

Categorywise, some Compound-Type Morphemes Seem to Be Rather Suffix-Like: On the Status of *-ful*, *-type*, and *-wise* in Present Day English¹

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Abstract

The elements *-ful*, *-type*, and *-wise* are productive formatives in present-day English usage as reflected in the 100 million word British National Corpus. They are, however, not satisfactorily documented in the literature on English word-formation. This paper discusses the occurrence and structural properties of the three formatives on the basis of data from the British National Corpus. This descriptive task raises questions about the grammatical status of these elements, and concerns in particular the delimitation between suffixation and compounding. It is concluded that labels such as 'semi-suffix' are theoretically undesirable as they do not provide additional insight into the nature of complex words and that the formations with *-ful*, *-type*, and *-wise* should be treated as either compounds (in the case of *-type*) or suffixations (in the cases of *-ful* and *-wise*).

1. Introduction

This paper describes the English formatives *-ful*, *-type* and *-wise*.² In spite of their frequency in present-day usage they have, in our opinion, escaped satisfactory documentation in the relevant handbooks and reference literature on word-formation. Additionally, all of them raise interesting questions regarding the definition of what counts as a derivational suffix and thus touch upon the demarcation between compounding and derivation.

The present paper is based on the analysis of all pertinent forms as they appear in the 100 million word British National Corpus (BNC). A summary of the quantitative findings for the three items in the BNC is given in Table 1.

As pointed out in Plag, Dalton & Baayen 1999, these figures show that *-ful*, *-type*, and *-wise* are productive, both in terms of number of different types and number of hapax legomena.

Table 1: *The formatives -ful, -type, and -wise in the British National Corpus*

AFFIX	N	V(N)	n ₁
<i>-ful</i>	2,785	175	83
<i>-type</i>	1,224	703	587
<i>-wise</i>	1,043	215	158

N = number of tokens, V(N) = number of types,
n₁ = number of hapax legomena

We present our findings on each type of formation in turn, starting with *-ful*. Unless indicated otherwise, examples throughout the paper are lifted from the BNC.³

2. *-ful*

Tokens with *-ful* lifted from a corpus like the BNC are most likely to be derived adjectives of the type *characterful, grateful, eventful, resourceful, useful* and so forth. The adjectival suffix, however, has been shown to be unproductive in present-day English (Plag, Dalton & Baayen 1999) and will therefore not be dealt with here.⁴ In this paper we take a closer look at what these authors have called 'measure partitive' *-ful*, which produces items like those in (1) below.

(1) *handful, mouthful, barrellful, potful, busful, officeful, canful, potful, eyeful*

Historically, these formations developed from the syntactic group 'a CONTAINER full of SUBSTANCE' (cf. OED s.v. *-ful*, Marchand 1969:292). The construction's status as a syntactic group meant that if more than one container of the substance was being referred to, the plural marker was attached to the CONTAINER-element: e.g. *3 barrels full of wine*. Throughout the history of English the plural marker has shown a tendency to move from its position at the end of the CONTAINER-element to the end of *full*, i.e. *3 barrels full of wine* becomes *3 barrelfuls of wine*. This shift was accompanied by a change in spelling so that the combination came to be written as one word and *full* lost its second <l>. The combination thus became orthographically and morphologically isolated and now has to be considered a complex word. The shift of the plural marker to the end of the word is as good as complete in present-day English: the BNC written data only contain 6 types (7 tokens) where plural /s/ is attached to the base word. These cases are enumerated in (2), the underlined items occur more often with final plural *-s*.

(2) *stockingsful, spoonsful, shelvesful, potsful, dippersful, clothsful*

The 'a CONTAINER full of SUBSTANCE'-pattern has parallels in other Germanic languages. However, their degree of univerbation, their morphological behaviour and thus their grammatical status differ from language to language. Examples from German would be *Handvoll*, or *Armvoll*. As opposed to its English counterpart, the German construction is indeclinable; thus, *eine Handvoll Reis* >

zwei Handvoll Reis; drei Armvoll Brennholz. Another noticeable difference between English and German is the number of different types which the pattern has produced. While in German the number of types is so restricted that one would hesitate to speak of a word-formation pattern, in English the number of bases which *-ful* can attach to has been growing continuously over the centuries. The oldest attested forms have bodyparts as their base (*mouthful, handful*). Later, the derivational base was extended beyond bodyparts to artefacts which function as containers: *barrelful, spoonful, ladleful, cupful*. These latter examples are all attested for Middle English in the OED. At a later stage, the range of possible bases was extended metaphorically to virtually anything that can be **construed** as a container including buses, offices, sticks or even keyholes (e.g. *officeful, stickful, keyholeful*). In so far as the information is retrievable from the OED — because attestations of *ful*-formations do not always appear with dated quotations — it seems to be the case that this metaphorical process got under way during the 19th century. This inspired a new spurt of growth in the number of types attested. There is also a non-negligible number of first attestations throughout the 20th century.

