THE STATUS OF BACK-FORMATION
AND MORPHEME-BASEDNESS OF ENGLISH MORPHOLOGY

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This paper will examine the three verb-deriving processes in English, affixation (e.g. filmN → filmizeV), conversion (e.g. catalogN → catalogV), and back-formation (e.g. televisionN → televiseV) and will claim that while affixation is a concatenative process in the morphology, conversion and back-formation result from a listing process in the lexicon. It will be demonstrated that conversion and back-formation belong to the same derivational type, and the latter follows automatically from the proper characterization of the former. The elimination of back-formation from the inventory of derivational processes will be claimed to contribute to the maintenance of morpheme-basedness of English morphology.*

Keywords: affixation, back-formation, conversion, morpheme-basedness

1. Introduction

The aim of this paper is to advance a new view of the process called back-formation (BF henceforth) and defend the morpheme-basedness of English derivational morphology. The morpheme-based model of morphology adopts a morpheme as the primitive unit and analyzes a complex word as a concatenation of morphemes (Selkirk (1982), Di Sciullo and Williams (1987), Lieber (1992)). This view makes a contrast with the word-based model, which treats a word as the primitive unit and describes a morphological process as the relationship between words.

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The fact that English morphology is largely dominated by affixation and compounding strongly suggests its morpheme-based nature; its essential operation is to concatenate smaller units into a larger one. This view, however, falls foul of the existence of non-affixational processes such as conversion (CV henceforth), BF, and blending. Especially CV and BF, due to their productivity and systematicity, are often cited as evidence against the morpheme-basedness of English morphology (Pennanen (1979: 112–117), Haspelmath (2002: 48–51, 167–169), Plag (2003: 186–187)).

One way of maintaining the morpheme-based view is to analyze CV as a type of affixation, i.e. zero-derivation. Positing a zero-morpheme makes it possible to describe CV as the concatenation of morphemes. This is the traditional strategy, advocated most strongly by Marchand (1969). We will, however, claim that it is not affixation and CV, but CV and BF, that belong to the same derivational type, and will maintain the morpheme-basedness of English morphology by showing that CV and BF are phenomena in the lexicon, not in the morphology.

To be specific, we will examine the organization of the V(erb)-deriving processes in English: affixation (e.g. film\(_N\) → filmize\(_V\)\)), CV (e.g. catalog\(_N\) → catalog\(_V\)\)), and BF (e.g. television\(_N\) → televise\(_V\)\)). Section 2 will disprove the traditional zero-derivation analysis of CV, which gives catalog\(_V\) a zero-morpheme and puts it on the same plane as filmize\(_V\). CV is a non-affixational process and section 3 will claim that its essential nature lies in the dependency on syntactic information; a converted word expresses its derivational functions, the category in particular, through its morphosyntactic context. Based on this characterization of CV, section 4 will show that BF is nothing but a type of CV, a case of CV whose output (e.g. television\(_V\)\)) happens to have a form which is obstructive to the category-expression on the syntactic level and undergoes an adjustment to a more appropriate form (e.g. televise\(_V\)\)). The only difference between a converted word (e.g. catalog\(_V\)\)) and a so-called back-formed word (e.g. televise\(_V\)\)) is whether they need a formal adjustment in order to express their category explicitly in a syntactic structure.

In this paper, we will assume that CV and BF are synchronically relevant, directional word-formation processes.\(^1\) The data to be used are

\(^1\) Sometimes CV is described as a non-directional process (e.g. Lieber (1981),
taken from the literature (e.g. Biese (1941), Jespersen (1942), Pennanen (1966), Marchand (1969), Adams (1973, 2001), Mencken (1977), Bauer (1983), Shimamura (1990), Bauer and Huddleston (2002)), several dictionaries (Barinhart et al. (1990), Knowles and Elliot (1997), Ayto (1999), Matsuda (1999), the OED), and the BNC (British National Corpus). For the sake of convenience, we will use the notation \(<x, y>\) in order to represent a derivational relation between the input word \(x\) and the output word \(y\).

2. Affixation and CV

This section aims to prove that CV in English is not a type of affixation but an independent, non-affixational process. The argumentation is simple: V-deriving affixation and CV have clearly different input- and output-properties. First of all, V-deriving affixes (-ate, -ify, -ize, be-, en-, de-, dis-, un-) attach to the input category N or A only (e.g. activate, massify, hospitalize, bedew, enrich, deplane, disbar, uncork) and impose strict phonological and morphological restrictions on the base (e.g. the input to -ify suffixation should be iambic and Latinate). CV, on the other hand, can take as its input an item of any category except V and of any phonological and morphological make-up (e.g. buttery, dirtyv, offy, wowy, Zv, meowy, nine-to-fivey, dog-earv, DJv, brunchv, macv).

As to the output properties, affixed verbs are, to use the semantic groups of Clark and Clark (1979), semantically restricted to the locatum-, location-, and goal-meanings (e.g. accessorize, enshrine, massify) and their ASs (Argument Structures) are uniform (e.g. -ify/-ize verbs always have the AS \(x <y>\)). Converted verbs, on the other hand, can express not only the locatum-, location-, and goal-meanings (e.g. saddlev, lodgев, pilev) but also the manner-, instrument-, duration-, source-, meal-, crop-, weather-, action-meanings (e.g. maidv, axv, Farrell (2001)) and BF as a process of purely diachronic relevance (e.g. Aronoff (1976: 27), Adams (2001: 138)). However, the independently-motivated criteria for judging derivational direction (Iacobini (2000: 870–871)), the semantic dependency criterion in particular, dictate that CV does have the directionality, and the longer member of BF should be treated as the base and its shorter member as the derivative not only diachronically but also synchronically.
summer\textsubscript{V}, word\textsubscript{V}, lunch\textsubscript{V}, cram\textsubscript{V}, snow\textsubscript{V}, samba\textsubscript{V}) and many other miscellaneous meanings that have something to do with the base meaning (e.g. flatline\textsubscript{V} “die,” mace\textsubscript{V} “eat (heavily)”). In accordance with such semantic diversity, converted verbs exhibit various ASs (e.g. culture\textsubscript{V}: x <\textsubscript{y}, e-mail\textsubscript{V}: x <\textsubscript{y}, feud\textsubscript{V}: x, x <with y>, breakfast\textsubscript{V}: x) (Lieber (1992: 162)).

This comparison makes it clear that while affixation has a delimited and uniform nature, CV is of a versatile and heterogeneous nature. CV as a whole is restriction-free (Bauer (1983: 226)),\(^2\) which makes a marked contrast to affixation, whose input and output are strictly restricted in various ways. This fact is sufficient for us to refute the zero-derivation analysis, for it disproves the underlying assumption of this analysis, i.e. the parallelism between an affixed verb and a converted verb. If CV were a type of affixation, it would exhibit delimitedness and uniformity likewise. Then, we should attribute the versatile and heterogeneous nature of CV to the lack of an affix rather than to its covert existence.

Essentially, we adopt Lieber’s (1992: 157–165, 2004: 89–95, 2005: 418–422) idea and claim that CV results from a listing process in the lexicon, whereas affixation concatenates a base morpheme and an affix in the morphology.\(^3\) Advocating the morpheme-based morphology, Lieber lists basically root and bound morphemes only in the lexicon and provides a lexical entry for both types of morphemes. The suffix -ify, for instance, has its C(ategorial)-, P(honological)-, M(orphological)-, LCS (Lexical Conceptual Structure)-, and AS-properties specified in the lexicon as shown in (1a) below. Since the morphology combines an affix and a base morpheme according to the lexical entry information, the resulting affixed words always exhibit such delimited and uniform

\(^2\) We have only two restrictions on the V-forming CV: first, suffixed words cannot be the input to the CV (e.g. *arrival\textsubscript{V}, *kindness\textsubscript{V}), and second, converted verbs cannot be the base of a derivational suffix except -able, -er, and -ing (cf. Myers (1984: 61–66), Pesetsky (1995: 76–78)).

