

Blackbirds and blue whales: stress in English A+N constructions¹

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(Received 11 November 2019; revised 7 April 2020)

In this article various constructions of English with the form A + N are considered, with particular reference to stress patterns. It is shown that there are several such patterns, and that stress patterns do not correlate with fixed effects. It is also argued that a simple division between compound and phrase does not seem to provide a motivation for the patterns found. The patterns seem to be determined partly by factors which are known to influence stress patterns in N+N constructions, and partly by lexical class, though variability in which expression belongs to which class is acknowledged. It is concluded that this is an area of English grammar that needs further research.

Keywords: compound, adjective, English, stress

1 Introduction

The aim of this article is to explore the phonology (specifically the prosody) and semantics of A+N constructions in English with the goal of considering the range of constructions, the differences between them, and the extent to which the prosody is predictable. The question will also be raised as to how the different factors are related to the distinction between morphological (compound) and syntactic (phrasal) constructions. Although various hypotheses will be proposed and motivated, and a tentative solution will be reached, a full answer will require an experimental approach over large amounts of data, which the present author has neither the facilities nor the expertise to carry out. Accordingly, all results here are provisional.

In this article I use the term ‘N-bar’ as a cover term for N+N and A+N constructions with right-hand heads. The article will begin with some background on prosody within N-bars with an N+N structure (section 2), in order to establish a framework for discussion and a terminology. The summary presented here is brief, since most of it is assumed to be familiar. Then six distinct A+N construction types will be considered (section 3). Three of these contain morphologically simple adjectives, three of them contain morphologically complex adjectives. It will be shown that prosody behaves differently in these two blocks of three constructions. Although most of the discussion will be over so-called endocentric A+N constructions (constructions which create hyponyms of the N involved), so-called exocentric constructions will also be briefly mentioned (section 4). Questions concerning the predictability of the prosodic pattern and the semantics associated with different patterns will be raised (section 5). Whether

¹ I should like to thank my colleagues who agreed to take part in the pilot test mentioned in section 5, and the anonymous referees for *ELL*.

the stress variation is in any way related to compound status will be considered in section 6. In the conclusion (section 7), the status of these constructions as syntactic or morphological will be considered.

2 Background and N+N constructions

Stress in English N-bar constructions has long been a topic of research, but most of the attention has been focused on N+N constructions, with examples like those in (1) being of vital importance.

(1) <i>Stress on first element</i>	<i>Stress on second element</i>
(a) apple cake	apple pie
(b) Madison Street	Madison Avenue
(c) glass case (to hold)	glass case (made of)
(d) silkworm (produces)	silk worm (made of)
(e) toy factory (produces)	toy factory (is a toy)
(f) shooting stick	shooting star

The examples in (1) are not all of the same type. Examples (1a) and (1b) appear to show lexical conditioning of stress placement, in that other examples with the same head noun (right-hand noun) tend to show the same stress pattern. In examples (1c)–(1e), the same head noun is found, but the relationship between the head noun and its modifier is different, and this appears to be criterial. Finally, example (1f), although it is of a type which is often discussed in this context, is strictly irrelevant, since *shooting* in the first column is a noun ('the stick is used during shooting'), while *shooting* in the second column is an adjective ('the star is of a type that shoots across the sky'), and they belong to different constructions. These factors of lexical conditioning and the semantic relationship between words will be shown to be relevant to A+N structures later in this article.

In (1) the heading 'Stress on the first/second element' is used. Following Chomsky & Halle (1968), the terms 'compound stress' and 'phrasal stress' became standard for first versus second element stress. Such nomenclature strongly implies that items in the first column of (1) are compounds while those in the second column are phrases. Although this view has apparently been held by linguists as diverse as Bloomfield (1935: 180) and Hogg & McCully (1987: 4), such a conclusion has been rejected by a number of linguists, from Bauer (1978) to Giegerich (2015), for a number of reasons, at least one of which will be set out below. In this article, the terms 'forestress' and 'end-stress' will be preferred, to avoid prejudging the issue. Even then, the background assumption of a dichotomy may be unhelpful. In some sources, it is suggested that there might be three stress patterns: forestress, level stress and end-stress (e.g. Pennanen 1980). While I shall make the assumption here, following what appears to be a majority viewpoint in the current literature, and one specifically endorsed by Collins & Mees (2013: 133), that level stress is a contextual variant of end-stress, the very fact that such a question

can be raised indicates that the facts in this area of description are not necessarily as clear-cut as we might suppose.