The semantic relatedness between *-ful* and its free counterpart, the adjective *full* is strong, but to regard the formations as compounds creates severe problems on the level of word-class affiliation. The adjective *full* as the head of the compound would mean that the compounds themselves are also adjectives, which they are clearly not. This is likely to be the reason why the OED (s.v. *-ful*) and the *Comprehensive Grammar of the English Language* (CGEL = Quirk *et al.* 1985:1548) declare this variant of *-ful* to be a suffix and include it among those which are used to form English nouns. On closer inspection, however, the relevant formations do not behave like full-blooded nouns either. They have a certain nouniness about them, but they do not fit all the nounhood criteria of the CGEL (p. 410). Table 2 lists the six criteria established for English nouns by Quirk *et al.* Typical English nouns should pass all the tests, as is reflected by the ticks in the third column of the table. As we run *ful*-formations through these six tests, it becomes clear that it is not possible to award ticks for all the tests.

The nominal *ful*-formations can take the plural and they can occur with other quantifiers; in fact, that is what they typically do. *Ful*-words can also occur in direct object position (cf. (3)), though it may be preferable to regard these structures as elliptic (see below).

- (3) a. The bird pecked at the grass, tearing up **beakfuls**.
 b. Practical work showed them that they could put six **canfuls** into the bottle.

Table 2: *Prototypical nouns vs. -ful formations*

nounhood criteria (CGEL, p. 410)	prototypical nouns	-ful- formations
1. pluralisation	✓	✓
2. co-occurrence with quantifiers	✓	✓ ✓
3. occurrence in direct object position	✓	✓
4. attributive use	✓	✗
5. fit 'I saw a N'-frame	✓	?
6. fit 'The N is here'-frame	✓	✗

On the other hand, it is almost impossible to think of a context where *ful*-formations could be used attributively. We have construed one example which is somehow interpretable but hardly acceptable.

(4) ?a cupful cake

'a cake where all the ingredients are measured in cups rather than weighed on a scale'

In other words, nominal *ful*-formations cannot act as modifiers and cannot, therefore, function as the determinant in a compound. Notice that they cannot function as the head or determinatum either. Starting out from a postmodified noun structure (*a N of N*) we can convert (5a) into a N+N compound but not (5b).

- (5) a. a wall of stone > a stone wall
 b. a stickful of glue > *a glue stickful

With regard to the criteria 5. and 6., it can be said that, given the appropriate context, *ful*-formations may fit the 'I saw a N'-frame (A: '*Have you seen any bats lately?*' B: '*Yes, I saw a handful only last night when we were sitting on the porch*') but such structures should be analysed as elliptical (see also (3) for illustration of elliptical structures). In the frame 'The N is here' *ful*-formations are out: **The potful is here*.

The behaviour of *ful*-formations in the nounhood tests strongly suggests the conclusion that these items are not fully-fledged nouns. What is striking about their behaviour is the extent to which it complies with what is reported in the literature about noun classifiers.

Noun classifiers have to be seen in the general context of nominal classification. Given the fact that by far the largest number of lexical items in any language are nouns, it seems in the interest of efficient language processing to structure them in some way, that is, to distribute the huge number of nouns over a limited number of classes. Typologically speaking there seem to be two ways in which languages achieve this. One strategy is the use of noun classifiers, the other the existence of morphological noun classes. Noun classes are typical of the inflecting Indo-European languages (Dixon 1982:166). Formally signalled

by bound morphemes, they tend to form a closed system of a smallish number of groups (declensions) over which all nouns of the language are distributed. Noun classifiers, on the other hand, are more typical of the isolating language type. They are always free forms and 'often have the same broad grammatical status as the particular nouns they qualify' (Dixon 1982:216). In other words, they are a type of noun. Noun classifier systems may vary considerably in size but they almost always contain more classes than a noun-class language has. Also, it is not obligatory for each and every noun in the language to co-occur with a noun-classifier. In short, noun classifier systems are much less grammaticalised than noun class systems. Thus, while it is very likely that the classification of the numerous nouns existing in any language into a limited number of groups has an experiential and/or semantic basis, it is clear that this basis is more easily accessible in systems of noun classifiers than in the often highly obscured morphological noun class systems.

Turning to the function of noun classifiers, there is widespread consensus that their function is to give information about the head noun in terms of some perceived characteristic of its referent (Allan 1977:285, Zubin 1992:91-93). In other words, noun classifiers do not semantically enrich the head noun or its underlying concept, but help to determine its reference.

There are two broad types of classifiers: quantitative and non-quantitative. (Dixon 1982:226). Quantitative noun classifiers involve some type of measure unit and are therefore always closely linked to numerals. They often consist of large inventories which are part of the lexicon. The English expressions *three head of cattle*, *two loaves of bread*, *two pairs of trousers* correspond very well to what has been described as quantitative noun classifiers for other languages, in fact they often appear as their glosses (Dixon 1982:211 and see below). The non-quantitative noun classifiers involve physical and functional properties of referents and represent a more complex field, which we can, however, disregard in this paper.

After this brief summary of the characteristics of noun classifiers, we can now reconsider the formal properties of the nominal *ful*-formations in this light. We will find that their behaviour appears a good deal less puzzling once we do that.

As mentioned above, noun classifiers tend to be somewhat ambiguous about their own nouniness and this is exactly the case with *ful*-nominals, too. We saw that *ful*-nominals do not pass all the nounhood criteria established for English (CGEL 1985:410). Among the criteria which they do not fulfil are attributive use as the first element in a compound, or the 'The N is here' test-frame. *Ful*-nominals are noun-classifier-like in other respects, too. It is obvious that *ful*-nominals have a preference for co-occurring with quantifiers and especially numerals much more often than an average noun (Dixon 1982:214), which is demonstrated by the typicality of contexts like *three cupfuls of rice*, *two fistfuls*

of hair, eight mouthfuls, a couple of mouthfuls, very few mouthfuls. Further, the examples used in (3) to illustrate that *ful*-nominals can occupy direct object position can be more elegantly and more adequately explained by the fact that noun classifiers may be used anaphorically with reference to the noun that they occurred with before (Dixon 1982:216). This seems to us to be a much more satisfactory interpretation of the examples in (3) above (examples reproduced here for convenience).