\(^3\) We assume the organization of the grammar in which the lexicon, morphology, and syntax constitute three distinct components. The lexicon lists all idiosyncratic information about listemes (Di Sciullo and Williams (1987: Chapter 1)), while morphology and syntax are independent generative systems (Ackema and Neeleman (2004: Chapter 2)). We do not adhere to Lieber’s (1992) view that morphology should be integrated into syntax, though our claims in this paper do not hinge on this point in any way.
properties as we saw above; the lexical entry information delimits the behavior of affixed verbs.

(1) a. -ify C: [N, A____]v
   P: [tifai], Input: iambic, Output: strictly alternating stress
   M: Input: [+Latinate], Output: nominalization by the suffix -Ation
   LCS: x CAUSE [BECOME [y BE WITH BASE]]
       (the locatum-meaning)
   x CAUSE [BECOME [y BE AT BASE]]
       (the goal-meaning)
   AS: x <y>

b. catalog C: [N____] catalog C: [v____]
   P: [kætəlɒɡ] P: [kætəlɒɡ]
   M: ... M: ...
   LCS: [Thing CATALOG] LCS: [Activity ... [Thing CATALOG] ...]
   AS: ... AS: ...

CV, on the other hand, occurs when an item already listed in the lexicon is re-entered as an item of a different category (Lieber (1992: 159)). As depicted in (1b), the relisting of the lexical item catalogN as a verb yields the new lexical entry catalogV in the lexicon. The lexicon allows for the addition of new entries, and there should be the possibility that an item in the lexicon can re-enter the lexicon as an item of a different category. As Lieber (1992: 162) points out, the lexical listing takes place piecemeal, one at a time, and no rule regulates its process. Therefore, CV, a type of listing in the lexicon, should also be a random, non-rule-governed process, and we can reduce its versatile and heterogeneous nature to its non-rule-governedness. For instance, the input categories of CV are not restricted to N or A, because a lexical item of any category except V can be relisted as a verb; as long as they are listed in the lexicon, adverbs (e.g. forwardV, offV), interjections (e.g. wowV), onomatopoeic items (e.g. Zv, meowV), or even lexicalized phrases (e.g. nine-to-fiveV) have the possibility of being relisted as verbs. As to the semantic diversity of converted verbs, since the listing process does not specify the output properties, relisted verbs can express almost any meaning as long as it includes the meaning of the input. Thus, in (1b) the only semantic information given to the relisted verb
catalogy is that its LCS includes that of the input noun.

In sum, while affixation is a process that concatenates morphemes in the morphology, CV is a process that relists a lexical item in the lexicon.

3. The Category-Expression Requirement on CV

The preceding section has adopted Lieber's claim that CV results from a listing process in the lexicon. To this claim, the present section adds the claim that a relisted word uses its syntactic information (including inflection) for expressing its derivational functions: its category and meaning.

Each derivational process has its own categorial and semantic functions and the resulting new lexeme should express (or mark) its category and meaning in some way. In the case of affixation, this is carried out by a derivational affix; in (2a), for instance, the category (V) and goal-meaning of cyclize are expressed/marked by means of the affix -ize.

(2) a. Kate cyclized this compound.
   b. Kate cycled into Nottingham.

A relisted word, however, does not have a derivational marker. Therefore, how does it express its category and meaning? Our idea is that it does so by means of inflectional and syntactic configurational information. In (2b), for example, it is the inflectional form and syntactic configuration that express the category and meaning of cycle; the syntactic configuration of (2b), along with the past-tense ending, automatically categorizes cycle as V, and the into phrase which follows cycle without an intervening direct object fixes it semantically as a motion-verb. In a word, a relisted word expresses the information of a derivational affix by means of its syntactic configuration and inflectional form; in CV, the function of a derivational affix is shifted to the morphosyntactic level.

The concept of the morphosyntactic characterization of a converted word itself is not new. Biese (1941: 387–397) explicitly argues that the most important factor for the development of CV in English lies in its establishment as a highly analytic language, i.e. the fact that English can express the grammatical function of a word not by its morphology but by its syntagmatic relation to other words in the sentence. Since the word order and the co-occurrence of different categories are fixed in
English, in most cases morphological marking is not necessary to discern the category of a word. CV heavily depends on this analytic nature of English.

Biese (1941: 317-322) examines the morphosyntactic contexts of the first instances of 2,260 converted verbs formed in the ME and ModE periods and demonstrates that a converted verb appears in a syntactic configuration and inflectional form that clearly characterize it as a verb. Specifically, 76% of the ME and ModE (denominal) converted verbs appear in the transitive configuration, and about 75% of them take the (passive) past participle, infinitive, or -ing form.

The same inflectional bias is exhibited also by converted verbs formed in the PE period. Consulting the OED, we find that 71.7% of its PE converted verbs (numbering 483) make their first appearance in the above three word-forms. The proportion of transitively-used instances in our PE data, however, is much lower than in Biese’s ME and ModE data, 57.3%. The strong tendency toward the transitive use, which is quite natural in that the direct object functions to fix the preceding converted verb as the category V, is on the decline. How does a converted intransitive verb express its category without the aid of a direct object?

Interestingly, English has certain syntactic patterns which function as category-markers of converted intransitive verbs; we often find them in the following patterns: (a) V + expletive object it (e.g. leg it), (b) V + particle (e.g. chicken out), and (c) go + Ving (e.g. go nutting). Of particular importance is the fact that the syntactic patterns (a) and (c) have no semantic effect on the converted verb inside, which strongly suggests their status as pure syntactic category-markers. Predictably, we have no instance of an affixed verb used in patterns (a)–(c); since its category is expressed explicitly by the derivational affix, it does not need such syntactic support.

Witness the following instances of pattern (a):

3. a. Manner-meaning
   Human: fool it, god it, heroine it, king it, lord it, man it, queen it, tom it (OED)
   Animal: ape it, cub it, parrot it, peacock it, pig it, rabbit it, swan it (OED); dog it (Matsuda (1999))

b. Instrument-meaning
   Body Part: foot it, hoof it, leg it, shin it, stump it, tongue it, wing it (OED); boot it (Matsuda
Vehicle: bus it, boat it, cab it, canoe it, coach it, jet it, train it, sledge it (*OED*)
Place: church it, court it, hotel it, pub it, slum it, tent it (*OED*); inn it (Jespersen (1942: 109))
Others: plank it, word it (*OED*); computer it (Farrell (2001: 119, fn. 16))

c. Miscellaneous meanings
From N: ace it, hook it, jazz it, rag it (*OED*); book it, booze it, coin it, deuce it (Matsuda (1999))
From non-N: brave it, highball it, hotfoot it, rough it, tough it (*OED*); gay it (Matsuda (1999))

As shown in (3a), converted verbs with the manner-meaning, the representative semantic group of converted intransitive verbs, occur with the object *it* with particularly high frequency. When used intransitively, converted verbs with the instrument-meaning as well favor this pattern, as in (3b). As in (3c), converted verbs with miscellaneous intransitive meanings also occur with the object *it*.

We assume that the object *it*, which is called the “empty object” by Jespersen (1942: 108) and “formal object” by Zandvoort (1969: 136), is an expletive element (Miyaoka (2002: 136)), for not only does it have no referent, but also it does not affect the semantics of the converted verb at all. The phrase *queen it*, for instance, expresses the same intransitive manner-meaning as *queen*. Then, what is the function of this *it*? Our claim is that *it* functions as the category-marker of a converted verb. Converted intransitive verbs by themselves are categorically unstable, so *it* is inserted as an expletive object to clarify their categorical status. This claim is confirmed by the following two facts. First, nonce converted verbs in particular take the expletive object *it* with high frequency (Jespersen (ibid.)). Second, not a few converted verbs are used only in combination with *it* (e.g. *five *(it)*, *good-time *(it)*, *high-and-mighty *(it)*, *Latin *(it)*, *middle-aisle *(it)*, *poor-boy *(it)*).4

Particles (as defined by Jespersen (1924: 87–90)), too, often accompany converted intransitive verbs. Below we present a few instances:

(4) a. Manner-meaning: chicken out, clown about, fool along,

4 These instances also disprove the claim that *it* is inserted as the phonological support for a monosyllabic converted verb (e.g. Miyaoka (2002: 139–140)).
hare off, jockey around, lord over, partner up, rabbit away, rat out, soldier on, usher in

b. Goal-meaning: balloon up, cave in, cluster together, gang up, queue up

Although the primary function of a particle is the specification of the semantics of a converted verb, the strong link between its occurrence and the intransitivity of the verb speaks for its secondary function as a syntactic category-marker. Just like the expletive object *it*, the particle supports the converted intransitive verb categorially. The fact that some converted verbs take both the expletive *it* and a particle confirms their functional parallelism (e.g. brave *it* out, man *it* out, tom *it* around, tough *it* out (OED); booze *it* up, coin *it* in, hotfoot *it* out (Matsuda (1999)); queen *it* over (Zandvoort (1969: 137)).

