sub> [breaker]<sub>N</sub> ]<sub>N</sub>

[ [church]<sub>N</sub> [goer]<sub>N</sub> ]<sub>N</sub>

[ [money]<sub>N</sub> [changer]<sub>N</sub> ]<sub>N</sub>

[ [type]<sub>N</sub> [setter]<sub>N</sub> ]<sub>N</sub>

The principled basis for claiming that these verbal compounds are distinct from root compounds and for not assigning to them the simple adjunction analysis of (24) takes on the form of a principle of the lexicalist theory of word-formation to which Roeper and Siegel --- following Aronoff (1976) --- subscribe.

(25) Word-formation rules create new words on the basis of existing words listed in the lexical core.<sup>(13)</sup>

Roeper and Siegel could point out that the adjunction analysis of (24) which treats the verbal compounds in question like root compounds violates the principle (25). The second (right) constituents of these verbal compounds are not listed in the lexical core as existing or actually occurring words.

(26)     & swallower                     & goer                     & setter<sup>(14)</sup>  
           & breaker                     & changer

Roeper and Siegel (1978:219) do in fact claim that the forms in (26) are not "independently existing" elements. Moreover, they do use the alleged nonexistence of these forms to argue against a phrase-structure analysis of the verbal compounds in (24) in terms of which these compounds would actually be "phrase-structure generated adjective + noun sequences". They could extend this argument in a natural way, arguing on the basis of the alleged nonexistence of the forms in (26) against

the primary compound adjunction analysis of these compounds as presented in (24). These compounds cannot be primary compounds, since in terms of the principle (25), a WFR cannot create a primary compound by adjoining to an existing word (e.g. sword, heart, church, money, type) a nonexisting word (e.g. & swallower, & breaker, & goer, & changer, & setter). This argument, however, must be rejected both on general theoretical and on empirical grounds.

On general theoretical grounds it can be claimed that Roeper and Siegel's use of the notion "occurring/existing/actual word" is objectionable. The basic point is that this notion can be used to restrict neither the input nor the output of productive word-formation processes and the rules describing them. This point has in fact been argued in the literature and it is not clear why Roeper and Siegel have failed to take notice of these arguments. Some of the arguments for not restricting the output of productive WFRs in terms of a notion "occurring/existing word" will be considered in §3.4 below.

Let us consider here the restriction that the input to --- i.e. the bases of --- productive WFRs must be actually existing or occurring words. This restriction was presented as (25) above. Various linguists have argued against this restriction, including Booij (1977:28) and, more recently, Allen (1978:185). Let us consider the gist of Allen's argument because it bears directly on the question of constructing a theory of verbal compounding. Allen (1978:185) proposes a general theory of morphology which she calls "Overgenerating Morphology", the empirical basis of which she presents as follows: "The central empirical datum in support of Overgenerating Morphology is the fact that words derived by regular derivational processes may not be occurring words (e.g. handed, sightly, toothed) but when subsequent derivational processes apply, occurring words may result (e.g. handedness, unsightly, sabre-toothed)".<sup>(15)</sup> The crucial point is that if the bases of WFRs are restricted to occurring words it would be impossible to derive derivatives such as handedness, unsightly and a synthetic compound such as sabre-toothed since these complex morphological forms are formed on the basis of nonoccurring words, i.e. words not available as input to regular WFRs in terms of the restriction (25). Clearly, this restriction cannot be maintained: WFRs must be allowed to operate on any well-formed/missible/possible word, regardless of whether or not it can be claimed to be an existing or occurring word.<sup>(16)</sup> This, then, is the gist of the theoretical grounds for rejecting

Roeper and Siegel's (possible) argument that the forms of (24) could not be considered to be primary compounds since their second constituents, as listed in (26), are not occurring or independently existing words. Each of the latter words is a morphologically well-formed or possible word of English. Thus, the notion "existing/occurring word" does not provide a principled basis for drawing a distinction between verbal and root compounds. Neither can this notion be used as the basis of an argument against an adjunction analysis --- such as in (24) --- of verbal compounds.

An additional theoretical problem is that Roeper and Siegel's notion "existing/occurring word" is not particularly well-defined. Specifically, it is unclear precisely what their criterion is for assigning a given word the status of "(non)existing/(non)occurring". Thus, consider the following remarks in this connection by them (1978:200): "There is ... a distinction between existing words in the lexicon, which are in common use, and possible words that are not in common use. For instance, happiness is a real English word that we recognize and that follows the lexical rule for the formation of -ness nouns from adjectives. On the other hand, expectedness is not a real English word, although it is a possible one; it is not in common parlance although it does obey the rule for forming -ness nouns. Therefore, happiness is in the lexical core but expectedness will not be in the lexical core until it is 'invented' in some appropriate circumstance and comes into general use". It appears that to qualify for the status of "existing/occurring word", a given word must not only "exist"; it must "be in common/general use" or "in common parlance" as well. But Roeper and Siegel fail to provide a basis for distinguishing between words which are and words which are not in "common/general use or parlance". Thus, the latter notion is obscure and, consequently, their notion "existing/occurring word" is not properly defined. This is a further reason for disallowing their (possible) argument against a primary compound analysis of the verbal compounds listed in (24) above.

This argument, moreover, would be weak on empirical grounds, as is shown by Allen (1978:158). On the one hand, she argues that goer is "non-occurring" not only as a simple derivative. It generally fails to appear in compounds as well, as is illustrated by the impermissibility of forms such as the following:

- (27)    \*bed-goer                                \*school-goer  
           \*prison-goer                        \*college-goer  
           \*supper-goer                        \*store-goer

From the impermissibility of these forms, Allen draws the conclusion that compounds with goer are "generally bad, church-goer being the exception".