- (3) a. The bird pecked at the grass, tearing up beakfuls.
 b. Practical work showed them that they could put six canfuls into the bottle.

In (3a) the *beakfuls* clearly stand for [beakfuls of *grass*], whereas in (3b) the context allows us to infer that we are concerned with some kind of liquid but not exactly which. Note that the inference is largely based on encyclopaedic knowledge: we know what kinds of things come in cans (beans, peas, sliced peach, soup, beer, soft drinks etc.), and we know what kind of things tend to come in bottles (namely only a subset of those which can come in cans) so that the combined knowledge limits the kind of thing which *canfuls* might be referring to in the given context. It seems, then, as though these *ful*-nominals do not refer to the world in the same sense as 'real' nouns such as *grass*, or *liquid* do. This is likely to be the reason why they do not work as heads of compounds themselves as has been shown in example (5) above. Table 3 summarises the comparison of *ful*-nominals with noun classifiers in general.

In short, there is a good deal of evidence that nominal *-ful* is indeed a suffix which produces (at least something close to) quantitative noun-classifiers in English.

Table 3: Characteristics of noun classifiers vs. *ful*-nominals.

	characteristics of noun classifiers (Dixon 1982)	noun classifiers	<i>ful</i> - nominals
1.	typically co-occur with quantifiers/ numerals	✓	✓
2.	may be used anaphorically for the noun they co-occurred with before	✓	✓
3.	quantitative noun classifiers involve some kind of measure unit	✓	✓
4.	large inventories which are part of the lexicon	✓	✓

3. *-type*

Plag, Dalton-Puffer & Baayen (1999) identified *-type* as one of the most productive formatives in the written part of the BNC. However, the morphological status of *-type* as in the examples given in (6) was not discussed in any detail:

- (6) behaviourist-type theories, Callanetic-type exercises, small Celtic-type cattle, miserable English-type April weather, a most wonderful Hollywood-type satin-quilted bedspread

It is largely unclear, for example, whether *-type* should be regarded as the head noun of a compound, or as a suffix, and if the latter, what kind of suffix it is. In order to solve this problem, we will first take a look at the different proposals found in the literature, discussing the BNC data as we go along. This will lead us to our own proposal, namely that *type*-formations are best analysed as compounds.

According to the OED, the free morpheme *type* is a highly polysemous and homonymous item. Nine different meanings are distinguished, which can, however, be boiled down to two. The first set of related meanings belong to the realm of printing, *type* being defined as 'A small rectangular block, usually of metal or wood, having on its upper end a raised letter, figure, or other character, for use in printing' or as 'A printed character or characters, or an imitation of these'. This *type* is not the one featuring in (6) and will therefore be ignored in the discussion to follow.

The second set of related meanings expressed by *type* are given as 'A kind, class, or order as distinguished by a particular character' or 'A person or thing that exhibits the characteristic qualities of a class; a representative specimen; a typical example or instance', or 'A person or thing that exemplifies the ideal qualities or characteristics of a kind or order; a perfect example or specimen of something; a model, pattern, exemplar.' Obviously, this is the kind of item that interests us with regard to the formations in (6). In what follows, when speaking of the free morpheme *type* we refer to this item, paraphrasable as 'kind, class, model'. However, the OED lists also a bound morpheme *-type*, which again shows homophony. On the one hand there are a number of words such as *anti-type*, *archetype*, *prototype*; and many technical words connected with printing and other modern processes of copying [which] have been formed on the model of them, with the sense 'type, block, or plate for printing from', as in *electro-type*, *logotype*, *phonotype*, *stereotype*; 'impression or picture', also 'process of reproduction', as in *autotype*, *calotype*, *chrysochrome*, *collotype*, *cyanotype*, *ferrotype*, *phototype*, *platinotype*. On the other hand there is a second class of items, which parallel those in (6), cf. *California-type barbecues*; *his farm-made, 'home-grown' Dutch-barn-type buildings*; *Fifties-type social realist films*; *A very spacious older type house*. Consider the OED entry preceding these examples:

-type [taip], *suffix*.

...

2. [type *n.*¹] Appended to adjs. and ns. or n. phrs. forming adjs. with the sense 'of the specified type; typical or characteristic of (..), reminiscent or imitative of (..)'.
 ...

It is not quite clear whether the OED regards *-type* as a nominal suffix, given that the sub-entry starts off with '[type *n.*¹]'. By their very nature, nominal suffixes derive nouns, not adjectives. If we ignore this minor caveat, the OED claims that *-type* is a suffix which derives adjectives from adjectives, nouns and noun phrases. A similar analysis is put forward by Warren (1984:110) and Leitzke (1989) without justification. Bauer (1983) and Marchand (1969) do not discuss *-type* at all, which probably suggests that these authors did not recognise these formations as being instances of suffixation.