The third syntactic category-marker is the VP “go + present participle (Ving).” Converted verbs with the crop-meaning (“gather/catch the base referent”) show a very strong preference for this syntactic pattern (e.g. go blackberrying, go clamming, go crabbing, go fishing, go haying, go huckleberrying, go nutting, go primrosing, go sharking), and some instances are attested only in this pattern (e.g. go palming, go sponging, go strawberrying). This fact must be due to the purpose meaning (“go in order to do something”) that the VP “go + V-ing” originally expressed (Zandvoort (1969: 43)), which, however, seems to have been (almost) lost in PE. The go-phrase (e.g. go nutting) expresses the same crop-meaning (e.g. “gather nuts”) as the converted verb in isolation (e.g. nutty) and hence cannot take a directional PP (e.g. go nutting {in/*into} the woods).5

The original purpose-meaning has been lost completely in the following go-phrases, which express the same (parenthesized) miscellaneous intransitive meanings as the converted verbs in isolation:

(5) a. go catting (“go after the opposite sex”), go jetting (“travel by jet plane”), go juking (“dance at a juke joint”), go soldiering (“become a soldier”), go tomming (“practice prostitution”), go vagabonding (“wander about”)

b. go hau-hauing (“utter the cry of a hyena”), go hooshing (“move rapidly”), go kyoolding (“make a loud noise”), go zizzing (“make a whizzing sound”)

5 This fact was pointed out to me by Shuji Chiba.
(5b) shows that a go-phrase can accommodate even a converted verb from an onomatopoeic item, a type of verb totally incompatible with the purpose meaning. These facts lead us to claim that having lost the original purpose meaning, the VP “go + Ving” now functions as a pure syntactic category-marker of a converted verb. It could be the case that its frequent occurrence with a crop-converted verb discussed above has led to the independent development of this function.

To summarize this section, CV results from a (re)listing process in the lexicon and heavily depends on the analytic nature of English; this language can express the derivational functions of a word by morphosyntactic means, and has even developed certain syntactic frames as category-markers.

4. BF as a Type of CV

4.1. Claim

This section argues that the process called BF is a type of CV. The idea is that in order to express the category explicitly on the syntactic level, relisted verbs sometimes undergo formal adjustment, and the so-called BF is merely a case of their forms being adjusted by a deletion operation.

English morphology has the following two types of BF: first, BF based on a one-root word (e.g. <televisionN, televiseV>, <beggarN, begV>, <destructionN, destructV>, <laserN, laseV>, <cosyA, coseV>), and second, BF involving a compound form (e.g. <laser-printerN, laser-printV>, <team teachingN, team-teachV>, <jam-packedA, jam-packV>). Although some researchers (e.g. Shimamura (1990: 132)) distinguish these two types theoretically, we treat them equally as a case of CV whose output is formally adjusted by a deletion operation. To put the claim more explicitly, our lexicon includes not only paired entries like (6a) but also those like (6b) as a result of the relisting:

6 Along with Marchand (1969: 100–101), Adams (2001: 100), and Plag (2003: 154–155), we assume that English does not have a productive verbal compounding process (cf. Ackema and Neeleman (2004: 55)). English compound verbs come from corresponding compound nouns/adjectives via BF (e.g. <laser-printerN, laser-printV>) or CV (e.g. <dog-earN, dog-earV>). For the inadequacy of the direct concatenation analysis of compound verbs, see Shimamura (1990: 144–167).
(6) a. catalogN/catalogV, dog-earN/dog-earV
    b. televisionN/televisionV, laser-printerN/laser-printerV
As we saw in section 3, any relisted word should express its category in the syntactic structure. Most of the converted verbs, including catalogV and dog-earV in (6a), satisfy this requirement automatically once they enter a sentence; inflectional/syntactic information suffices to characterize them as V. This is the case traditionally called CV. But some relisted verbs happen to have a form that is obstructive to the requirement in question (e.g. televisionV and laser-printerV in (6b) end in the same form as a nominal suffix), so that they enter a sentence in an adjusted, categorically more appropriate form (e.g. televise, laser-print). It is this type of CV that is traditionally called BF. Hence, <catalogN, catalogV> and <televisionN, televiseV> represent the same derivational process, CV, differing only in that the latter case involves a formal adjustment for the category-expression requirement.

4.2. Previous Approaches to BF

In the literature, we have mainly two approaches to BF, the one using a unidirectional WFR (Word Formation Rule) and the other adopting a bidirectional lexical redundancy rule. Their representative definitions of BF are cited below.

(7) a. [BF is] a backwards application of a WFR.
    (Aronoff (1976: 27))
    e.g. \([X]_V \rightarrow [[X]_V + \text{ion}]_N\)
    b. [BF] is ... an application of a morphological [correspon-
    dence] rule in the less productive direction.
    (Haspelmath (2002: 169))
    e.g. \(\begin{bmatrix} /\text{X}/ \\
    \text{V} \\
    \text{“x”} \end{bmatrix} \Leftrightarrow \begin{bmatrix} /\text{Xion}/ \\
    \text{N} \\
    \text{“act/result of xing”} \end{bmatrix}\)

For instance, the WFR-based approach derives televiseV by applying the WFR given in (7a) backward to televisionN. The approach using a redundancy rule (Jackendoff (1975)) derives this verb by activating the CR (Correspondence Rule) given in (7b) in the less productive direction, i.e. from right to left (CR is Haspelmath’s version of the redundancy rule). Importantly for us, despite the differences in the type of rule, both of these previous approaches follow the traditional view of BF, i.e. the view that “[BF] is the formation of a new lexeme by deleting a suffix, or supposed suffix ...” (Bauer (1983: 64, emphasis added)).
They take it for granted that a BF process corresponds to some affixation process, or to use Becker’s (1993: 7) term, that every BF process has a corresponding “forth-formation” process. The fallacy of this assumption will be demonstrated shortly.

Consider the following three types of BF (the representative instances to be used in the discussion are bold-faced):


b. <bruxismN, bruxV>, <frivolousA, frivolV>, <one-upmanshipN, one-upmanV>, <cathecticA, cathectV>, <sullenA, sullV>


In (8a), the deleted part (e.g. -ance, -ish) corresponds to an unproductive suffix; the deverbal N-forming suffix -ance (ence) and the deverbal A-forming suffix -ish, for example, are no longer productive in PE (Marchand (1969: 305), Bauer and Huddleston (2002: 1700)). Since a WFR is posited only for a process that can produce a word, the back-formed pairs in (8a) do not have a corresponding WFR (e.g. *[X]V → [X]V+anceN, *[X]V → [X]V+ishA), which means that their existence cannot be accounted for in the WFR-based approach. The deletion in (8b) has no corresponding WFR or CR because it ignores the categorial selectional property of the deleted suffix. Suffixes -ism and -ous, for instance, cannot be attached to a verb as their selectional property, so there exist no deverbal -ism/-ous suffixation processes in English morphology. This means that we do not have the WFR (e.g. *[X]V → [X]V+ismN) or the CR (e.g. *[X]V ↔ [Xism]N) that should produce the pair <bruxismN, bruxV>, for instance. If BF were the reverse of some affixation process, as assumed in the previous studies, the output
category of BF should always be equal to the input category of the affixation process.

The fallacy of the common assumption becomes even clearer when we look at the instances in (8c). In this type, the deleted part (e.g. -on, -evik) does not even exist as an affix. English does not have an affix in the form on or evik, let alone a WFR or CR for it. Hence, the not infrequent occurrence of the (8c) type of back-formed pair, which receives no explanation in the previous approaches, forces us to make a radical revision of the traditional view; BF does not necessarily delete an affix, and not every BF process has a corresponding forth-formation process.