While this division into compounds and phrases using stress as a criterion (not necessarily as the only criterion) was once widespread (see the review in Bauer 1978: 89–95), more recent research – and much more sophisticated research – suggests that the difference in stress pattern is largely predictable over N+N structures (Plag *et al.* 2007; Plag *et al.* 2008; Plag 2010; Arndt-Lappe 2011; Bell 2011; Kunter 2011; Bell & Plag 2012). If stress is, on the whole, predictable and does not itself define categories, it is difficult to see how stress can distinguish between compounds and some other category. We must conclude that while stress is a feature of N+N constructions which requires attention, even if it is itself dichotomous, it does not allow for the definition of two categories of N+N constructions (other factors including those which are supposed to define ‘words’, of course, are also available, if not always useful – Bauer 1998; Payne & Huddleston 2002: 448–51).

An extra level of complexity is added by the fact that precisely this set of constructions is often subject to the rule of iambic reversal (aka the rhythm rule, stress shift), whereby a sequence of unstressed–stressed can be changed to stressed–unstressed in the presence of an immediately following stress. For instance, we find *àpple pie order* despite *apple pie*. Although this will not be discussed in any detail in this article, it is a factor which must be taken into consideration in testing or in interpreting corpus data.

General predictability does not, of course, exclude a certain amount of variability. Some of the attested variability is dialectal (American *ólive oil* contrasts with British *olive óil*), some is based on semantics (a *gláss case* displays glass, while a *glass cáse* is made of glass, as in (1)), some is due to language change (*ice créam* is no longer the norm in British English as it once was), some of it is individual or otherwise inexplicable – perhaps due to varying analogies; *churchwarden* is given forestress by some authorities, including Upton *et al.* (2001), Brookes (2003), Mayor (2009), Deuter *et al.* (2015), the *OED online* (2019), and as a specifically American pronunciation by Wells (2008); it is given end-stress by Kenyon & Knott (1953), Jones (2003), Wells (2008), and as a specifically American pronunciation by Deuter *et al.* (2015) and Mayor (2009).

Drawing a distinction between compounds and phrases on the basis of stress has been even more common with A+N constructions than in N+N constructions. This division will be questioned here, but first, in section 3, six different A+N construction types will be considered. Subsequently, the implications of these construction types will be considered.

3 Six A+N construction types

In this section, six constructions types with A+N will be distinguished and compared, the types differing in stress pattern and morphological complexity of the adjectives. The first three types contain morphologically simple adjectives, the last three contain morphologically complex adjectives (canonically, denominal adjectives) or collateral

adjectives (adjectives not derived directly from bases which are nouns, but fulfilling the same function – Koshiishi 2011). The types will be labelled S1–3 and C1–3 for ease of reference, though some have other labels in the literature already. Much of the literature on forestressed A+N sequences has dealt only with simple adjectives, and the complex adjectives lead to problems of interpretation and classification (see e.g. Bauer *et al.* 2013: 434f.)

Unless otherwise stated, the data on stress here are taken from the reference works mentioned in section 2. Unless otherwise stated, the sources agreed. An attempt was made to cover all the relevant forestressed items in Wells (2008); end-stressed items are harder to confirm, since they are often left unmarked, and compositional forms may not even be listed, but a lack of overt marking in a listed item can in some works be interpreted as indicating end-stress. Some forestressed items are discussed in e.g. Bauer (2004), Giegerich (2015) among other sources.

3.1 Construction type S1: black paint

Examples of type S1 are given in (2).

(2) black paint, deep lake, old building, new shoes, pretty kitten, red car

The examples in (2) are all standard N-bar constructions containing fundamental adjectives. In much of what follows, I shall concentrate on fundamental colour adjectives (i.e. excluding terms such as *turquoise* and *cyan*) simply to reduce the range of relevant material, but the basic principles of the discussion are not affected by this. Specifically, the constructions in (2) show the characteristics set out in (3), and summarized in table 1.