Which kind of analysis is preferable? Is *-type* a suffix or the head of a compound? And, on the basis of which kind of argument could this be decided? Applying Occam's Razor, the postulation of an independent adjectival suffix should be avoided if the pertinent formations can be analysed as compounds involving the free morpheme *type*. The meaning of *-type* formations as paraphrased in the OED already suggests that, at least semantically, the supposed adjectival suffix and the noun are closely related. We will argue in the following that the postulation of an adjectival suffix is unnecessary and that the pertinent complex words are best explained as compounds.

The free morpheme *type* is a relational noun, in that its lexical entry provides an optional argument position for another nominal participant. This argument may appear as an *of*-phrase, as in the examples in the right column of (7), or as the first member of a compound with *-type* as its head, see the examples in the left column of (7). The examples on the left are taken from the BNC, the data on the right are paraphrases for these compounds:

(7) word as attested in BNC	paraphrase
blood type	a type of blood
band-type	a type of band
description-type	a type of description
paper-type	a type of paper
personality-type	a type of personality
question-type	a type of question
reward-type	a type of reward
skin-type	a type of skin
text-type	a type of text
trial-type	a type of trial

However, the first member of a compound headed by a relational noun need not be interpreted as argument-satisfying. Compounds like *Adonis-type* in (8) and

questionnaire-type in (9) show that the first member of a two-member *type*-compound can be a modifier:

- (8) But a librarian, more likely to be an **Adonis-type** than a boar or a Goddess, might be tempted to catalogue this book under 'Hughes' than under 'Shakespeare'.
- (9) An alternative to the **questionnaire-type** of worksheet, is the field booklet or pamphlet with pre-selected headings and blank spaces where the pupils can jot down their own notes on particular features, or make plans and annotated sketches.

Thus, *Adonis-type* in (8) is not a kind of Adonis, but a type standing in some relation to Adonis, and a *questionnaire-type* as used in (9) is not a kind of questionnaire, but a type (of worksheet) resembling a questionnaire. In a different context both modifiers could be interpreted as arguments ('type of Adonis', 'type of questionnaire', see Meyer 1993 for a general discussion on the interpretation of compounds in different contexts). What is interesting about these modifier-head compounds involving *type* is that they are rarely found in constructions like those in (9). Instead we find such compounds overwhelmingly premodifying another noun, without the preposition *of* intervening (see the examples in (6)). What is the difference between the structures [*questionnaire-type of worksheet*] and [*questionnaire-type worksheet*] and why are constructions of the latter kind more frequent? Let us answer these questions by looking at one *type*-formation which occurs in both constructions. Consider (10):

- (10) a. In this way the structure of British unions themselves contributed to the growth of [**industry-type bargaining**].
- b. the employer tendency to favour [**the industry-type of bargaining**] was reinforced by the broad socialist, class consciousness of major European unions which probably led them to favour this approach, since it would engage 'employers through mass class action', and also extend protection to a larger part of the workforce.

We propose the following syntactic structures for the two NPs:

- (11) a. [[*industry-type*] bargaining].
- b. [the [*industry-type*] [*of bargaining*]].

The crucial difference between these structures is that in (11a) [*bargaining*] is the head of the NP, whereas in (11b) [*industry-type*] is the head of the NP. Pragmatically, (11a) and (11b) differ in focus. Whereas in (11a) we speak about bargaining, (11b) focuses the type of bargaining. Considering the internal structure of [*industry-type*] in the two constructions, one would not want to postulate two different internal structures, i.e. one according to which in (11a) [*industry-type*] is a suffixed word and another, in (11b), according to which [*industry-type*] is a compound. Both constructions feature the compound [*industry-*

type] and it is only their function within the NP that differentiates them. In (11a) it acts as a modifier, in (11b) as the head of an NP.

There is one possible argument against this position and in favour of the adjectival suffix analysis of *-type* words: its premodifying character. Thus it could be claimed that *type*-formations are derived by an adjectival suffix, hence they are adjectives, which explains their widely attested occurrence as premodifiers. This is, however, a weak argument since it is widely acknowledged that nouns can equally well act as premodifiers in English (e.g. CGEL: 410). Note that other standard tests for adjectivehood also fail with *-type* words (predicative function, premodification by *very*⁵, comparative and superlative forms). Under the nominal compound analysis these facts are naturally accounted for.

What is nevertheless striking is the preponderance of premodifying *-type* words. If these are 'normal compounds', why don't they occur more often as heads of noun phrases? To get a better idea of the quantitative aspects of the different constructions involved we picked a random sample of every tenth *-type* word (taken from the written subcorpus of the BNC, which consists of c. 80,000,000 words). Of all these *-type* words (69 types, 116 tokens), only one type (*question-type*, with one token) had an argument as its first element,⁶ the rest of the forms all involve a modifier as first element. One form (with 3 tokens) was a brand name (a word processing software called *PC-Type*), while the remaining 67 types (with 112 tokens) all involved a modifier as first element. The latter forms were then classified according to their external syntax, i.e. the syntactic position in which they occurred, with the result given in (12):

(12)	<i>total</i>	<i>premodifying position</i>	<i>head of NP</i>
<i>number of types</i>	67	63	6
<i>number of tokens</i>	112	94	18

Note that two *-type* words (*head-type*, *Strato-type*) occurred in both kinds of construction, hence the figures of the type count add up to 69, although we only have 67 types. Quite a number of the 18 tokens with *type*-formation as head of NP could have also been classified as instances of 'premodifying position' because they lend themselves to an interpretation as elliptical structures, which would have further increased the high proportion of premodifying *type*-formations. For example, there are 8 tokens of *Strato-type* that occur in classified ads using telegraphic speech, where *Strato-type* is short hand for *Strato-caster-type guitar*. A similar analysis could be advanced for *head-type* (for *head-type station*). But even under our conservative, purely surface-oriented classification procedure, the figures for both types and tokens show a clear preponderance of premodifying *type*-formations.