The problem disappears once we discard the traditional notion of BF as the reverse of affixation. Our approach introduced in section 4.1 is the first attempt to free BF from this notion, and its inner workings are illustrated as follows:

(9) a. In the lexicon: the relisting process

\[
\begin{align*}
\text{catalog}_N & \ [\text{Thing CATALOG}] \\
\text{catalog}_V & \ [\text{Activity} \ldots [\text{Thing CATALOG}]] \\
\text{television}_N & \ [\text{Thing TELEVISION}] \\
\text{television}_V & \ [\text{Activity} \ldots [\text{Thing TELEVISION}]]
\end{align*}
\]

b. In the syntax: the category-expression requirement

e.g. They catalog the furniture.

e.g. They televise the Royal wedding.

Look at (9a). Since they are simple nouns, \textit{catalog}_N and \textit{television}_N are listed in the lexicon. The relisting of these items as V yields the new lexical entries \textit{catalog}_V and \textit{television}_V. This is all that happens in the lexicon, but when used in a sentence, these relisted verbs have to express their category explicitly. \textit{Catalog}_V can satisfy this requirement by its syntactic context alone, but \textit{television}_V cannot, for the latter ends in the form obstructive to the requirement, i.e. the same form as the derivational nominal suffix -ion. The formal identity with the nominal marker obstructs the category-expression of the verb \textit{television}_V. Hence, as depicted in (9b), while \textit{catalog}_V enters a syntactic structure with no formal adjustment, \textit{television}_V is adjusted to the form televise, a form that can satisfy the category-expression requirement. In this analysis, the deletion is not an independent derivational process but merely one way for a converted word to express its category explicitly.\footnote{We assume that deletion is applied to a relisted word at lexical insertion.}
We need not posit the deletion operation independently as BF, because it occurs as a consequence of the category-expression requirement imposed on all converted words.

Let us see how our approach deals with the three types of BF given in (8). The productivity of the suffix deleted in (8a) and the categorial selection of the suffix deleted in (8b), which cause trouble in the previous approaches, do not matter for our approach, for CV/relisting occurs independently of these properties. All that matters for us is the fact that the input words of (8a, b) (e.g. surveillance\textsubscript{N}, frivolous\textsubscript{A}) end in a form that obstructs their use as a verb, i.e. the same form as a nominal/adjectival derivational suffix. Given this property, their relisted forms (e.g. surveillance\textsubscript{V}, frivolous\textsubscript{V}) are naturally adjusted to shorter, categorically more appropriate forms (e.g. surveille, frivol).

But our approach, unlike its precedents, also admits the possibility of a non-affixal element being deleted, as in (8c), for any element can be deleted from a relisted word if the deletion facilitates its category-expression. To put it simply, the deletion is applied to a relisted verb in order to make its form “more verbal.” Suppose that due to their phonological properties, the forms liaise and bolsh sound more verbal than the forms liaison and bolshevik. Then, the category-expression requirement is satisfied more easily by using the former forms rather than the latter forms, irrespective of the affixal status of the deleted parts -on and -evik. In other words, -on and -evik are deleted not because their presence obstructs the category-expression but because the forms devoid of them have certain properties that facilitate the category-expression. More generally, given the back-formed pair <xa, x>, the relisted form xa is adjusted to the form x either because a has a certain property obstructive to the category-expression requirement or because x has a certain property favorable to it.\footnote{Although its strict characterization requires further study, we expect the property of x that triggers a formal adjustment to be phonological (rather than morphological), given the observation that output verbs of the (8c) type of BF show a marked tendency to be monosyllabic (e.g. bolsh) and/or end in the vowel e (e.g. liaise). If our analysis is on the right track, these phonological traits should be among the typical formal characteristics of English verbs, so that they contribute to enhancing the “verbiness” of the form.}

In sum, not only converted pairs (e.g. <catalog\textsubscript{N}, catalog\textsubscript{V}>) but also (so-called) back-formed pairs (e.g. <television\textsubscript{N}, televise\textsubscript{V}>) follow from
our characterization of CV. So we do not need to posit the process of BF in English morphology, which has been mistakenly characterized as the reverse of affixation.

4.3. Empirical Support for BF as a Type of CV

4.3.1. Semantic Parallelism

This section provides empirical support for our claim. The first evidence comes from the semantic parallelism between CV and BF. The following table compares the semantic domains of the three V-forming processes, affixation, CV, and BF (the asterisk stands for the absence of an instance), and strongly suggests that our idea of grouping CV and BF rather than the traditional idea of grouping CV and affixation is on the right track:

<table>
<thead>
<tr>
<th>(10) Semantic group</th>
<th>Affixation</th>
<th>CV</th>
<th>BF</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Locatum</td>
<td>ammonify</td>
<td>buttonhole</td>
<td>bibliograph, air-condition</td>
</tr>
<tr>
<td>b. Location</td>
<td>ghettoize</td>
<td>lodge</td>
<td>pillor (&lt;pillory)</td>
</tr>
<tr>
<td>c. Goal</td>
<td>amitate</td>
<td>cash</td>
<td>jell (&lt;jelly), jam-pack</td>
</tr>
<tr>
<td>d. Manner</td>
<td>vampirize</td>
<td>private-eye</td>
<td>butte(&lt;butler), cheerlead</td>
</tr>
<tr>
<td>e. Instrument</td>
<td>*</td>
<td>rivet</td>
<td>rotavate (&lt;Rotavator), word-process</td>
</tr>
<tr>
<td>f. Duration</td>
<td>*</td>
<td>winter</td>
<td>vacate (&lt;vacation)</td>
</tr>
<tr>
<td>g. Source</td>
<td>*</td>
<td>word</td>
<td>*</td>
</tr>
<tr>
<td>h. Crop</td>
<td>*</td>
<td>shrimp</td>
<td>bird’s-nest (&lt;bird’s-nesting)</td>
</tr>
<tr>
<td>i. Action</td>
<td>*</td>
<td>dart</td>
<td>aviate (&lt;aviation), channel-surf</td>
</tr>
<tr>
<td>j. Onomatopoeia</td>
<td>*</td>
<td>meow</td>
<td>*</td>
</tr>
<tr>
<td>k. Miscellaneous</td>
<td>*</td>
<td>flatline</td>
<td>york (&lt;yorker), cliff-hang</td>
</tr>
</tbody>
</table>

This table shows that affixation and CV are not semantically parallel, as claimed in section 2, but CV and BF are; BF can express as many meanings as CV and their semantics are of an equally diverse nature. This fact means that back-formed verbs (e.g. teleisvev, laser-printv) express the same meaning as their converted counterparts (e.g. televisionv, laser-printerv) would express, which is exactly what our theory predicts. CV and BF also share the particularly high productivity of the manner-, instrument-, and action-groups.

The parallelism between CV and BF spreads to semantic details. As Jespersen (1942: 105–107) discusses under the name of “retort,” CV can verbalize a word/phrase used in an utterance (e.g. “Honey”—“Don’t honey me”). Affixation does not allow this usage, but BF does, as the following instances show:
(11) a. You will be killed; he is a prize-fighter—I’ll prize-fight him.


(Jespersen (1942: 106))

Moreover, both CV and BF can produce a verb with various meanings from a proper noun, as in (a) CV: (Robinson) Crusoe\textsubscript{V}, Houdini\textsubscript{V}, Titanic\textsubscript{V} and (b) BF: quisle\textsubscript{V} (<Quisling\textsubscript{N}), kipple\textsubscript{V} (<Kipling\textsubscript{N}), diddle\textsubscript{V} (<Diddler\textsubscript{N}). Even a proper noun turns into a verb not by CV but by BF when its end-form happens to be identical with a nominal marker. This fact can be easily accounted for by our claim that BF is merely a case of CV whose output needs a formal adjustment.

4.3.2. Input Properties

The second evidence comes from the input properties of BF. Examining all the back-formed pairs introduced so far, we notice that the input to BF is either a simple word (e.g. liaison\textsubscript{N}, television\textsubscript{N}, beggar\textsubscript{N}, cosy\textsubscript{A}) or a complex word lexicalized in some way (e.g. destruction\textsubscript{N}, laser-printer\textsubscript{N}); no transparent complex word undergoes BF. This fact receives a straightforward account in our approach. As a type of CV, BF involves a relisting process, which applies to the items listed in the lexicon. Since transparent complex words are not listed in the lexicon (as discussed in section 2), they cannot be the input to BF.