On the other hand, Allen (1978:160) argues that Roeper and Siegel wrongly judge forms such as breaker and dweller to be nonexistent. She points out that these forms are "non-evident" only in a particular context, one which lacks the required type of complement:

- (28)    \*He is a breaker           (compare : \*He breaks)  
           \*He is a dweller       (compare : \*He dwells)

In contexts where breaker and dweller do appear with the appropriate complement, they are permissible:

- (29)    He is a typical breaker of contracts and promises  
           (Compare : He breaks promises)  
           They are former dwellers of the city of light  
           (Compare : They dwell in a city)

Verbs such as tell, avoid, make and suggest exhibit this pattern as well; they only appear not to have -er derivatives. In sum: there are also empirical considerations which severely weaken an argument against a primary compound analysis of forms such as (24) which is based on the "nonexistence/nonoccurrence" of the forms listed in (26). It is not clear how Roeper and Siegel could avoid the criticism that their notion "verbal compound" is ill-defined in the sense that they have no principled basis for distinguishing verbal compounds from root compounds.

3.2.2 Verbal compounds vs. complex derivatives

A second respect in which Roeper and Siegel's notion "verbal compound" is ill-defined relates to the fact that they do not provide a principled basis on which a distinction can be drawn between certain verbal compounds and complex derivatives formed on the basis of certain compounds by means of suffixation. To see this, it is necessary to consider the list of "diagnostics" proposed by Roeper and Siegel (1978:225) for verbal compounds.

- (30) (a) Does it have an affix (-er, -ing, -ed)? (boatmaker)  
 (b) Does it have a nonindependent verb form? (church-goer/&goer)  
 (c) Does it fail to allow the Rhythm Rule? (Chinese lover)  
 (d) Does it take re- internally? (story-retelling)  
 (e) Does it have no related compound verb? (time-consuming;  
 \*time-consume)

To this list of diagnostics for verbal compounds Roeper and Siegel (1978:225) add the following, crucial, remark: "If the answer is positive to the first question (75a) [i.e., our (30)(a) --- R.P.B.] and any of the remaining four questions, then the phrase is a verbal compound and will obey the FS Principle".

Suppose now that in the case of an arbitrary "phrase" the answer is positive to the first question and, in addition, to the final question, (30)(e). The quoted remark by Roeper and Siegel would force one to conclude that the phrase is a verbal compound and not a complex derivative derived from a compound verb by means of suffixation. Notice now that in the diagnostic (30)(e), the expression "no related compound verb" has to be interpreted as "no related existing/occurring compound verb". This interpretation is dictated by the restriction (25) to which Roeper and Siegel subscribe. Thus, the diagnostic (30)(e), like (30)(b), makes critical use of the notion "existing/occurring form". The problematic nature of this notion has been dealt with in §3.2.1 above, but let us determine here how it affects the analysis of our arbitrary phrase. This phrase consists of a possible compound verb which does not "exist independently" as an "actual word" and a suffix, say -er, -ed or -ing. Roeper and Siegel's diagnostics now force us to "diagnose" this phrase

as a verbal compound. In virtue of its suffixal constituent it satisfies the first diagnostic, (30)(a). And because of the fact that the compound verb has not been found "to exist/occur as an actual word", the phrase satisfies the final diagnostic, (30)(e), as well. Thereby, the conjunction of these criteria arbitrarily rules out the analysis of this phrase as a complex derivative formed on the basis of a possible compound by means of suffixation. This, in essence, means that Roeper and Siegel have no principled basis for drawing a distinction between verbal compounds and complex derivatives of the type under consideration. (17)

### 3.3 Correspondence between verbal compounds and sentences

Recall that basic to Roeper and Siegel's (1978:208) theory of verbal compounding is the observation that "the permissible and impermissible compounds correspond exactly to grammatical and ungrammatical sentences". Allen (1978:233), however, points out that there are impermissible verbal compounds that correspond to perfectly grammatical syntactic units:

(31) (a) Verbal Compound	(b) Syntactic Unit
<u>*worried-appearer</u>	<u>to appear worried</u>
<u>*president-becomer</u>	<u>to become president</u>
<u>*quick-elapser</u>	<u>to elapse quickly</u>
<u>*fortune-promiser</u>	<u>to promise a fortune</u>
<u>*pale-turner</u>	<u>to turn pale</u>

All the verbal compounds in (31)(a) obey the FS Principle but are nevertheless impermissible. This, of course, erodes the basic observation underlying Roeper and Siegel's theory and is at the root of a second major shortcoming of their theory.

Allen (1978:162) argues that there is a straightforward explanation for the impermissibility of the verbal compounds, but that this explanation is unavailable within the framework of Roeper and Siegel's theory. The essence of this explanation is that the compounds of (31)(a) are impermissible since they incorporate impossible words as second constituents: \*appearer, \*becomer, \*elapser, \*promiser, and \*turner. This explanation is unavailable to Roeper and Siegel since their simple -er suffix rule

~~which has to disallow these impossible words~~ is distinct from their compound -er suffix rule. So the relevant restriction on the simple ~~-er~~ rule cannot be brought to bear directly on the compound -er rule. Roeper and Siegel could, of course, claim that all the restrictions on the simple -er rule apply to the compound -er rule as well. This claim, which would be most damaging to their theory, brings us to a third serious defect of their theory of verbal compounding.

### 3.4 The two affix rule hypothesis

As pointed out in §2.2 and §3.3 Roeper and Siegel's theory of verbal compounding includes the hypothesis that for each of the affixes -er, -ing, and -ed English has two affixation rules. Whereas a simple or noncompound rule generates simple derivatives such as those in (32)(a), the corresponding compound affix rule functions in the derivation of verbal compounds such as those in (32)(b).

(32)	(a)	Simple <u>-er</u> Rule	(b)	Compound <u>-er</u> Rule
		<u>cleaner</u>		<u>oven-cleaner</u>
		<u>driver</u>		<u>truck-driver</u>
		<u>mover</u>		<u>fast-mover</u>
		<u>owner</u>		<u>home-owner</u>

This point can be illustrated with reference to simple and compound -ing and -ed forms as well.

Any linguist who accepts the view that a central aim of linguistic description is to capture genuine generalizations will find the two affix rule hypothesis highly suspect. Allen (1978:150ff.) and Botha (1979) have independently expressed their misgivings about this hypothesis. So let us briefly review the problems with Roeper and Siegel's hypothesis.