- (3) (a) The construction takes end-stress.
 (b) The adjective is descriptive/intersective: *black paint* is both paint and black.
 (c) The adjective is gradable: *blacker paint* and *very black paint* are normal constructions.
 (d) The adjective cannot be felicitously denied/contradicted: **This black paint is brown*, **This yellow black paint*. (In some instances, such strings are felicitous iff they involve mention: that is, *This 'black' paint is brown* is fine if we are denying the applicability of the label *black*, but not if *black* is being used to describe the paint.)
 (e) The adjective can be freely used predicatively: *This paint is black*.

Such strings are normally considered to be free syntactic combinations in N-bar, of a type that barely needs special consideration; it is a kind of default A+N construction. Importantly, although this set may include some items which are recognizable as collocations, the examples are unlikely to be found listed in dictionaries as multi-word expressions (MWEs).

Table 1. *Summary of type S1*

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
End-stress	Descriptive	Yes	No	Yes

3.2 Construction type S2: blackbird

Examples of S2 are given in (4). They differ from the S1 construction in terms of stress and interpretation.

(4) blackbird, blueberry, blue tit, green card, greyhound, whitefly

It should be noted that the spelling of items in this set is not consistent, despite the fact that there is a preference for single-word orthography. Moreover, the items in this set are not necessarily fixed. Although items such as *cold drink*, *hot drink* and *high cloud* are usually treated as being part of an S1 construction, I have heard them pronounced with forestress which makes them look as if they fit into the S2 construction. Whether speakers change the stress because they perceive the semantics already to have changed, or whether they operate simply on a factor such as frequency is not clear. It should also be noted that pronunciation dictionaries give variable stress for a few items including *black currant* and *grey matter*. (It is not always clear what variable stress means in such works: it could mean that different individuals use different stress patterns, it could also mean that all speakers use different stress patterns in different environments.) The characteristics of this type are set out in (5), and summarized in [table 2](#).

- (5) (a) The construction takes forestress.
 (b) The adjective is classificatory: a *blackbird* is a type of bird, not just a bird that happens to be black.
 (c) The adjective is not gradable if the integrity of *blackbird* is to be maintained: **blackerbird* and **very blackbird* are not possible.
 (d) The adjective can be felicitously denied/contradicted: *This blackbird is brown*, *This brown blackbird*.
 (e) The adjective cannot be freely used predicatively: *This bird is black* is a type S1 construction, not a type S2 construction.

Table 2. Summary of type S2

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
Forestress	Classifying	No	Yes	No

This type is nearly always called a compound. It shares many features with constructions which are called compounds in other Germanic languages, including those in (5). It shares forestress and its classificatory (or categorizing) nature with a subset of N+N structures, such as *carpark*, *tax law*, *windmill*, which are also regularly termed compounds. The semantic features attributed to this class in (5) can be found in Bauer *et al.* (2013: 434–5).

3.3 Construction type S3: blue whale

Examples of S3 are given in (6). In terms of stress it is like S1, in terms of meaning it is like S2.

(6) blue whale, black pepper, brown sugar, red squirrel, yellow fever

Although this set favours an orthographic representation in two distinct orthographic words, this is not always the case. A word like *red()currant* can be spelt in one or two words and pronounced with forestress or with end-stress (pronunciation dictionaries show this item as having variable stress), and the two are not obviously correlated.

Strictly speaking, this type is ambiguous between the readings seen with S1 and the readings seen with S2. If we assume that a child is given a picture of a sperm whale and colours it blue with a crayon, we could legitimately say we have a *blue whale*. But in another sense, a *blue whale* refers to *Balaenoptera musculus*. In the first of these senses, *blue whale* is a type S1 construction, in the second, it is a type S3, and it is in this reading that *blue whale* (and the other examples) are to be taken in this section.

The characteristics of this type are set out in (7), and summarized in table 3.

- (7) (a) The construction takes end-stress.
 (b) The adjective is classificatory: a *blue whale* is a type of whale.
 (c) The adjective is not gradable if the integrity of *blue whale* is to be maintained: **bluer whale* and **very blue whale* are not possible as S3 constructions.
 (d) The adjective can be denied/contradicted, but it is not always easy, since there is a clash with the S1 construction: *This blue whale is black*, *This black blue whale*, *A brown red squirrel*.
 (e) The adjective cannot be freely used predicatively: *This whale is blue* is a type S1 construction, not a type S3 construction.