The acceptability difference between the following back-formed compound verbs (taken from Miller (1993: 111)) is also due to the listedness of the input compounds:

(12) a. <hand carving\textsubscript{N}, hand-carve\textsubscript{V}>, <tape recorder\textsubscript{N}, tape-record\textsubscript{V}>

b. <meat eating\textsubscript{N}, *meat-eat\textsubscript{V}>, <tax payer\textsubscript{N}, *tax-pay\textsubscript{V}>

All the input compounds in (12) have the form [N-Ving\textsubscript{er}]\textsubscript{N}. But the non-head N is an adjunct to the head V in (12a), while the N is an argument of the V in (12b). As discussed in Shimamura (1990: Chapter 5), the “adjunct-type” compound nouns constitute fertile ground for BF into compound verbs, but the “argument-type” compound nouns rarely undergo BF. Our approach accounts for this fact as follows: only the items listed in the lexicon undergo BF, a type of CV/relisting. As a type of N-N compound, adjunct-type compounds tend to deviate from semantic compositionality (Downing (1977), Ryder (1994)), so they are often listed in the lexicon. Argument-type compounds, on the
other hand, do not enter the lexicon because, as a type of synthetic compound, they are formed and interpreted regularly on the basis of the head V’s argument structure (Roeper and Siegel (1978), Selkirk (1982), Lieber (1983), Ito and Sugioka (2002: Chapter 2)). Then, it is clear why only adjunct-type compound nouns can undergo BF: a listed word (e.g. *hand carving*~N, *tape recorders*) can undergo a relisting process, but it is impossible to relist a word that does not exist in the lexicon (e.g. *meat eating*~N, *tax payer*~N). Note that apparent counterexamples arise (e.g. &lt;clock-watcher*~N, *clock-watch*~V>, &lt;sheep-stealing*~N, *sheep-steal*~V&gt;) due to the slim possibility of argument-type compounds losing the compositionality and entering the lexicon (e.g. *clock-watcher*~N is not “one who watches a clock”).

4.3.3. Syntactic Category-Markers

The third evidence concerns the ways in which a derivative expresses its functions, particularly its category. In section 3, we argued that whereas an affixed verb expresses its category by derivational means (i.e. by the derivational affix), a converted verb does so by inflectional and syntactic means. We revealed that as syntactic means of expressing the category of a converted verb, English uses not only the transitive configuration but also the following three types of syntactic pattern: (a) V + expletive object *it* (e.g. *leg it*), (b) V + particle (e.g. *chicken out*), and (c) go + V*ing* (e.g. *go nutting*).

As predicted from our claim, back-formed verbs as well occur in these syntactic patterns. Witness the following instances:

(13) a. bum it (<bummer*~N*), petitfog it (<pettifoger*~N*), spank it (<spanking*~N*), strump it (<strumpet*~N*), wayfare it (<way-faring*~N*), fox-hunt it (<fox-hunting*~N*) (*OED*); cold-haul it (<cold-hauling*~N*) (Matsuda (1999))

b. bum around (<bummer*~N*), drowse off (<drowsy*~A*), duff up (<duffer*~N*), gad about (<gadling*~N*), hawk about (<hawker*~N*), hoke up (<duffer*~N*), loaf away (<loaf*~N*), sidle along (<sideling*~Adv*), sprightle up (<sprightly*~A*), cold-haul it (<cold-hauling*~N*) (Matsuda (1999))

c. go hawking (<hawker*~N*), go peddling (<peddler*~N*), go sauntering (<sauntering*~N*), go spelunking (<spelunker*~N*), go surfing (<surfing*~N*), go totting (<totting*~N*), go pub-crawling (<pub-crawling*~N*), go wool-gathering (<wool-gathering*~N*) (*OED*); go sight-seeing (<sight-seeing*~N*)
In view of the fact that we have no instance of an affixed verb used in the three syntactic patterns, the above data confirm the parallelism between CV and BF. Back-formed verbs and converted verbs (but not affixed verbs) express their category by the same formal means, or to put it more strongly, they get established as verbs through the support of the same morphosyntactic contexts.

4.3.4. Inflection of Back-Formed Compound Verbs and Three Types of CV

Kiparsky (1982: 213) points out the interesting fact that compound verbs are not consistent in their inflection and exhibit at least four distinct inflectional paradigms, as shown below (we capitalize the lexeme).

(14) a. SIGHTSEE\textsubscript{V} b. SKYWRITE\textsubscript{V} c. GHOSTWRITE\textsubscript{V} d. DAYDREAM\textsubscript{V}

Participle: sightseeing skywriting ghostwriting daydreaming
Infinitive: to sightsee to skywrite to ghostwrite to daydream
Present: *sightsees skywrites ghostwrites daydreams
Past: *sightsees *skywrote/ ghostwrote daydreamt/

According to the author, some compound verbs, like sightsee\textsubscript{V} in (14a), allow non-finite forms but not finite forms. Other compound verbs, like skywrite\textsubscript{V} in (14b), allow non-finite forms and a present form but not a past form. There also exist compound verbs which allow all the word-forms, like ghostwrite\textsubscript{V} in (14c). When the head verb is a weak verb, as in daydream\textsubscript{V} in (14d), compound verbs make a (possibly regularized) past form if they make a present form. The inflectional variability among individual items is reflected in the fact that researchers make different generalizations about the inflectional paradigm of a back-formed compound verb, as pointed out by Shimamura (1990: 189). Thus, while Jespersen (1942: 104) and Bolinger (1975: 409) argue that compound verbs are inflected regularly, Marchand (1969: 106–107) claims that they are inflected irregularly when headed by an irregular verb. Adams (1973: 110) makes yet another generalization that compound verbs are used only in the non-finite form.

Given these facts, we have to concede that there exists no one general inflectional paradigm for compound verbs (Shimamura (1990: 191–192)). Certain generalizations exist, however. Notice that both the inflectional variability among individual items and the inconsistency among researchers’ descriptions concern the use and form of finite
forms. All the compound verbs given in (14) can be used at least in non-finite forms, and the researchers do not disagree on this point. Moreover, additional data show that it is in the participle form, rather than in the infinitive form, that compound verbs are used with the highest acceptability. For instance, in the following sentence-pairs, sentence (a) is (much) more acceptable than sentence (b), according to the respective authors:

(15) \[
\begin{array}{ll}
  a. & \text{He is } \underline{\text{henpecked}} \text{ (by his wife).} \\
  b. & \text{His wife } \underline{\text{henpecks}} \text{ him.} \\
  a. & \text{They went } \underline{\text{deer-hunting}} \text{.} \\
  b. & *\text{They } \underline{\text{deer-hunted}} \text{. (Bauer and Huddleston (2002: 1661))} \\
  a. & \text{Several people were } \underline{\text{skinny-dipping}} \text{ in the river.} \\
  b. & *\text{Johnny } \underline{\text{skinny-dips}} \text{ a lot. (Shimamura (1990: 185))}
\end{array}
\]

The inflectional bias toward the participle form is also confirmed by Miller’s (1993: 113) statement that a compound verb back-formed from an argument-type compound occurs always in the (present) participle form, as shown below.