The first problem with the hypothesis under consideration stems from a flaw in the conceptual basis of the arguments furnished by Roeper and Siegel to support it. These arguments are based on their untenable notion of "((not) independently) occurring/existing/listed word". Con-

sider the following typical cases of their use of this notion:

(33) (a) "... there is an Affix Rule that supplies -er and an empty frame [empty]. This frame distinguishes the compound -er affix rule from the noncompound rule (e.g. lose → lose + er). The distinction is necessary because not all compounding verbs can undergo the noncompound rule. We hear church-goer, but not a & goer" (p. 210).

(b) "Verbal compounds, however, can incorporate forms like growing, which are not listed in the lexicon as separate nouns:

- |        |    |                |    |               |
|--------|----|----------------|----|---------------|
| [(57)] | a. | flower-growing | b. | & the growing |
|        |    | house-keeping  |    | & the keeping |
|        |    | habit-forming  |    | & the forming |
|        |    | .....          |    | .....         |

The expressions in (57a) must derive exclusively from the compound rule ... We have shown that compound formation is different from the generation of adjective + noun sequences in phrase structure. We can express this difference formally by stating distinct affix rules for the compound nouns and the simple nouns in the morphology" (p.220).

(c) "We have stated two affix rules because some verbs appear not as independent adjectives but just in compounds:

- |         |    |                                   |
|---------|----|-----------------------------------|
| [(120)] | a. | & the read book                   |
|         | b. | the well-read book                |
|         | c. | & the heard symphony              |
|         | d. | the oft-heard symphony" (p. 238). |

Thus, in the case of each of the affixes -er ((33)(a)), -ing ((33)(b)), and -ed ((33)(c)), Roeper and Siegel's argument runs as follows: a distinction must be drawn between a compound and a noncompound rule since forms which do not "exist/occur (independently)" as simple derivatives "occur" as second constituents of verbal compounds.

~~The "nonoccurring" simple derivatives can be blocked by preventing the noncompound affix rule from applying to their bases; the second constituents of the given verbal compounds can be generated by allowing the compound affix rule to apply to these base words.~~

This argument of Roeper and Siegel's is flawed because it makes crucial use of the objectionable notion "existing/occurring word". Specifically, the argument is based on the following restriction on the output of productive WFRs:

- (34) The output of (i.e., the morphologically complex words generated by means of) productive WFRs must be "actually occurring/existing" words.

Botha (1968:126ff.), surveying the then relevant literature, argued at length that a restriction with the purport of (34) cannot be placed on WFRs which aim to describe an aspect of linguistic competence. Reduced to its essentials, the argument has two sides to it. On the one hand, it is shown that notions such as "occurring form", "attested form", "familiar form", "used form", etc. --- insofar as their content is clear --- represent aspects of linguistic performance. Specifically, these notions cannot be used appropriately to characterize or restrict the output of rules whose function it is to characterize a creative aspect of linguistic competence. Productive WFRs, by definition, are rules which attempt to do just this: to claim that a WFR is productive is to state, inter alia, that it can be applied to form an unlimited number of possible morphologically complex words. On the other hand, to adopt a restriction such as (34) is to reduce the status of a grammar to that of a description of a restricted corpus of linguistic utterances. Notions such as "existing/occurring/attested, etc. form" can be meaningfully used only in relation to the content of a finite corpus of data. A generative grammar, of course, purports to be a description of a language or linguistic competence and not of a restricted set of utterances of the language. Moreover, it is in principle impossible to list the output of productive rules --- be they syntactic or morphological --- in a finite corpus. In sum: there are principled reasons for rejecting a restriction such as (34). The appropriate distinction is not between existing and nonexistent (morphologically complex) words but between

well-formed/missible/possible and ill-formed/immissible/impossible words. Thus, (34) must be replaced by a restriction with the general tenet of (35).

- (35) The output of productive WFRs must be well-formed/missible/possible (morphologically complex) words.

This restriction is in fact argued for in such early studies as Botha 1968 and Halle 1973. And at a level of theoretical reflection, even Roeper and Siegel (1978:200) seem to accept it: "The WFRs have the power to generate many possible words that are not in the lexicon".<sup>(18)</sup> Unfortunately, however, Roeper and Siegel's justification for the two affix rule hypothesis is in disaccord with the restriction (35).

The other problems with Roeper and Siegel's two affix rule hypothesis are of an empirical nature. On the one hand, recall that Allen has shown that it is simply not true that forms such as *& dweller*, *& swallower*, and *& breaker* fail to occur in an absolute sense. They do occur in appropriate contexts such as those illustrated in (29) above.

On the other hand, the two affix rule hypothesis makes empirical predictions which are incorrect. This point may be illustrated with reference to *-er*. The hypothesis that there are two *-er* affix rules --- a compound and a noncompound rule --- gives rise to the expectation that these rules will differ in regard to what they claim about such properties of derived forms as allomorphy, stress pattern, meaning, and subcategorization. But Roeper and Siegel provide no evidence of such differential behaviour with regard to these two rules. Thus, they present no empirical evidence indicating (a) that the set of allomorphic variants of the suffix involved in the noncompound rule differs from that of the suffix involved in the compound rule, (b) that the effect of the noncompound rule on the stress pattern of bases differs from that of the compound rule, (c) that the suffix involved in the noncompound rule differs in meaning from the one involved in the compound rule, (d) that the noncompound rule effects changes in subcategorization frames which are non-identical to those brought about by the compound rule. As regards (a), Allen (1978:158) has in fact provided evidence from which it is clear that the expected differences in allomorphy do not exist: "The deverbal

allomorphy is always the same, regardless of whether the suffix appears in a simple derivative or a verbally derived compound". In sum, Roeper and Siegel's two affix rule hypothesis must be rejected, both on theoretical and on empirical grounds.

### 3.5 The lexical rules

It was shown in §2.2 above that Roeper and Siegel require at least four special lexical rules for the derivation of verbal compounds: Affixation (cf. (8)), Subcategorization Insertion (cf. (10)), Variable Deletion (cf. (11)), and the Compound Rule (cf. (15)). For the derivation of -ed compounds a fifth rule is needed, viz. Subcategorization Adjustment/Deletion (cf. (9)). These rules have various questionable properties, to which we turn now.