Table 3. *Summary of type S3*

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
End-stress	Classifying	No	Yes	No

Despite the commonalities between S2 and S3, S3 constructions are rarely included as compounds: Adams (1973: 83) does include them, Bauer *et al.* (2013: 435) specifically exclude them.

3.4 Construction C1: dangerous behaviour

We now switch to morphologically complex adjectives, where we find apparently (but not entirely) parallel examples. Examples of C1 are given in (8).

- (8) dangerous behaviour, expensive watch, friendly neighbour, nervous child, popular author

The constructions in (8) show the characteristics set out in (9), and summarized in table 4.

- (9) (a) The construction takes end-stress.
 (b) The adjective is descriptive/intersective: *dangerous behaviour* is both behaviour and dangerous.
 (c) The adjective is gradable: *more dangerous behaviour* and *very dangerous behaviour* are normal constructions.
 (d) The adjective cannot be felicitously denied/contradicted: **This dangerous behaviour is safe*, **This innocuous dangerous behaviour*. (In some instances, such strings are

felicitous iff they involve mention: that is, *This 'dangerous' paint is safe* is fine if we are denying the applicability of the label *dangerous*, but not if *dangerous* is being used to describe the behaviour.)

- (e) The adjective can be freely used predicatively: *This behaviour is dangerous*.

Table 4. *Summary of type C1*

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
End-stress	Descriptive	Yes	No	Yes

While the adjectives involved here are denominal and mostly learned, they are gradable, and these constructions are seen as standard N-bars, just like those in S1.

3.5 Construction C2: dental decay

This next construction differs in semantics, but not in stress, from C1. Examples of construction C2 are given in (10).

- (10) dental decay, canine tooth, electrical engineer, mental picture, papal murder, rural police officer, vernal equinox

This type has been given various labels in the literature: *non-predicate* (Levi 1978), *associative* (Giegerich 2005, 2015), *relational* (Bally 1950). These adjectives do not describe the head noun, but, as Giegerich (2015: 11) explains it, ‘denote entities, not properties’, and define what is involved with the head nouns, so that the meaning of *dental decay* is ‘decay associated with teeth’. Giegerich takes the relationship ‘associated with’ to be at the heart of the semantic effect of these adjectives. These adjectives show a variable relationship between the adjective and the head noun (Levi 1978; a *rural policeman* serves in the country – locative – while a *papal murder* is the murder of a pope – direct object).

This construction shows the characteristics listed in (11), and summarized in table 5.

- (11) (a) The construction takes end-stress.
 (b) The adjective is classifying: *dental decay* is a type of decay.
 (c) The adjective is not gradable: **more dental decay* and *very dental decay* are not possible constructions showing gradability.
 (d) The adjective cannot be felicitously denied/contradicted: **This dental decay is gingival*, **This lingual dental decay*. (In some instances, such strings are felicitous iff they involve mention.)
 (e) The adjective cannot be freely used predicatively: **This decay is dental*.

Table 5. *Summary of type C2*

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
End-stress	Classifying	No	No	No

Where these adjectives are canonically associative/relational, they cannot be used predicatively, any more than we can say **This mill is wind* or **This library is university*. Some of them, though, can be used predicatively, but not when they have an associative/relational interpretation. Examples from the the *British National Corpus* (BNC; Davies 2004) are given in (12), where the adjective has an extended or figurative meaning.

- (12) (a) a part of Scotland where alcohol addiction is chronic
 (b) The atmosphere at Central's studio 7 is electric
 (c) His face was feline in shape
 (d) I realized the chap was mental

It is also the case that some of these adjectives do get literal predicative usage, though this seems relatively rare, so that the term 'non-predicate' is strictly misleading although it indicates the canonical behaviour. Again, examples from the BNC are given in (13).

- (13) (a) various forms of sexual activity which are criminal
 (b) leave someone who is diabetic to be cared for by a chiroprapist
 (c) where the machine is electrical
 (d) in most cases the larger cell is polar (presumptive trophectoderm, TE) and the smaller cell is apolar

Examples of C2 are called compounds by Adams (1973: 86), are linked with compounds as 'complex nominals' by Levi (1978) and are seen as being between compounds and phrases by Giegerich (2015). Bauer *et al.* (2013: 435) say that these constructions 'are not clearly morphological'.