(16) \[
\begin{array}{ll}
  a. & \text{I was } \underline{\text{clam-digging}} \text{ yesterday.} \\
  b. & ?I \text{ want to } \underline{\text{clam-dig}}. \\
  c. & ?I \underline{\text{clam-dig}} \text{ every day.} \\
  d. & *I \text{ (had) } \underline{\text{clam-dug}}/\underline{\text{clam-digged}} \text{ last Saturday.} \\
\end{array}
\]

As discussed in section 4.3.2, in contrast to adjunct-type compounds (e.g. hand-carvingsN, tape-recorderN), argument-type compounds (e.g. meat-eatingN, tax-payerN) strongly resist BF. But if they do undergo BF, the resulting compound verbs can be accepted only in the participle form. Shimamura (1990: 185) makes a similar observation; most of the compound verbs of the [argument N-V]v type that she found come in the present participle form:

(17) \[
\begin{array}{ll}
  a. & \ldots \text{ they’ll be } \underline{\text{carol-singing}} \text{ for appreciative audiences.} \\
  b. & \text{I was } \underline{\text{cabinet-making}} \text{ in the garage.} \\
\end{array}
\]

(Shimamura (1990: 185))

Based on these facts, we arrive at the following generalization: back-formed compound verbs are used most freely in the participle form.\footnote{Strictly, the generalization goes as follows: back-formed compound verbs are used most freely in the participle form that is identical with their input form. When back-formed from an -ing compound noun (e.g. skinny-dippings, clam-}
Our approach accounts for the participle-oriented inflection of back-formed compound verbs as a natural consequence of the category-expression requirement. Look at the following derivation of the word-pair \(<\text{skinny-dipping}_N, \text{skinny-dip}_V>\):

(18) a. In the lexicon: the relisting process

- \(\text{skinny-dipping}_N\) [\text{Thing SWIMMING NAKED}]
- \(\text{skinny-dipping}_V\) [\text{Activity SWIM NAKED}]

b. In the syntax: the category-expression requirement

e.g. Several people were \text{skinny-dipping} in the river.

Applied to the listed compound \(\text{skinny-dipping}_N\), relisting yields the compound verb in the form \(\text{skinny-dipping}_V\) in the lexicon. As a relisted verb, this verb has to express its category explicitly in the syntax, but it does so automatically when it appears in a participial syntactic context like (18b); the end-form \(-ing\) enables the compound verb to enter the syntax as a participial word-form directly, i.e. with no formal adjustment. In contrast, using the compound verb in non-participial syntactic contexts requires a formal adjustment, the deletion of \(-ing\). This difference leads to the inflectional bias of compound verbs toward participle; the participial use of the relisted verb \(\text{skinny-dipping}_V\) is particularly favored because it requires no formal adjustment and hence constitutes the most economical way to satisfy the category-expression requirement. Any relisted word should express its category in the syntax, and optimally it should do so in the most economical way, i.e. with no formal adjustment.

Thus, the participle-oriented inflection of compound verbs means that certain relisted words satisfy the category-expression requirement by taking advantage of a formal coincidence between the input- and output-categories. The form \(-ing\) exists not only as the derivational \textit{nominal} marker but also as the inflectional \textit{verbal} marker. Thanks to this formal coincidence between N and V, a relisted verb from an \(-ing\) nominal can satisfy the category-expression requirement automatically if it occurs in the participial syntactic context.

\(\text{digging}_N\), compound verbs prefer the present participle form, but compound verbs back-formed from a compound adjective (e.g. \(\text{hen-pecked}_N, \text{tailor-made}_A\)) are used most freely in the past participle form. The following discussion on the BF from an \(-ing\) compound noun applies also to the BF from a compound adjective, though the latter involves certain complications which cannot be discussed here.
To put the present discussion in a wider context, CV includes the following three types, (i), (ii), and (iii), that differ from one another in the way they satisfy the category-expression requirement (the arrow represents the direction of CV):

(19) Lexicon Syntax (e.g.)
   a. i. catalogN → catalogV They cataloged the furniture.
      ii. surfingN → surfingV That is a good place to go surfing.
      iii. televisionN → televisionV They televise the Royal wedding.
   b. i. dog-earN → dog-earV I used to dog-ear my books.
      ii. skinny-dippingN → skinny-dippingV He was skinny-dipping in the river.
      iii. heat treatmentN → heat treatmentV We have to heat-treat that metal.

The three types at issue are found both in the CV from one-root input shown in (19a) and in the CV from compound input given in (19b).

In the (i) type, the category-expression requirement is satisfied with no formal adjustment because the input does not have a form that signals its category. CatalogN and dog-earN, for example, have no formal element that characterizes them as N. Hence, their relisted verb forms catalogV and dog-earV need no formal adjustment to satisfy the requirement; they have no categorially-obstructive element to be deleted, and their inflectional/syntactic information suffices to characterize them as V. Since the majority of English words do not have a morphology that signals its category, most of CV instances belong to the (i) type; this type corresponds to what is traditionally called CV.

Some listed words, however, have a form that signals their category. TelevisionN and heat treatmentN in (19aiii) and (19biii), for example, end in forms specific to the category N, i.e. the nominal suffixes -ion and -ment. Therefore, their relisted verb forms (televisionV and heat treatmentV) have to have those obstructive elements deleted in order to express their category (V) explicitly on the syntactic level. In brief, the (iii) type is a type of CV which satisfies the requirement by adjusting its output form. The so-called BF belongs to this type.

Between the (i) and (iii) types comes the (ii) type. This type is interesting in that the input word (e.g. surfingN, skinny-dippingN) has an element that belongs not only to the input category but also to the output category. This formal coincidence between the input- and output-categories makes it possible to satisfy the category-expression requirement by doing nothing, with no formal adjustment. Thus, although input of this type has its category formally characterized, as in the (iii) type, the formal coincidence between two categories enables its output
to satisfy the requirement in the same way as the (i) type rather than as the (iii) type. Since CV without formal adjustment is more economical than CV with it, the (ii) type is more productive than the (iii) type, and its output shows a marked bias toward the participial inflection.

To summarize the discussion, most of the relisted words (e.g. catalogV, dog-earV) have no category-specific element, so they satisfy the category-expression requirement by their morphosyntactic contexts alone. Some relisted words (e.g. televisionV, heat treatmentV), however, have an element specific to the input category, so they undergo a formal adjustment to satisfy the requirement. The so-called BF from -ingl-ed compounds (e.g. skinny-dippingN, hen-peckedA) belongs to yet another type of CV, which satisfies the requirement through the formal coincidence between input- and output-categories.

4.3.5. -Ate Verbs

Plag's (1999: Chapter 7) analysis of -ate verbs gives us further support. It is widely acknowledged that English verbs ending in the form -ate are of heterogeneous origin, consisting chiefly of -ate verbs borrowed from Latin, those derived by -ate suffixation, and those back-formed from -ation nouns (Jespersen (1942: 447-448), Marchand (1969: 256-259), Bauer and Huddleston (2002: 1713)). Plag (1999), however, is the first to set up clear criteria for distinguishing between -ate verbs derived by the verbal suffix -ate and -ate verbs whose end form happens to be homophonous with the verbal suffix -ate. The gist of his criteria is:

(20) a. Suffixed -ate verbs are phonologically regular and semantically fixed.
   i. Phonology: more than two syllables, secondary stress on -ate, and alternating stress
   ii. Semantics: locatum- and goal-meanings involving chemical substance
   b. Non-suffixed -ate verbs are phonologically irregular and semantically diverse.

Plag derives by the verbal -ate suffixation only the -ate verbs that show the regular properties stated in (20a) (e.g. iodinâtev, métalâtêv, nitrógenâtêv) and ascribes those that do not (e.g. formátev, réspirâtêv, rótvâtêv; citrâtêv, phôspâtêv, xânthâtêv) to non-suffixal processes, chiefly BF and CV. In his view, the non-suffixal -ate verbs that have a corresponding -ationl-ator noun are derived by BF (e.g. <formationN,
formate\textsubscript{V}, <respiration\textsubscript{N}, \textsubscript{V}, <Rotavator\textsubscript{N}, \textsubscript{V}>, and those with a corresponding -ate noun by CV (e.g. <citrate\textsubscript{N}, \textsubscript{V}>, <phosphate\textsubscript{N}, \textsubscript{V}>, <xanthate\textsubscript{N}, \textsubscript{V}>). The OED tells us that among the 72 -ate verbs produced in the 20th century, the suffixed ones are in the minority (18 entries; 24%), and the majority (39 entries; 54%) come from BF.