The main reason for this distribution must be sought in the semantics of *-type* words themselves and in their pragmatic value. The classificatory meaning of *-type* words makes them prone to be used as modifiers of nouns denoting the

things to be classified. In this respect *-type* words are similar in function to classifying adjectives. In pragmatic terms, it seems that speakers more often speak about entities and assign them to classes than they speak about these classes themselves.

Let us consider one further peculiar property of *-type* words and examine how the suffix vs. compound analyses can cope with this property. With many formations we find phrases as first elements, as exemplified in (13):

- (13) a. **Breakaway-type** sinkers are only used during rough conditions.
 b. It also enables him to produce a version of ‘what is being talked about’, i.e. the topic of conversation, which is much more comprehensive, and certainly of greater analytic interest, than the single **word-or-phrase-type** title which is often used in a fairly trivial way to characterise ‘topic’ in the study of conversation.
 c. Americans especially distinguish between ‘realty’ (land, housing, property type wealth) and ‘personalty’, the latter being subdivided further into tangibles (physical-type personal wealth, e.g. cars) and intangibles (**financial-asset-type** wealth, e.g. share certificates).
 d. Despite this caveat, the arithmetic of **social-dividend-type** schemes does not look attractive.

It is commonly assumed that phrases generally resist suffixation. The fact that *-type* attaches quite freely to phrases and compounds is therefore a strong argument against its suffixal status. But is it an argument for the compound analysis? According to some morphological theories, in particular those of the Lexical Phonology-type (e.g. Kiparsky 1982), syntactic structures may not feed morphology, i.e. compounding, derivation and inflection. According to such models *type*-formations could thus neither be derived by suffixation nor be analysed as compounds, but must be syntactic structures instead of morphological objects. However, Wiese (1996) has shown that phrases can easily occur within compounds and that, consequently, the said models make wrong empirical predictions. Be that as it may, under any theory the occurrence of phrases within *type*-formations is evidence against *-type* being a suffix.

The question whether *type*-formations are syntactic or morphological entities, i.e. phrases or compounds, may of course be raised independently of the problem of phrasal elements as first members. The question itself assumes that there is a clear-cut distinction between compounds and syntactic structures. This is a traditional problem that has been dealt with in numerous publications (see Bauer 1998 for an overview). In his article on this subject, Bauer (1998) surveys standard criteria for this distinction (listedness, orthography, compound stress, syntactic isolability, co-ordination and pronominalisation) and comes to the conclusion ‘that there is no strong evidence for a distinction between two fundamental types of noun + noun construction’ (1998:85).

We take no stand on this general question here but argue that there is at least one property of *type*-formations which indicates its compound status quite clearly, namely stress. It is standardly assumed that compounds and phrases differ in their stress patterns. While two-member compounds (e.g. *bláckboard*), have main stress on their left element (e.g. Liberman & Prince 1977), phrases have right prominence (as in *the black bóard*, *the big black cátt*, the so-called ‘nuclear stress rule’, e.g. Chomsky & Halle 1968). Bauer (1998:70-72) points out, however, that the stress pattern of NN compounds is not uniform and cites numerous counterexamples to standardly assumed left prominence. What Bauer does not say is that such counterexamples do not invalidate the stress criterion for compound status as such: in those cases where compound stress (instead of phrasal stress) is clearly and uniformly attested, the pertinent form should be analysed as a compound. This is exactly the case with the *type*-formations under discussion, which — when read aloud — all carry stress on their left element. This fact would be left unexplained under a phrasal analysis.

To summarise our discussion of *type*-formations, we can say that there is a quantitatively significant set of complex words with *-type* as their head element which usually occur as premodifiers of nouns and which are best analysed as compounds, and not as suffixed forms.

4. *-wise*

When searched for in the BNC, the element *-wise* occurs 1043 times as the second element of a complex word. The items *likewise* and *otherwise*, which would add some 10,000 tokens, have been considered as fully lexicalised and have therefore been excluded from the data. The remaining *wise*-formations represent several different categories involving at least two different *-wise*’s: adverbs and compound adjectives. The adverb category can be further split up into manner and dimension adverbs and viewpoint adverbs (see CGEL: 568 for the latter). The quantitative dimension of this distribution is demonstrated in Table 4 with the rows in descending order of absolute token frequency. Table 4 contains also a category ‘trade names’, which as we will see below, is a peculiar extension of the categories ‘viewpoint adverbs’ and ‘compound adjectives’.

Table 4: *Types of formations with the element -wise in the BNC*

	N	V(N)	n1
manner/dimension adverbs	591	39	21
viewpoint adverbs	205	137	111
compound adjectives	146	20	14
trade names	101	19	12

Given the total number of 1043 tokens, then, compound adjectives make up for 13%, with the bulk of *wise*-formations (76%) made up by the adverbs. Among

the latter we can see a clear dominance of manner/dimension adverbs, but it will turn out to be necessary to consider matters of relative frequency/type number and productivity in more detail below. The examples in (14) illustrate each of the categories from Table 4.