To begin with, there is the question of the power of lexical transformations such as the Compound Rule. On the surface, it appears that the inclusion of movement transformations in the lexicon leads to an increase in the descriptive power of the total grammar. According to Allen (1978: 169-170), Roeper and Siegel conceded this point in the 1976 version of their paper. Such an increase in descriptive power would of course be highly undesirable, given the general aim of the linguists who work within the framework of the (Revised) Extended Standard Theory.<sup>(19)</sup> In the introduction to their 1978 paper, Roeper and Siegel, however, appear to have reversed their judgment of the effect of lexical transformations on the overall power of the grammar. Thus, they (1978:200) claim that "Our analysis ... does not lead to an increase in the power of the total grammar (a) because it simplifies the syntax where it complicates the lexicon, and (b) because the lexical transformation operates on a highly constrained structural description". Let us consider the (a) and (b) claims separately.

The (a) claim is extremely difficult to evaluate. To make a nonarbitrary assessment of the effect that the adoption of lexical transformations has on the power of the total grammar, three steps have to be taken. First, the contribution of lexical transformations to the power of the total grammar has to be calculated. Second, the decrease in the power of the total grammar resulting from the simplification of the syntax has to be calculated.

Observe, that not just any "simplification" of "the syntax" would lead to a decrease in this power. Third, the former (possible) increase and the latter (possible) decrease have to be compared and the result evaluated. Of course, if the "simplification" of "the syntax" leads to a grammar which is descriptively less adequate, there is no point in proceeding with this comparison.

Roeper and Siegel have made no attempt to take the three steps mentioned above in an explicit and systematic manner. This is the reason why their (a) claim is hard to evaluate and why it appears to be rather arbitrary. Allen's assumption that lexical transformations do lead to an increase in the power of the total grammar does not fare better in this regard. Without first having made the above-mentioned calculations, the only safe conclusion would be that lexical transformations are undesirable because of a potential increase in the power of the total grammar which may result from their adoption. (20)

Now consider Roeper and Siegel's (b) claim in which they assert that the lexical transformation operates on a highly constrained structural description (which provides the second reason for their judgment that their analysis does not lead to an increase in the power of the total grammar). This (b) claim is more amenable to critical analysis: analysis which reveals a number of undesirable properties of their lexical rules. The gist of the argument below will be that, whereas the structural descriptions on which the Compound Rule operates may be "highly constrained", these structural descriptions are generated by means of unconstrained and ad hoc lexical rules. Let us take a closer look at the individual lexical rules, aptly called "adjustment rules" by Roeper and Siegel.

Affixation --- which initiates the derivation of verbal compounds --- performs two quite unrelated functions by means of two unrelated operations, viz. supplying an affix and creating an empty frame. The fact that a single rule performs such disparate operations makes it quite undesirable within the framework of a theoretical approach which aims to place strong constraints on the possible operations or structural changes that may be effected by individual rules. What makes Affixation an even more undesirable rule is the fact that both of these operations duplicate operations of other rules within the grammar. Whereas the affixation operation duplicates the operation carried out by noncompound affix rules,

the creation of an empty frame duplicates the structure building function of phrase structure rules.

Subcategorization Insertion, as a lexical rule, has the same kinds of undesirable properties as Affixation. On the one hand, the function and operation of Subcategorization Insertion duplicate lexical insertion in base structures, a point conceded by Roeper and Siegel (1978:211): "Subcategorization Insertion operates much as regular lexical insertion does in syntax". On the other hand, it is not at all clear that Subcategorization Insertion has only this single function and performs only this unitary operation. From Roeper and Siegel's formulation (10) of this rule it is clear that the input and output of the rule differ in regard to the labelling of phrase brackets as well:  $[\bar{X}]$  becomes  $[X]$ . Roeper and Siegel (1978:210) comment on this structure changing operation by stating that "By convention, ..., we eliminate the phrase brackets from the subcategorization frames, since they are no longer eligible for expansion. Thus, NP becomes N, AdjP becomes Adj, AdvP becomes Adv." This "convention", however, is represented in the rule itself, as is clear from (10). Thus, it is hard to see how one can avoid the conclusion that Subcategorization Insertion is an unconstrained rule in the sense that it comprises two unrelated operations.

Before turning to Roeper and Siegel's two other "adjustment rules", viz. Subcategorization Adjustment/Deletion and Variable Deletion, it is necessary to consider an aspect of their theory of verbal compounding which is rather poorly explicated. Recall that the "adjustment rules" we have just mentioned as well as the Compound Rule operate on strings of subcategorization frames. A typical string of these frames is presented as follows by Roeper and Siegel (1978:212, 240):

(36) Verb [Direct Object] [Adverb] [Instrument] [Agent] [Locative]

A first question which arises in connection with strings of subcategorization frames such as (36) concerns their origin. How are such strings created or generated? Roeper and Siegel unfortunately do not deal with this question in an explicit manner. They (1978:210, 212) do no more than merely state that "redundancy rules supply the frames" in such strings. This statement is obscure and puzzling. Notice that a string of subcategorization frames such as (36) is structured in the sense that the individual frames have to occur linearly in a certain fixed order. Thus, the strings (37)(a) and (b) in which the order of the individual frames has

been changed cannot constitute possible strings of subcategorization frames to which Roeper and Siegel's lexical rules could apply.