Thus, we have at least three types of -ate verbs: suffixed -ate verbs (e.g. metalate\textsubscript{V}), back-formed -ate verbs (e.g. respirate\textsubscript{V}), and converted -ate verbs (e.g. phosphate\textsubscript{V}).\textsuperscript{10} The derivational history of each type can be depicted as follows:

\begin{align*}
(21) & \quad \text{a. metal}_N + \text{ate}_V \rightarrow \text{metalate}_V \\
& \quad \text{b. respire}_V + \text{ation}_N \rightarrow \text{respiration}_N \rightarrow \text{respirate}_V \\
& \quad \text{c. phosph-} + \text{-ate}_N \rightarrow \text{phosphate}_N \rightarrow \text{phosphate}_V
\end{align*}

As shown in (21b), the input to back-formed -ate verbs is (mainly) derived by the nominal suffix -ation, which is not the combination of the verbal -ate and the nominal -ion but one non-compositional morpheme (e.g. <declare\textsubscript{V}, declaration\textsubscript{N}>, <derive\textsubscript{V}, derivation\textsubscript{N}>). On the other hand, the input to converted -ate verbs comes from the nominal suffix -ate, which yields an -ate noun denoting salt formed by the action of an acid on the base (e.g. carbonate\textsubscript{N}, sulphate\textsubscript{N}).

The existence of the three types of -ate verbs and their properties, as revealed by Plag (1999), receive a clear explanation from our approach. First of all, the phonological and semantic regularity of suffixed -ate verbs follows from our claim (stated in section 2) that an affix is listed in the lexicon with its categorial, phonological, morphological, semantic, and AS properties, and each affixed word is formed compositionally on the basis of those specifications. The verbal suffix -ate has a lexical entry like (22) below and the information therein governs the concatenation of -ate and the base morpheme. As a result, suffixed -ate verbs always exhibit regular and fixed properties, such as those stated in (20a).

\begin{align*}
(22) & \quad \text{-ate} \quad \text{C: } \_N\_\_ \_V \\
& \quad \text{P: } \text{[eIt]}, \quad \text{Input: trochaic, Output: strictly alternating stress}
\end{align*}

\textsuperscript{10} We put aside -ate verbs borrowed from Latin (e.g. create, translate) because in the English lexicon they should be counted as simplex verbs rather than as derivatives. See Marchand (1969: 256) for the process of the borrowing.
M: Input: [+Latinate], Output: nominalization by the suffix -Ation
LCS: x CAUSE [BECOME [y BE WITH BASE Chemical Substance]]
   x CAUSE [BECOME [y BE AT BASE Chemical Substance]]
AS: x <y>

On the other hand, the phonological and semantic irregularity of back-formed and converted -ate verbs (see (20b)), both of which belong to CV in our approach, follows from our claim that CV is a type of listing process in the lexicon. As discussed in section 2, lexical listing is a random, non-rule-governed process, so that its output, including the CV/relisting output, lacks regularity. Therefore, it is no wonder that both back-formed and converted -ate verbs exhibit a diverse and heterogeneous nature, just like converted verbs in general. Since we do not distinguish between back-formed and converted -ate verbs, their behavioral parallelism follows automatically. Plag, however, needs to account for why BF and CV, distinct processes in his view, lead to the same, irregular type of -ate verb.

The greatest advantage of our theory, however, lies in the natural explanation it gives to the process and productivity of BF and CV into -ate verbs. The following schemas illustrate how the back-formed verb respi-rate\textsubscript{V} in (21b) and the converted verb phos-phate\textsubscript{V} in (21c) come into existence:

(23) a. In the lexicon: the relisting process
\[
\begin{align*}
\text{respiration}_N \ [\text{Thing} \ldots] & \quad \text{phosphate}_N \ [\text{Thing} \ldots] \\
\text{respiration}_V \ [\text{Activity} \ldots [\text{Thing} \ldots] \ldots] & \quad \text{phosphate}_V \ [\text{Activity} \ldots [\text{Thing} \ldots] \ldots]
\end{align*}
\]

b. In the syntax: the category-expression requirement
   e.g. The animals were respi-rate artificially.
   e.g. They phosphate and rinse the fabricated parts thoroughly.

As depicted in (23a), the relisting of the listed items respiration\textsubscript{N} and phosphate\textsubscript{N} yields the new items respiration\textsubscript{V} and phosphate\textsubscript{V} in the lexicon. As relisted words, they both have to express their category (V) in the syntax and crucially, they can do so by taking advantage of the existence of the verbal suffix -ate. They surface in the back-formed form respi-rate and in the converted form phosphate, respectively (as shown in (23b)), because the formal coincidence of the ending and the
verbal suffix -ate facilitates the satisfaction of the category-expression requirement.

The only difference between the back-formed pair \(<respiration_N, respirate_V>\) and the converted pair \(<phosphate_N, phosphate_V>\) lies in the necessity of formal adjustment. The relisted verb \(phosphate_V\) satisfies the category-expression requirement automatically because it already ends in the same form as the verbal suffix -ate. The relisted verb \(respiration_V\), on the other hand, undergoes deletion because the adjusted form \(respirate\) is "categorically better" than the non-adjusted form in two senses: first, it has no element that signals the input category (N) and second, it has an element that signals the output category (V). The formal adjustment in this case not only deletes an element obstructive to the requirement but also yields an element favorable to it. In brief, in the CV from an -ate noun (e.g. \(phosphaten_N\)), the non-adjusted, relisted form (e.g. \(phosphate_V\)) is optimal for the satisfaction of the requirement, whereas in the CV from an -ation noun (e.g. \(respiration_N\)), the adjusted form (e.g. \(respirate_V\)) is the optimal form.

In section 4.3.4 (see (19)), we saw that CV has at least three types that differ in the way they satisfy the category-expression requirement: the (i) type (e.g. \(<catalog_N, catalog_V>, <dog-ear_N, dog-ear_V>\)) can satisfy the requirement by means of morphosyntactic information alone, the (ii) type (e.g. \(<surfing_N, surf_V>, <skinny-dipping_N, skinny-dip_V>\)) does so by relying on the formal coincidence between input- and output-categories, and the (iii) type (e.g. \(<television_N, televis_e_V>, <heat treatment_N, heat-treat_V>\)) does so by adjusting the output form. The CV from -ate nouns (e.g. \(<phosphaten_N, phosphate_V>\)) belongs to the (ii) type. Just as a relisted -ing verb (e.g. \(surfing_V, skinny-dipping_V\)) expresses its category by taking advantage of the formal coincidence between N and V, so a relisted -ate verb profits from the fact that the form -ate happens to exist both as a nominal suffix and as a verbal suffix. In the CV from -ate nouns as well as in the CV from -ing nouns, the formal coincidence between the input- and output-categories facilitates the category-expression in the syntax.

Interestingly, the (so-called) BF into -ate verbs (e.g. \(<respiration_N, respirate_V>\)) belongs to both the (ii) and (iii) types, for it satisfies the category-expression requirement by deleting the obstructive element, as in the (iii) type, and by profiting from the formal coincidence between the input- and output-categories, as in the (ii) type. Relisted -ation verbs (e.g. \(respiration_V\)) are adjusted to the -ate form (e.g. \(respirate\)
not only because the end-form -ion is obstructive to the requirement but also because the resulting end-form -ate is favorable to it. At the end of section 4.2, we claimed that formal adjustment is applied to the relisting output either because the non-adjusted form has a property obstructive to the requirement, as in (8a, b), or because the adjusted form has a property favorable to the requirement, as in (8c). The deletion applied to relisted -ation verbs is interesting in that it is driven by both of these factors. This fact may contribute to the rather high productivity of (so-called) BF into -ate verbs.