(14) *Manner and dimension adverbs*

- a. Bridhe lifted the baby, slipped a magic coral and rowan-berry necklace over his head and walked **sun-wise** round the bed three times for good fortune,
- b. He was standing very close to her, his waist and hips only inches from her face and covered only by the towel wound **sarongwise** about his middle.
- c. The cone can be sliced **lengthwise** by two planes at right angles, offering a vertical-horizontal cross like a gunsight to the eye.
- d. Using a grapefruit knife (or other slim-bladed, preferably serrated knife) push and twist a hole through each potato working **crosswise**.

Viewpoint adverbs

- e. Now **controlwise**, we can look at various things, and I think last year we had various discussions on different things, but, naturally, you're looking for smooth, positive control of the vehicle.
- f. They make no special demands **food-wise**, and tolerate a wide pH range.
- g. But if you look at the H and the A's, they're in fact, **feature-wise**, identical but you're able to work out that one's an H and one's an E based on the context.
- h. **Shape-wise** the New York is hard to pin down, not having an obvious parentage.

Compound adjectives

- i. You are, you, you were very sort of **standard-wise**
- j. Those ingratiating nudges to the audience, all those lovable, identifiable tricks and traits, the **camera-wise** knowingness — he never learned.
- k. Andy is a **street-wise** ex-cop, with a blunt, no-nonsense approach that is offensive to some but appreciated by many.

Trade names

- l. Dalgety Agriculture sponsored all the printing and promotional costs along with **Herdwise**, which is supplying the second prize of 10 semen straws.
- m. Remote procedure call technology developer **Netwise Inc.** is retreating back to its home base in Boulder, Colorado.

In the following we will work our way up the frequency list but the discussion of the least frequent category 'trade names' will be deferred until later as it needs to make reference to some of the other categories. The next item on the frequency scale are the compound adjectives. These are noun + adjective com-

binations whose second element is the adjective *wise* in a somewhat specialised but by no means opaque sense (OED, s.v. *wise* a.). These compounds can thus be paraphrased as 'knowledgeable, knowing about N; cunning in the ways of N' (e.g. *drug-wise*, *jungle-wise*, *businesswise*, *media-wise*, *water-wise*, *wine-wise*). The highly frequent *streetwise* (the only one of the BNC-types which boasts an entry in the OED) is a special case in that the first compound element *street* is a metonymy for 'modern city' so that the compound means 'knowledgeable about how to live/survive in modern cities'. The epithet 'slang' given to *streetwise* by the OED is somewhat relativised by the fact that the *wise*-compounds occur disproportionately frequently in the written subcorpus of the BNC but a closer stylistic analysis would be necessary before anything definite can be said.

Qualitatively speaking, the adjectival compounds in *-wise* seem to enjoy a high profile in the consciousness of speakers. There is a clear sense of a series or pattern which holds the examples together. This may be taken as an argument for regarding the *wise*-element as more suffix-like than maybe an average second element in a compound would be. The term semi-suffix has been used in such instances (e.g. *-like*, *-worthy*, *-monger*, *-ways*, *-man*; cf. Marchand 1969) but the value of such terminological solutions seems questionable. As a class of morphological objects, compound adjectives in general seem to be quite frequent in present-day usage (cf. Ljung 2000). Typically, their second elements are adjectival participles but plain adjectives also occur in this position. Many of these second elements form whole series, which gives them the character of patterns rather than unique noun + adjective combinations. Among these recurring second elements are: *-like*, *-free*, *-high*, *-based*, *-owned*, *-born*, *-led*, and *-wise*. Here are some examples:

- (15) rock-like, sugar-free, poliunsaturate-high, Los Angeles-based, management-owned, New Zealand-born, party-led

Some of these second elements have been included among the suffixes (cf. Bauer (1983:112) for *-like*; Górska 1994 for *-free*) but this must have happened on account of their frequency of occurrence rather than on structural or semantic grounds. The semantic and structural properties of formations such as the ones in (14i-k) can be straightforwardly accounted for without postulating another derivational suffix under the simplest assumption that they are compound adjectives.

Let us now turn to the largest group of items featuring the element *-wise*, the adverbs, all of which are derived from nouns. Two kinds of adverbs can be distinguished: the larger group are the manner and dimension adverbs, which are also historically older. This adverb type has the meaning 'in the manner of N, like N'; sometimes these adverbs indicate the spatial arrangement or spatial execution of the movement referred to in the VP (cf. the examples in (14a-d)). It is, however, not always possible to distinguish clearly between the two readings

'manner' and 'dimension' (e.g. is '*cut X crosswise*' an instance of one or the other?) and the distinction is not made in all reference books. The smaller and much more recent group of viewpoint adverbs is made up of adverbs whose meaning can be rendered as 'with respect to, in regard to, concerning [BASE]'. They are mentioned in grammars and dictionaries but not in the reference literature on word-formation. We have called them 'viewpoint adverbs', basically following CGEL, which discusses these *wise*-formations under the heading of 'wide-orientation subjuncts' (p.568-569), suggesting the paraphrase 'if we consider what we are saying from a N [=base] point of view'. The scope of the viewpoint adverbs is thus not a VP (as for the manner/dimension adverbs) but a whole clause or sentence, a fact which is visible in the surface word-order of the examples given in (14e-h).