- (37) (a) Verb [Instrument] [Adverb] [Direct Object] [Locative] [Agent]  
 (b) Verb [Locative] [Agent] [Adverb] [Instrument] [Direct Object]

It is unclear how conventional redundancy rules could generate structured strings of subcategorization frames such as (37)(a) and (b). These rules, in essence, specify that "If a lexical item has a feature (of the form) X, then it also has a feature (of the form) Y".<sup>(21)</sup> Such conventional lexical redundancy rules obviously cannot generate ordered strings of subcategorization frames. For the generation of these strings a different kind of rule is needed: one which is capable of building structures, or generating strings consisting of linearly ordered subcategorization frames. Moreover, rules of this kind must be applicable in such a way that they generate only certain ordered strings of subcategorization frames (e.g. (36)) but not others (e.g. (37)(a) and (b)). Roeper and Siegel, however, provide no information regarding the form, mode of application or power of this kind of "redundancy rules".<sup>(22)</sup> The absence of this information implies that the strings of subcategorization frames required by Roeper and Siegel's theory of verbal compounding are created in a mysterious way by devices which are obscure both in regard to formal properties and descriptive power. Moreover, in creating structured strings of the kind in question these devices or "redundancy rules" duplicate an aspect of the function and operation of independently needed rules, namely PS-rules. Thus, to motivate the particular order of the subcategorization frames in the string (36) and to draw a distinction between a permissible string of subcategorization frames such as (36) and impermissible strings such as (37)(a) and (b), redundancy rules must repeat some of the information about syntactic structure already expressed by PS-rules. To put it differently: the frames in (36) must occur in the order in question because this is the order in which NPs or PPs representing Direct Objects, Adverbial Phrases, Instrumental Phrases, Agentive Phrases and Locative Phrases are generated independently by PS-rules. If this assumption were not made, the order of the subcategorization frames in (36) would be both ad hoc and arbitrary. In sum: the generally obscure nature of Roeper and Siegel's "redundancy rules" and the fact that they

~~have to duplicate part of the syntax~~ reflect quite negatively on any theory (of verbal compounding) which has to rely on them.

This brings us to two other, functionally related, "adjustment rules" proposed by Roeper and Siegel: Subcategorization Adjustment/Deletion and Variable Deletion. That these rules are functionally related should be clear from the discussion in §2.2: through the deletion of subcategorization frames, both of these rules function so as to change strings of subcategorization frames on which the Compound Rule cannot operate to form permissible verbal compounds into strings on the basis of which this rule can form permissible compounds. Specifically, both Subcategorization Adjustment/Deletion and Variable Deletion are used to ensure that the FS position contains appropriate subcategorization frames.

Recall that Subcategorization Adjustment/Deletion has the function of deleting from FS position subcategorization frames containing direct objects, adjective complements, and other predicate nominals. If these frames were to occur in FS position, the Compound Rule would, according to Roeper and Siegel (1978:210), derive such impermissible -ed compounds as the following:

- (38)   \*green-grown           (adjective incorporated)  
           \*car-driven           (direct object incorporated)  
           \*president-elected (predicate nominal incorporated)

The rule under consideration ensures that only "the adverb, instrument, agent, and locative frames supplied by redundancy rules are left as potential first sisters".

Subcategorization Adjustment/Deletion has more than one unattractive property. First, as used by Roeper and Siegel this rule is completely ad hoc, its only function being to protect the FS principle from the refuting impact of such impermissible -ed verbal compounds as those listed in (38). Second, to perform its function the rule crucially depends on the availability of strings of subcategorization frames whose components exhibit the order of (36). As we have seen such strings are created in a dubious way. Thus for its operation, Subcategorization Adjustment/Deletion depends on an input structure which comes into existence in an obscure and arbitrary manner. Third, the rule performs a

deletion operation, the constraints on which are unclear. In view of the attempts to constrain the number and nature of the operations performed by grammatical rules, this is a particularly unfortunate state of affairs. Finally, there are empirical problems with Subcategorization Adjustment/Deletion as well. These are considered within the context of a critical analysis of the Compound Rule below.

Both the motivation for and the functioning of Variable Deletion, the other "adjustment rule" performing a deletion operation, have been outlined in some detail in §2.2 above. Let us now take a look at the problematic aspects of this rule, which are akin to those of Subcategorization Adjustment/Deletion considered above. To begin with, Roeper and Siegel present independent motivation for neither this specific rule nor the general type which it instantiates. Moreover, the rule crucially depends for its operation on a string of subcategorization frames --- e.g. (36) --- which has the undesirable properties dealt with above. In addition, the constraints on the deletion operation of the rule are unclear. This is illustrated by the fact that Variable Deletion may perform, in addition to its major deletion operation, a further, peripheral deletion operation. Thus, whereas the rule is primarily designed to delete subcategorization frames, Roeper and Siegel propose that it be used for the deletion of prepositions in the case of certain -ed compounds as well. The "underlying structure" of -ed compounds such as starstruck, homemade and bullet-ridden incorporate a preposition according to Roeper and Siegel (1978:241). This preposition, of course, does not occur in the "superficial structure" of the compound. Consequently, Roeper and Siegel (1978:242) have to propose that "The preposition will automatically be deleted by the Variable Deletion rule, which includes everything that falls between verb and [+word]"<sup>(23)</sup>. In sum: Variable Deletion is a rule which is not motivated independently, which operates on an arbitrarily created string of subcategorization frames, and which is not properly constrained in terms of the operations it may perform. Notice that if ordered strings of subcategorization strings may be arbitrarily created and if particular frames may be arbitrarily deleted from these strings, it is virtually impossible to refute Roeper and Siegel's FS Principle.

It is now possible to appraise Roeper and Siegel's claim --- the (b) claim quoted above --- that the Compound Rule "operates on a highly constrained structural description" (and hence does not lead to an increase

in the power of the total grammar). This, clearly, is a misleading claim. The salient point is that the structural description of the Compound Rule is created by prior "lexical redundancy" and "adjustment rules" which are themselves not properly constrained and which, moreover, have other undesirable properties. This point undermines Roeper and Siegel's (b) claim. To see this, compare the Compound Rule, as a lexical movement transformation, to ordinary syntactic movement transformations. The latter rules apply to structures which, in a proper sense, are highly constrained. Thus, these structures are generated by PS-rules which must not only be independently motivated, but which must, in addition, meet such constraints as those expressed, for example, by the  $\bar{X}$ -theory. By contrast, the structures to which Roeper and Siegel's Compound Rule applies are generated by rules which do not have these or parallel properties. It is therefore in principle impossible for these rules to generate "highly constrained" structures or structural descriptions.

The fact that the Compound Rule does not apply to appropriately constrained structures is not its only defect. A second questionable aspect of this rule becomes apparent when forms such as those in (39) are considered.