3.6 Construction type C3: medical school

The final type differs from C2 in terms of stress. Examples of this construction are given in (14).

- (14) medical school, aquatic centre, dramatic society, musical box, primary school, solar system

The adjectives that take part in this construction are of the same type as those that take part in C2; indeed, often the same adjectives can be found in both constructions. This construction type, however, has forestress, while the construction C2 has endstress. Examples of C3 show the characteristics listed in (15), and summarized in table 6.

- (15) (a) The construction takes forestress.
 (b) The adjective is classifying: a *medical school* is a type of school.
 (c) The adjective is not gradable: **more medical school* and *very medical school* are not possible constructions.
 (d) The adjective cannot be felicitously denied/contradicted: **This medical school is surgical*, **This dental medical school*. (In some instances, such strings are felicitous iff they involve mention.)
 (e) The adjective cannot be freely used predicatively: **This school is medical*.

Table 6. *Summary of type C3*

Stress?	Semantics?	Gradable?	Deniable?	Predicative?
Forestress	Classifying	No	No	No

3.7 *Reviewing the construction types*

It should be clear that the six construction types listed above do not exhaust the types of N-bar constructions containing adjectives. For example, there are also post-posed adjectives (*the lie direct, the governor general*) and learned adjectives not derived from nouns (*connective tissue, permissive society* and participial adjectives – Adams 1973: 85). As far as I am aware, none of these other types shows variable prosody.

It has been implicit in what has been said above, but needs to be made explicit, that adjectives do not belong to one or another type by virtue of their lexical identity, but by virtue of their function in a particular N-bar. The colour adjectives can often appear in forestressed expressions like *blackbird*, in end-stress classifying constructions like *black eye* and in end-stress descriptive constructions like *black car*. Examples like *dramatic* can have forestress in some examples, end-stress in others (*dramatic society* versus *dramatic irony*), and in yet others with end-stress they can be descriptive and gradable (e.g. in *dramatic appearance*). In some of these instances (such as the *dramatic* one), we probably feel that there is some polysemy involved, but such a position is harder to motivate with the colour adjectives (even if different shades of red may be involved in *redcap, red squirrel, red wine* and *red paint*). The difference between the types illustrated here with the colour adjectives (although other basic adjectives also take part) and the denominal, learned adjectives is based on their historical and morphological nature and, importantly, their behaviour with regards to stress. But this is not first and foremost a classification of adjectives; it is a classification of constructions based on the uses of adjectives. This may influence our view of how to describe these constructions.

We can provide an overview of the material here in a slightly different format as in table 7. The bold outline in table 7 surrounds the associative adjectives. Although table 7 does not reflect all of the information from tables 1–6, much of the information that is omitted can be predicted on the basis of the information in table 7. Importantly, the deniability of the value of the adjective is not the same for simple and complex adjectives, so that the distinction between the two is necessary.

Table 7. *Overview of types*

	Forestress	End-stress	
	Classifying		Descriptive
Simple adjectives	<i>blackbird</i>	<i>brown sugar</i>	<i>old building</i>
	<i>blueberry</i>	<i>blue whale</i>	<i>blue sky</i>
Complex adjectives	<i>medical school</i>	<i>dental decay</i>	<i>dangerous behaviour</i>
	<i>nervous system</i>	<i>nervous energy</i>	<i>nervous candidate</i>

4 An excursus: so-called exocentrics

Some discussion of so-called exocentric A+N compounds is also required. Although the term ‘exocentric’ is in general usage (Bloomfield 1935; Bauer 2010), I have argued elsewhere (e.g. Bauer 2016) that the label ‘exocentric’ is misleading. I will retain the label here as a recognizable symbol of the class or expressions which are not hyponyms of their head noun. For the moment, I will also retain the standard label ‘compound’ for these structures, although just how far any of these constructions are justifiably described as compounds is raised in section 6 below. Typically, exocentric A+N compounds are synecdochic in nature (a *blackshirt* has/owns/possesses/is characterized by a black shirt, but is not a shirt), but other figurative interpretations are also widespread. Forestress often seems to be a marker of exocentricity with this class. Brookes (2003) lists the examples of forestress in (16) with the adjective *red*, for example.