In the meaning of the viewpoint adverbs there is no connection to the semantics of the noun *wise* 'manner', which suggests that they must have been coined by speakers for whom *-wise* was a simple adverbial suffix without further semantic content. And indeed there is a huge age-difference between the two adverb-types: while manner adverbs in *-wise* have been around since Middle English, the viewpoint adverbs are a fairly recent phenomenon.

Independently of each other, Houghton (1968) and the OED narrow down the appearance of these adverbs to the 1940s.⁷ Reference is repeatedly made to their U.S. origin (OED, CGEL p. 569, 1536)), and also Houghton (1968:213) seems to believe that the usage is American rather than British. What the BNC data clearly show is that fifty years on, the usage has certainly gained a foothold in British English too.

This brings us directly to the question of productivity: the shortest look at Table 4 shows us the impressive share of hapax legomena (i.e. words that occur only once in the corpus) among the viewpoint adverbs. The number of hapaxes is highly indicative of the productivity of a morphological category because it correlates with the number of neologisms of that category (e.g. Baayen 1993). Note that the claim is not that a hapax legomenon *is* a neologism. A hapax legomenon is defined with respect to a given corpus. When this corpus is small, most hapax legomena will be well-known words of the language. However, as the corpus size increases, the proportion of neologisms among the hapax legomena increases, and it has been shown that it is precisely among the hapax legomena that the greatest number of neologisms appear (Baayen & Renouf 1996). From a statistical viewpoint, the hapax legomena play an essential role for gauging the probability that new forms will be encountered that have not been observed before in the corpus.

This approach to measuring morphological productivity receives strong support from the fact that high-frequency words (e.g. *happiness*) are more likely to be stored in the mental lexicon than are low-frequency words. Baayen & Renouf write that

[i]f a word-formation pattern is unproductive, no rule is available for the perception and production of novel forms. All existing forms will depend on storage in the mental lexicon. Thus, unproductive morphological categories will be characterised by a preponderance of high-frequency types, by low numbers of low-frequency types, and by very few, if any, hapax legomena, especially as the size of the corpus increases. Conversely the availability of a productive word-formation rule for a given affix in the mental lexicon guarantees that even the lowest frequency complex words with that affix can be produced and understood. Thus large numbers of hapax legomena are a sure sign that an affix is productive. (Baayen & Renouf 1996:74)

Of the 137 different viewpoint adverb types, 111 or 81 % occur only once in the 100 million-word BNC. Despite their much larger token number, the manner/dimension adverbs perform rather poorly in comparison (21 hapaxes out of only 39 different types). Notwithstanding Marchand's assertion that the manner type "is strong" (1969:358), we are thus inclined to go along with CGEL (p. 1557), which says that they are only "limitedly productive". The viewpoint adverbs in contradistinction seem to be very productive indeed, a fact which is accurately reflected by the Cobuild Dictionary's ordering of sub-entries under *-wise*: the viewpoint use comes first, the manner use second.

The question of relative productivity of the two adverb types becomes important in interesting ways when we consider the trade names in *-wise* that appear in the BNC (see again Table 4 above). These trade-names are rather ingenious coinings playing on the ambiguity of isolated 'N+*wise*' formations. Such items may be adjectives or they may be adverbs. Both makes sense with regard to the company that is being named: *Netwise*, *Bookwise*, *Carpetwise* etc. *Bookwise* is a company that concerns itself with books (in fact it seems to be a bookstore), i.e. its activity is 'with regard to books'. But *Bookwise* is also a company (or so one would hope) that is knowledgeable about books. *Carpetwise* sell carpets but simultaneously their name makes a claim as to their expertise about them. The same double pattern holds for all the trade-names which appear. Note, however, that there is never a question of the other adverb reading (manner/dimension) coming into play. Even without the figures of Table 4, the simultaneous use of compound adjectives and viewpoint adverbs in *-wise* in these trade names demonstrates their salience and productivity in current English usage.

What we need to consider now is the morphological status of the element *-wise* itself. The OED treats the adverbs under the headword of '*wise* n1', a fact which would seem to give these combinations the status of noun + noun compounds. There are two problems with this. The first is that a compound with a nominal head would be expected to be a noun and not an adverb. The second problem is that *wise* (Old English *wise* = 'manner'; cf. German *Weise* f.) is — apart from some truly archaic occurrences — no longer an independent noun in Modern English. This is accounted for by the OED by the statement that *-wise* actually "has the appearance of a suffix in the adverb combination" (OED s.v.

wise n¹, II.). Marchand's treatment of *-wise* as a semi-suffix is thus in accordance with the position of the OED (Marchand 1969:358).