- |          |                           |     |                                  |     |                             |
|----------|---------------------------|-----|----------------------------------|-----|-----------------------------|
| (39) (a) | <u>-ed Adjective</u>      | (b) | <u>-ing Adjective</u>            | (d) | <u>-er Noun</u>             |
|          | <u>beautifully-danced</u> |     | <u>beautifully-dancing</u>       |     | * <u>beautifully-dancer</u> |
|          | <u>smartly-dressed</u>    |     | <u>smartly-dressing</u>          |     | * <u>smartly-dresser</u>    |
|          | <u>loudly-screamed</u>    |     | <u>loudly-screaming</u>          |     | * <u>loudly-screamer</u>    |
|          |                           | (c) | <u>-ing Noun</u>                 |     |                             |
|          |                           |     | * <u>the beautifully dancing</u> |     |                             |
|          |                           |     | * <u>the smartly dressing</u>    |     |                             |
|          |                           |     | * <u>the loudly screaming</u>    |     |                             |

With reference to these forms, Roeper and Siegel (1978:221) point out that there is a systematic gap in the set of possible compounds. The gap is illustrated by the impermissibility of (c) and (d) forms and is filled by adjective + noun constructions such as those in (40).

(40)	(a)	<u>-er</u> Noun Gap	(b)	<u>-ing</u> Noun Gap
		<u>beautiful dancer</u>		<u>the beautiful dancing</u>
		<u>smart dresser</u>		<u>the smart dressing</u>
		<u>loud screamer</u>		<u>the loud screaming</u>

In accord with the FS Principle, the Compound Rule, however, will generate the impermissible -ing compounds in (39)(c) and the impermissible -er compounds in (39)(d).

Roeper and Siegel (1978:222-223) propose the following solution to the problem of preventing the impermissible forms in question from being generated by the Compound Rule: "... the lexicon must have a provision that eliminates compounds in case the adjective + noun construction systematically produces the same reading. (See Aronoff (1976) for a discussion of 'blocking' among morphological rules.)". However, they do not elaborate on either the formal nature or the mode of application of the device required for this blocking. This is unfortunate, since Allen (1978:182, n. 23) claims that this device has the status of a transderivational constraint. Transderivational constraints, she proceeds to point out, are "as theoretical devices ... extremely powerful, allowing for potentially unlimited descriptive power, as any stage in one derivation may be referred to by any stage in any other derivation. But if we can describe everything with our theoretical device, then we can explain nothing. And our task is clearly one of explanation". Thus, if the device required by Roeper and Siegel for blocking impermissible compounds such as (39)(c) and (d) were indeed to be a transderivational constraint, this would be a most undesirable consequence of the Compound Rule.

This brings us to a third problem, one of an empirical nature, with regard to the Compound Rule.<sup>(24)</sup> The rule incorrectly predicts that verbal compounds, such as those in (41) must be impermissible.

- (41) calorie-controlled  
time-controlled  
surface-sealed  
tongue-tied

~~This incorrect prediction stems from the fact that in the case of -ed compounds, the Compound Rule --- through the "adjustments" made by Subcategorization Adjustment/Deletion --- is never required to operate on an input structure with a direct object in FS position. And, in (41) calorie, time, surface and tongue appear to be direct objects incorporated in the compounds in question. In terms of this analysis, calorie-controlled would, for example, be derived from a source such as control calories.~~

Roeper and Siegel's (1978:234-235) solution to this problem is based on the claim that the compounds of (41) "can be paraphrased in terms of a passive with a prepositional phrase":

- (42) It was controlled for calories.  
It was controlled in time by the meter.  
It was sealed at the surface with tape.  
 ?He was tied at/by the tongue by his embarrassment.

This solution, in terms of which the compounds of (41) incorporate the NP of a prepositional phrase rather than a direct object, is unsatisfactory. Roeper and Siegel make no attempt to provide independent grounds for motivating the prepositional object analysis vis-à-vis the more natural direct object analysis.

Finally, if a lexical movement rule such as the Compound Rule were to be used in the derivation of Afrikaans synthetic compounds, two serious empirical problems would arise in connection with this rule. On the one hand, Afrikaans has synthetic compounds which are not verbally based but which have a noun (to which a suffix is attached) as their central constituent. This type of synthetic compounds are dealt with in some detail in Botha to appear: §4. The following examples should suffice to illustrate the general point:

- (43) Adj/Adv + Noun + Suffix  
onder + grond + s  
 "under" + "ground" + affix  
 "underground/subterranean"

binne + aar + s  
 "inside" + "vein" + affix  
 "intravenous"

buite + muur + s  
 "outside" + "wall" + affix  
 "extramural"

It is extremely difficult, if not impossible, to conceive of an analysis in terms of which synthetic compounds such as these are derived by means of a movement rule. Consequently, if a parallel of the Compound Rule were to be used for the derivation of Afrikaans verbal compounds, it would have to be claimed that Afrikaans has two distinct types of synthetic compounds: one involving movement and one not involving movement. A unitary analysis in which all synthetic compounds are derived in fundamentally the same manner would, of course, be superior. Elsewhere (Botha to appear: 84) it is argued that there is such an analysis which does not use a movement rule such as the Compound Rule for the derivation of Afrikaans synthetic compounds. (25)

On the other hand, as has been shown by De Villiers (1979), Afrikaans has synthetic compounds which incorporate phrases as first constituent. The following examples illustrate the point (the verbal bases are capitalized):

(44) (a) AdvP + V + Suffix

[ baie + laat ] + SLAAP + er  
 "very" + "late" + "sleep" + "er"  
 "a person who usually sleeps very late"

[ vreeslik + vinnig ] + RY + ery  
 "terribly" + "fast" + "drive" + "ing"  
 "the act of driving terribly fast"

(b) PP + V + Suffix

[ kerk + toe ]<sub>PP</sub> + GAAN + er (P = postposition)  
 "church" + "to" + "go" + "er"  
 "church-goer"

[ in + die + bed ]<sub>PP</sub> + LÊ + er (P = preposition)  
 "in" + "the" + "bed" + "lie" + "er"  
 "someone who habitually lies in bed"

(c) NP + PP + V + Suffix

[ [ boek ]<sub>NP</sub> + [ in + die + bed ]<sub>PP</sub> ] + LEES + ende  
 "book" + "in" + "the" + "bed" + "read" + "ing"  
 "in the act of reading a book in bed"

[ [ stoele ]<sub>NP</sub> + [ op + die + tafel ]<sub>PP</sub> ] + PAK + ery  
 "chairs" + "on" + "the" + "table" + "stack" + "ing"  
 "the stacking of chairs on tables"

If verbal compounds such as those in (44) should be derived by means of a movement rule analogous in essential respects to the Compound Rule, the former rule would have to violate the condition that WFRs do not involve phrases. As shown by De Villiers (1979) the cases listed in (44) are by no means isolated examples. The general point is clear: a compound rule for Afrikaans would have the undesirable property of violating a constraint on WFRs considered to be basic by Roeper and Siegel (1978:202, 211-212). This concludes the discussion of problematic properties of Roeper and Siegel's Compound Rule.