- (16) (a) *Exocentric by synecdoche*: redback, redbelly, redbreast, redbud, redcap, redcoat, red-eye, redhead, redleg, redneck, redpoll, redroot, redshank, redskin, redstart, redstreak, red-top, redwater, redwing, redwood
 (b) *Exocentric by part of speech*: redbrick (adj), redcurrant (adj), red-lattice (adj), red-tape (adj)
 (c) *Endocentric*: red-fish, red-plague

Despite this, there are A+N exocentric compounds with this class of adjective which do not take forestress. Examples include *big top* (‘circus tent’), *blue Peter* (‘nautical flag’), *new blood* (‘new talent’), *old bird* (‘wise, experienced person’), *old hand* (‘person with experience’), *Pink Lady* (‘cocktail’), *red admiral* (‘butterfly’), *round robin* (‘newsletter’).

There are also many exocentric compounds in the *dental decay* class (C2). By definition, these have end-stress. In this set the exocentricity mostly arises from non-synecdochic figurative usage. Some examples are presented in (17).

- (17) *civil death* (‘loss of legal privileges’), *financial crash* (‘failure of a financial undertaking’), *legal eagle* (‘lawyer’), *marital harmony* (‘peace in a marriage’), *moral bankruptcy* (‘having no moral principles’), *moral highground* (‘a (figurative) position of moral superiority’), *musical chairs* (‘children’s game’), *political football* (‘something which is discussed but not solved by a government’), *political suicide* (‘ending one’s political career by some act’), *social butterfly* (‘person who attends many social events’)

Although this is not evidence, I have been unable to find a good example of an exocentric in the *medical school* construction (C3), unless *board* in *medical board* is perceived as a metonym. If exocentrics really are excluded from this construction (and I suspect that my failure is simply a failure of data rather than a genuine principle), it would be the first evidence that I know of that exocentric compounds are formally different from endocentric compounds.

There are many A+N constructions which do not function as N-bars. Most of these have an adjectival function (although saying this opens up a whole set of questions that really deserve separate treatment). Some examples with the modifier *red* were cited above in (16). Some of these examples, although analysed as compound adjectives by lexicographers, are rather dubious illustrations of the principle. For instance, the forestress in *red-brick* (which almost always occurs in attributive position as in *red-brick university* or with the name of some other building replacing *university*) could be argued to arise through stress shift, and the same analysis could be applied to *red-currant* in *red-currant jelly*. A better example may be *broad-brush*, or *barefoot* (which is also used predicatively and/or adverbially in examples like *As she stood barefoot on the cold boards* (BNC)). *Bigtime* occurs as a noun, an adjective and as an adverb and retains forestress in all cases. *Brown-nose* ('sycophant, to flatter') occurs as a noun or a verb, but the stress is apparently variable (Wells 2008), and it is not clear whether the noun and the verb differ in stress or not. There is too little evidence here, either to say that the forestress in such cases follows from forestress in segmentally identical nominal cases, or to suggest that stress in the exocentric instances follows independent rules.

5 Possible factors influencing stress

Bauer (2004) makes the suggestion that the distinction between forestress in S2 and end-stress in S3 correlates with greater frequency. This is hard to measure, since both types vary immensely in the frequencies of the constructs involved. Nevertheless, the average frequencies of the items with colour adjectives in the list in (18) – with forestress – and (19) – with endstress – in the BNC and in the iWeb (Davies 2018) corpus of 14 billion words support this general finding, as shown in table 8 (items followed by the symbol '•' in (19) show variable stress in reference sources). Some of

Table 8. *Average frequencies of the items in (18) and (19) in two corpora*

	In the BNC	In the iWeb corpus
Items from (18) with forestress	59.8	13,386.9
No. per million words	0.598	0.956
Items from (19) with end-stress	50.3	10,212.5
No. per million words	0.503	0.729

the terms are also regional, with e.g. *green bean* and *pink slip* relatively less frequent in the BNC than in the iWeb corpus.