We think, however, that the fact that there is — or rather was — a cognate noun is not decisive in this context.⁸ It is well known that the suffixes *-dom* and *-hood* have also turned from independent nouns into derivational suffixes within the documented history of the English language, but nobody would argue about their status as suffixes. It is true that they lost their status as independent nouns much earlier than *-wise* so that their historical origin is completely opaque. The noun *wise*, on the other hand, can be found in a couple of phrasal remnants even in present-day usage (*in like wise* (N=1 in BNC), *in no wise* (N=13 in BNC)) so that one might argue on these grounds that the manner adverbs are compounds. But, as mentioned above, this creates the problem of a noun+noun compound functioning as an adverb. Once we take the viewpoint adverbs into account the matter stops being ambivalent altogether since with the viewpoint adverbs, the semantic connection to the 'manner' meaning of the independent Old English noun *wise* is conspicuously absent. We indicated above that it was probably the perceived status of *-wise* as an ordinary, semantically rather empty adverbial suffix which prompted the coinage of the viewpoint adverbs in the first place. The semantic-relatedness-argument against declaring *-wise* a suffix is problematic for yet another reason: *-ful* and *-less* (*beautiful*, *powerless*) are generally counted among the derivational suffixes of present-day English even though they are formally and semantically overtly connected to free morphemes which are not only still in use but part of the core vocabulary. In terms of formal and semantic connectedness to its free form origin, then, *-wise* seems to rank in between *-dom/-hood* and *-ful/-less*, all four of which are commonly regarded as derivational suffixes of Modern English. We think these are good enough reasons to include adverbial *-wise* among the class of suffixes, too.

5. Suffixation vs. compounding: dichotomy or cline?

In the foregoing chapter we have argued that the morphological status of *-ful*, *-type*, and *-wise* can be clearly determined. *-ful* and *-wise* are suffixes, whereas *-type* is the right-hand member of a compound. We are thus assuming that it is possible and theoretically desirable not to unnecessarily proliferate the kinds of categories used in a language. However, it could be argued that there is a cline between typical compounds on the one hand and typical suffixations on the other. Consequently, instead of assigning *-type* formations to compounds, and *-ful* and *-wise* formations to suffixation one could simply state which criteria of typical compounds/suffixations each item fulfils.

But what is the nature of these criteria or properties that are taken to be more or less represented in a given item? Two kinds of properties come to mind: morphological and semantic. Thus it has been argued that an item is the more

affix-like, the more integrated it is morphophonologically. Since none of the items under discussion is phonologically strongly fused with its left neighbour, this may speak for their compound status. We have to be careful however with the value of phonological observations for morphological arguments. While it is true that phonologically fused elements tend to be affixes, the reverse is not necessarily the case. Even among affixes, phonological integration is not uniform. For example, most vowel-initial suffixes in English are integrated into the phonological word, whereas most consonant-initial suffixes are not (Raffelsiefen 1999), and many prefixes (e.g. *pre-*, *post-*, *anti-*, *de-*, *dis-*, *mis-*) are even phonological words by themselves, allowing co-ordination (see Wiese 1996:65-74 for a detailed discussion of similar facts in German).

In essence, degree of phonological integration and morphological status do not always coincide, with the consequence that morphological criteria *per se* do not tell us whether we are dealing with a compound element or an affix. Due to their phonological make-up the items under discussion may be considered phonological words, but this does not decide on their morphological status.

Note also that the problem with the items under investigation is not to place them on the putative cline from compound to suffix on the basis of some more or less sensible criteria. This would be a mere exercise in defining and subsuming. What really is at stake is whether we need to posit one lexical entry or two different ones for each of our formatives. This brings us finally to the semantic arguments. Semantic non-transparency and a high degree of lexicalization might be adduced as typical properties of derivational morphology, with compounding being allegedly more transparent. This position is, however, not well taken. Many compounds are non-transparent (Libben 2000), and productive derivational processes are — by their very nature — semantically transparent (Plag 1999). According to Rainer (1993), the most important criterion to distinguish a compound element from a suffix is therefore its relatedness to a free form. If the constituent in question occurs *with the same meaning* as a free form, no additional suffix should be assumed. As shown above, this is the case with *-type*, but crucially not with *-ful* and *-wise*.

In sum, in spite of the possible existence of a cline of phonological, semantic and morphological integration it is nevertheless possible to determine whether it makes more sense to posit suffixes homophonous with related free morphemes, or whether the facts can be explained on the basis of the already existing free morphemes.

6. Conclusion

In this paper we have discussed morphologically complex English words in *-ful*, *-type* and *-wise*. On the basis of the analysis of a large number of forms as they occur in the BNC we have investigated their productivity and structural proper-

ties, showing that some previously proposed analyses need to be revised. In particular, it was argued that there are good arguments for treating these formations as either compounds (in the case of *-type*), or as suffixes (in the cases of *-ful* and *-wise*). Labels such as 'semi-suffix' are theoretically undesirable and do not provide additional insights into the nature of complex words.

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Notes

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- 2 In this paper we use a hyphen to spell *-ful*, *-type* and *-wise* whenever we refer to them as second elements in complex words. This generalises over the spelling practice in the BNC, which is variable in all three cases. Neither does the use of the hyphen prejudice our analysis of these formatives as either suffixations or compounds.
- 3 Simple word searches in the BNC can be carried out at the following website: <http://sara.natcorp.ox.ac.uk/lookup.html>.
- 4 Note that the figures concerning *-FUL* refer to 'measure *-ful*' only. The figures for derived adjectives in *-ful* are as follows: N=82,889; V(N)=282; n1=50.
- 5 There is, however, one counterexample to this generalisation: *In one of my first jobs I plastered on the make-up and wore very executive-type suits.*
- 6 The list in (7) is an exhaustive list of all such forms in the written part of the BNC.
- 7 First citation in the OED is from 1942; Houghton (1968) dates the appearance of these *-wise* adverbs in the second half of the 1940s.
- 8 Bauer (1983:225) includes *-wise* among the adverbial suffixes without discussion.

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