### 3.6 Missing generalizations

Recall that fundamental to Roeper and Siegel's (1978:208) theory of verbal compounding is the observation that permissible and impermissible compounds correspond exactly to grammatical and ungrammatical sentences. Their theory attempts to account for this correspondence on the basis of the assumption that both sentences and compounds are formed from subcategorization frames. But notice that the rules required for the derivation

of verbal compounds are not the same as those involved in the derivation of the corresponding sentences. Thus, for the formation of verbal compounds, Roeper and Siegel need unconventional "redundancy rules" plus an assortment of lexical "adjustment rules" and, of course, the Compound Rule. To specify the relevant aspects of the structure of the corresponding sentences, PS-rules and conventional redundancy rules are needed. Thus, Roeper and Siegel use different (kinds of) formal devices for the derivation of verbal compounds and corresponding sentences. But to state that two "corresponding" linguistic units have to be derived by means of different (kinds of) formal means, is to state that they are in fact unrelated. If these two units were indeed related, their differential derivation would be symptomatic of an inability to capture the relevant generalization(s). And this brings us to a serious shortcoming of Roeper and Siegel's theory of verbal compounding: by not using essentially the same formal devices for deriving verbal compounds and corresponding sentences, it fails to capture the relevant generalizations.

#### 4. Conclusion

In the preceding sections it has been argued that Roeper and Siegel's theory of verbal compounding exhibits the following major shortcomings:

1. Roeper and Siegel's notion "verbal compound" is ill-defined, with the result that they are unable (a) to draw a principled distinction between, on the one hand, verbal compounds and, on the other hand, root compounds and certain complex derivatives; (b) to motivate their lexical transformation analysis vis-à-vis an adjunction analysis in a non-ad hoc manner.
2. The observation basic to this theory --- viz. that permissible and impermissible compounds correspond exactly to grammatical and ungrammatical sentences --- is incorrect in its full generality.
3. For each affix the theory postulates a duplication of affixation rules --- i.e., a compound as well as a noncompound affix rule --- which is untenable because (a) Roeper and Siegel's argument for this duplication is based on the objectionable distinction between "occurring/existing" and "nonoccurring/nonexisting forms"; (b) Roeper and Siegel fail to provide empirical support for this duplication in the form of data about such properties of derived forms as allomorphy, stress pattern, meaning and subcategorization.

4. The formal devices proposed by Roeper and Siegel for the derivation of verbal compounds exhibit a variety of undesirable properties.

- (a) The "(lexical) redundancy rules" required for the generation of structured strings of subcategorization frames (i) are obscure in regard to formal properties, mode of application and power; (ii) duplicate part of the syntax.
- (b) Affixation/The Affix Rule(s), by supplying both an affix and creating an empty frame, perform(s) two quite disparate operations and is/are consequently not properly constrained.
- (c) Subcategorization Insertion (i) duplicates the function of regular lexical insertion in syntax, and (ii) is unconstrained in the sense of performing two disparate operations, viz. inserting words in empty frames, and changing the labelling of phrase brackets.
- (d) Subcategorization Adjustment/Deletion (i) is ad hoc in the sense of being restricted to -ed compounds to prevent them from refuting the FS Principle; (ii) crucially depends for its operation on arbitrarily created strings of subcategorization frames; (iii) performs a deletion operation the constraints on which are unclear.
- (e) Variable Deletion (i) is a rule belonging to a general type for the existence of which Roeper and Siegel provide no independent motivation; (ii) crucially depends for its operation on arbitrarily created strings of subcategorization frames; (iii) performs a deletion operation the constraints on which are unclear; (iv) is a rule which, because of the above-mentioned properties, drastically reduces the refutability of the FS Principle.
- (f) The Compound Rule, as a lexical transformation, (i) represents a kind of formal device whose contribution to the power of the total grammar is unclear; (ii) crucially depends for its operation on input structures created by the unconstrained and questionable "adjustment rules" listed above; (iii) probably requires a transderivational constraint to block its application in the case of certain impermissible verbal compounds; (iv) incorrectly fails to generate certain -ed compounds which incorporate direct objects; (v) would have a parallel in Afrikaans which (OC) would fail to provide an account of the structure of synthetic compounds

involving no movement at all; ( $\beta$ ) would have to violate the basic constraint that WFRs do not involve phrases.

5. Roeper and Siegel's theory of verbal compounding fails to capture the relevant generalizations by not using essentially the same formal devices to account for the shared structural properties of verbal compounds and corresponding sentences.

NOTES

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1. This paper, in fact, represents one section of a larger study (Botha to appear) that is concerned with the question of which linguistic units may constitute the bases of word-formation rules (henceforth: WFRs). In addition, this larger study contains a critical appraisal of Allen's (1978) theory of synthetic compounding. It also attempts to develop a theory of synthetic compounding which is less inadequate than the theories proposed by Allen and by Roeper and Siegel. The former critical appraisal of Allen's theory of synthetic compounding is being published as Botha 1980.
2. The most significant contributions to the lexicalist approach to morphology/word-formation --- all of which take Chomsky's (1970) analysis of English nominalizations as point of departure --- include Halle 1973; Siegel 1974; Jackendoff 1975; Aronoff 1976; Wasow 1977; Bresnan 1978; Roeper and Siegel 1978; and Allen 1978. For a brief outline of Aronoff's (1976) theory of word-formation cf. De Villiers 1979:40-42.
3. Cf., e.g., Bloomfield 1933:231; and Marchand 1969:15ff.
4. The former expression is used, for example, by Roeper and Siegel (1978), the latter by Allen (1978). All the synthetic compounds in (1) clearly are verbal or verbal-nexus compounds. In Dutch and German respectively the expressions "samenstellende afleiding" (cf. Schultink 1976) and "Zusammenbildung" (cf. Henzen 1957:237) are used to denote a synthetic compound.
5. Whereas Roeper and Siegel (1978) prefer the former term, Allen (1978) uses the latter.
6. The lexical core consists of a list of simple (or atomic) words and

the morphologically complex words that have been created by WFRs ---  
cf. Roeper and Siegel 1978:200.