5. Subtypes of Formal Adjustment

We have assimilated BF into CV by analyzing deletion as one way to adjust the form of the relisting output. Deletion, however, is not the only way to do so; formal adjustment for the category-expression requirement includes at least the following four types:

\begin{enumerate}
\item a. deletion e.g. \(<\text{television}_N, \text{televise}_V>,\>
\(<\text{laser-printer}_N, \text{laser-print}_V>\>
\item b. replacement e.g. \(<\text{tailor-made}_A, \text{tailor-make}_V>,\>
\(<\text{head-adjunction}_N, \text{head-adjoin}_V>\>
\item c. final voicing e.g. \(<\text{calf}_N, \text{calve}_V>,\>
\(<\text{house}_N, \text{house}_V /\text{hauz}/>\>
\item d. stress shifting e.g. \(<\text{permit}_V, \text{permít}_N>,\>
\(<\text{give away}_V, \text{giveaway}_N>\>
\end{enumerate}

We regard all the word-pairs given above as instances of CV. In (24b), the categorial change into V occurs with the replacement of the head by its root verb. Since the form headed by the root verb (e.g. \text{tailor-make}_V) expresses the category V more explicitly than the relisted form (e.g. \text{tailor-made}_V), the replacement operation is justly classified as a type of formal adjustment. In (24c), the categorial change accompanies a final-voicing process, while in (24d) it occurs with a stress-shifting process. The fact that these operations bring a clear phonological distinction between the input (e.g. \text{calf}_N, \text{permít}_V) and the output (e.g. \text{calve}_V, \text{permít}_N) justifies their status as a type of formal adjustment for the category-expression requirement. Stress-shifting is especially interesting in that it is motivated by the general prosodic difference between the categories N and V; in English, “in a great many cases, nominals ... have fore-stress and the corresponding verbs end-stress” (Jespersen (1909: 173); see also Biese (1941: Chapter 10)).
In the foregoing sections, we saw that deletion is applied to a relisted form either to remove an obstructive element or to obtain a favorable element. The three additional formal-adjustment operations, i.e. replacement, final-voicing, and stress-shifting, are applied to yield a favorable element, something that distinguishes the input and output of CV explicitly, rather than to remove an obstructive element. But since all the four operations contribute to the explicit category-expression in a syntactic structure, the instances given in (24) belong to the (iii) type of CV (see (19)), i.e. the type that satisfies the category-expression requirement by adjusting the output form.

We close this section by pointing out the intricacy of formal adjustment. First, our inventory of formal adjustment operations given in (24) accounts for the fact that one and the same input word (e.g. locomotion\textsubscript{N}, self-destruction\textsubscript{N}) can be “back-formed” into two different forms (e.g. locomote\textsubscript{V}/locomove\textsubscript{V}, self-destruct\textsubscript{V}/self-destroy\textsubscript{V}) and the fact that certain “back-formed” pairs (e.g. <adsorption\textsubscript{N}, adsorb\textsubscript{V}>, <physisorption\textsubscript{N}, physisorb\textsubscript{V}>) exhibit not only deletion but also certain phonological changes, final-voicing in this case. The traditional concept of BF as the deletion of an affix has no way of dealing with replacement forms like self-destroy\textsubscript{V} nor deletion forms with an additional phonological change like adsorb\textsubscript{V}. Citing the instance <self-destruction\textsubscript{N}, self-destruct\textsubscript{V}/self-destroy\textsubscript{V}>, Aronoff (1976: 28) argues that speakers observe the “principle of least effort,” so that they prefer the output form self-destruct\textsubscript{V} rather than self-destroy\textsubscript{V}. But in our terms it is not clear why producing the former form, i.e. CV with deletion, costs less effort (or is more economical) than producing the latter form, i.e. CV with replacement.

It is clear, however, that CV without formal adjustment costs less effort than CV with it. Hence, a converted word with no formal adjustment sometimes competes with its adjusted counterpart, or even overrides it. Witness the following data, where (25) exemplifies N-to-V CV and (26) V-to-N CV:

(25) <attrition\textsubscript{N}, attrit\textsubscript{V}/attrition\textsubscript{V}>, <butler\textsubscript{N}, butle\textsubscript{V}/buttle\textsubscript{V}/butler\textsubscript{V}>, <helicopter\textsubscript{N}, helicopt\textsubscript{V}/helicopter\textsubscript{V}>, <jelly\textsubscript{N}, jell\textsubscript{V}/jelly\textsubscript{V}>, <liaison\textsubscript{N}, liaise\textsubscript{V}/liaison\textsubscript{V}>, <propaganda\textsubscript{N}, propagand\textsubscript{V}/propaganda\textsubscript{V}>, <salvage\textsubscript{N}, salve\textsubscript{V}/salvage\textsubscript{V}>, <sculpture\textsubscript{N}, sculpt\textsubscript{V}/sculpture\textsubscript{V}>, <usher\textsubscript{N}, ush\textsubscript{V}/usher\textsubscript{V}>, <vacation\textsubscript{N}, vacate\textsubscript{V}/vacation\textsubscript{V}>

(26) a. <dispute\textsubscript{V}, dislike\textsubscript{N}/dispute\textsubscript{N}>, <rem\textsubscript{V}, rémit\textsubscript{N}/rem\textsubscript{N}>
b. <accórđ_{V}, *áccórđ_{N}/accórđ_{N}>,
<presérve_{V}, *préserve_{N}/préserve_{N}>
The input nouns in (25) have both non-deleted and deleted V-forms, which means in traditional terms that they have both converted and back-formed V-forms. In (26a), too, the non-adjusted N-form coexists with the adjusted N-form, but the former wins out over the latter in (26b). No significant semantic difference is found between the non-adjusted and adjusted forms in (25) and (26a). These data imply that economy of operation competes with more explicit category-expression by formal adjustment. CV without formal adjustment (e.g. attrition_{V}) is valued more highly than CV with formal adjustment (e.g. attrit_{V}) in terms of the economy of operation, though the latter is valued more highly than the former in terms of the explicitness of the category-expression. Since any relisted word should satisfy the category-expression requirement, our approach predicts that the non-adjusted form in (25) and (26a) will enter the morphosyntactic context with stronger “categorizing force” (see section 3) than that of its adjusted counterpart; the lack of morphophonological categorization realized by formal adjustment (i.e. deletion, replacement, final-voicing, stress-shifting) can be compensated for with the strength of morphosyntactic categorization. For instance, unlike its deleted counterpart attrit_{V}, the non-adjusted V-form attrition_{V} in (25) is always used in the V + particle pattern attrition out, which means that unlike the morphologically-categorized attrit_{V}, the morphologically-non-categorized attrition_{V} needs the categorical support of a participle (cf. section 3 (4)). The distribution of CV doublets like those in (25) and (26a) should receive a similar explanation once we examine their morphosyntactic contexts; the stronger the categorizing force of the morphosyntactic context, the stronger the possibility becomes that the relisted form is spared a formal adjustment operation in favor of economy of operation.\[11\]

\[11\] This statement, of course, awaits a full investigation of empirical data. If confirmed empirically, however, it enables us to deal with the apparently surprising fact that even BF from a compound form is sometimes rivaled by CV. As long as we restrict our data source to the literature and dictionaries, almost all the instances of the BF/CV doublet take the form of a one-root word as in (25), and we find few BF/CV doublets in the compound form (in fact, we have only the following two instances: <bartender_{N}, bartend_{V}/bartender_{V}>, <cross-reference_{N}, cross-referv/cross-
Finally, it seems to take some time to learn the necessity of formal adjustment. Children use a relisted word directly, without adjusting its form, irrespective of its morphological properties; they use a non-adjusted form even when it ends in an obstructive element. For instance, Clark (1993: 202–205) cites children’s utterances like (3;5) (Of a prayer book) *He prayers with it* (cf. *pray*), (3;6) *I’m gonna lawnmower you*, (4;9) *Can I typewriter on your typewriter or Daddy’s?* (cf. *typewrite*), (4;11) *We already decorationed our tree* (cf. *decorate*), (5;3) *Don’t vacuum-cleaner in the backyard* (cf. *vacuum-clean*). These data reveal that CV covers the domain of BF in children’s grammar. Our approach begs no explanation for this fact and predicts that BF will emerge when they acquire a sensitivity to the categorial value of each morpheme.

6. Conclusion

We have examined V-deriving affixation, CV, and BF, and proposed a new view of their organization. The fact that affixation and CV are far from being parallel in their input- and output-properties, whereas CV and BF show systematic behavioral parallelism, has led us to make the following three claims. First, the versatile nature of CV in contrast to the delimited nature of affixation arises because while affixation is a process that concatenates morphemes in the morphology, CV involves a listing process in the lexicon. Second, CV, the relisting process in the...
lexicon, uses inflectional/syntactic information to express its derivational information. Third, BF arises when CV needs a formal adjustment to do so. Not only does this conclusion eliminate an independent process called BF from the grammar, but it also contributes to maintaining the morpheme-basedness of English morphology by locating CV and BF in the lexicon.

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THE STATUS OF BACK-FORMATION

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