7. Allen's dissertation was unknown to me at the time of my working on the former paper, entitled "Buitelyne van 'n teorie oor samestel-lende afleiding". It should be noted that Allen's criticisms of Roeper and Siegel's theory are levelled at an earlier, preliminary exposition of this theory in Roeper and Siegel 1976. The majority of these criticism as I understand them, however, apply to the later presentation in Roeper and Siegel 1978 as well.
8. It is neither possible nor necessary to explicate these principles here.
9. For additional examples of verbal compounds formed by means of less productive affixes not listed above cf. Allen 1978:157.
10. Notice incidentally that Roeper and Siegel's claim that verbal compounds are "extremely productive" is quite problematic within the framework of the general theory of word-formation which they accept. This theory states (cf. Roeper and Siegel 1978:200) that "the output of word formation rules (WFRs) is entered in long-term memory". (This claim has become known as "the 'full-entry' theory of the lexicon".) Roeper and Siegel call the long-term memory the "lexical core" (cf. note 6 above) which, as a component of the lexicon, "is a list of atomic words and those complex words that have been generated by WFRs". Being a component of the lexicon, this list must be finite. But how could the potentially infinite output of "extremely productive" rules such as those involved in verbal compounding be included in a finite list? Roeper and Siegel fail to broach this issue. The only indications they (1978:204) are prepared to give take the form of such intriguing statements as the following: "Words with particularly frequent affixes could not all be listed in the core. For instance, the -ly adverbs are so numerous that it would be inefficient to remember each one". But what do these statements mean and how do they fit into "the 'full-entry' theory of the lexicon" quoted above?
11. When the list of their criteria for verbal compounds is presented in

§3.2.2 below, it will be clear that they have no criterion in addition to those considered above for drawing this distinction in a principled way. Observe that it is not claimed here that it is in principle impossible to draw such a distinction. In fact, it will be argued in Botha to appear: §4 that such a distinction has to be drawn. The pertinent claim here is that Roeper and Siegel cannot do this in a principled way. At the heart of this inability on the part of Roeper and Siegel lies the fact that, in reality, they have no (linguistic) theory of root compounding. They (1978:206) tentatively allow, in the vaguest terms possible, for "the possibility that rules of concept construction (perhaps derived from cognitive psychology) might capture many intuitive regularities [observed in root compounds --- R.P.B.], such as the relation "like a" in babyface (face like a baby's)". On the nature and function of these "rules" they have nothing to say. In a note, they (1978:206, n.7) add that "The fact that we claim that cognitive rules are relevant to the definition of root compounds does not mean that syntactic factors may not also be present". They give no indication of how a linguistic account of these "syntactic factors" --- which they, incidentally, do not identify --- should be fitted into the overall grammar.

12. This analysis is discussed in detail in connection with Allen's (1978) theory of synthetic compounding in Botha 1980; and Botha to appear: §3.
13. For a discussion of this principle and its background cf. Roeper and Siegel 1978:200.
14. Roeper and Siegel mark possible but "not existing" or "not actually occurring" words with "&".
15. Allen's (1978:185) morphology is "overgenerating" in the sense that rules of word-formation must generate the infinite set of possible, well-formed words, only a subset of which includes "actual" or "occurring" words.
16. In a note, Allen (1978:286, n. 3) states that "It is not clear why the distinction between morphologically well-formedness and lexical occurrence has not played a more central role in the development of

recent theories of morphology. Halle's (1973a) work is exceptional in this respect". These statements are truly remarkable, given the existence of studies such as Botha 1968 and Booij 1977.

17. Allen (1978:§4.3) argues that in English complex derivatives cannot be formed (freely) on the basis of compounds by means of suffixation. In Botha to appear I will argue that this claim by Allen is not well-justified for English and that a parallel claim for Afrikaans would be simply false.
18. At this point in the discussion the content of note 10 above is once more relevant.
19. For a recent discussion of this aim of restricting the power of the general linguistic theory cf., e.g., Chomsky and Lasnik 1977:427.
20. Arguments against the use of certain formal devices because of the way in which they would adversely affect the power of the total grammar are often weaker than they are (fashionably) taken to be. The reason for this is that few propounders of such arguments take the trouble to make the necessary calculations in a systematic and explicit manner. For a recent controversy about how a specific theoretical device, namely traces, affects the power of the total grammar cf., e.g., Postal and Pullum 1978; and Chomsky and Lasnik 1978:268, n. 1.
21. Cf., e.g., Bach 1974:170 for the conventional notion "lexical redundancy rule".
22. For an implicit proposal that the power of redundancy rules be increased cf. Chomsky 1970. This proposal is criticized in McCawley 1973 and Botha 1977:168ff.
23. Alternatively, according to Roeper and Siegel (1978:342), the prepositions could be listed in the Compound Rule and "be deleted at that point".
24. A first empirical problem with this rule was dealt with in §3.3 where it was shown that, operating in accordance with the FS Principle,

the rule would derive impermissible verbal compounds such as those of (31)(a).

25. English may also have synthetic compounds which are not verbally based. Thus, Meys (1975:135) speculates on the possibility that forms such as short-circuiting, hot-gospelling, grand-touring, and perfect-fitting are derived by means of -ing suffixation from "adjective-noun combinations" which also underly (a) short-circuit, (a) hot-gospeller, (the) grand tour, (a) perfect fit respectively.

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