- (18) blackbird, blackbuck, blueberry, bluegrass, blue tit, green card, greenroom, greenstone, greyhound, whiteboard, whitefish, whitefly
- (19) black bread, blackcurrant, black eye, black ice, black pepper, blue cheese, blue movie, blue whale, brown bear, brown bread, brown coal, brown paper, brown rice, brown sugar, green bean, green light, green paper, green tea, grey economy, grey matter, pink gin, pink slip, red cabbage, redcurrant, red squirrel, red wine, white dwarf, white gold, white lie, yellow fever, yellow jersey, yellow line

This fits with Plag's (2006: 146) observation that 'we should find more modifier-head structures with leftward stress among ... more frequent items' because frequency and lexicalization correlate. Nonetheless, it seems that some riders need to be added to this observation of the correlation of frequency with stress, as in (20).

- (20) Colour Adj+N constructions with first-element stress tend to be, on average, more frequent than in the same construction with second element stress, with the proviso that while frequency may lead to first-element stress, loss of frequency does not lead to loss of first-element stress once it has been associated with the construct. Furthermore, there may be a time lag between a gain in frequency and a shift to first-element stress. Again, the stress pattern may be borrowed along with an item, independent of the frequency of that item in the borrowing variety.

An alternative (or, perhaps, extra) factor leading to forestress seems to be lexical conditioning, where the item doing the conditioning is the head noun in the construction. Some examples are given in (21), but some comments are required. First, it is often difficult to find end-stressed items given a stress pattern in reference works, so here, rather more than in other sections, my (fallible) intuitions have been called upon. Second, sometimes different polysemes of the noun appear to give rise to different stress patterns. And third, stress is not always consistently determined by the head noun, just as is the case with N+N constructions. If A+N constructions work rather like N+N constructions, this is not surprising, as Plag and his team (see the references in section 2 above) have found multiple factors which influence stress, not just the identity of the head noun. The examples in (21) show simple adjectives where it might be considered that lexical conditioning applies. In (22) we find some C3 constructions (thus, all with forestress) where the same applies.

- (21) (a) backboard, blackboard, freeboard, hardboard, whiteboard *all take forestress*.
 (b) black lead, blue lead, cold lead, red lead, white lead, yellow lead *all take end-stress*.
 (c) clean room, common room, dark room, greenroom, sickroom *all take forestress*; double room, single room, spare room *take end-stress*.
 (d) Broadway, clearway, freeway, highway *all take forestress*.
 (e) black tea, green tea, high tea, pink tea, red tea, white tea *all take end-stress*.
 (f) bluefish, numbfish, red-fish, weakfish, whitefish ('Coregonus') *all take forestress*; white fish ('whiting, haddock, etc. collectively') *takes end-stress*.

- (22) (a) dental school, medical school, normal school (NZ), primary school, secondary school, technical school
 (b) dramatic society, friendly society, historical society, humane society, musical society, operatic society
 (c) decimal system, digestive system, feudal system, nervous system, solar system

It is not clear whether the forestress in expressions with *school* in (22a) is related to the corresponding stress in *correspondence school*, *dame school* (US), *drama school*, *summer school*, *trade school* which have nominal modifiers.

Since the question is raised by a referee, it is perhaps worth deconstructing just why it is not a simple matter to investigate usage in this area, and why this researcher (as mentioned in section 1) does not have facilities to provide more than sketchy data. First, written corpora are of no value, not even transcriptions of spoken corpora, because such corpora do not provide relevant prosodic information. It has already been noted above on several occasions that orthography does not always reflect the stress patterns that are recorded for some of the items. This means that orthography cannot be reliably used as proxy for stress. Moreover, any experiment that involves reading aloud is problematic. News-readers in the media regularly read items which are usually forestressed as end-stressed (Bauer 2015), and whether this is a matter of genre or a matter of error brought on by the process of reading aloud, it means that material gathered from read materials cannot be assumed to be representative of normal usage. Further, as shown in the experiment reported in Bauer (1983), speakers regularly report different stress patterns for the same items when asked on different occasions to say where they think the stress falls. Whether this is due to genuine variation, or whether it is due to speakers' general lack of attention to stress phenomena is not something that is easily answered, but it suggests strongly that intuitions in this area are particularly untrustworthy. This may be related to the fact that English speakers do not, in general terms, need stress in order to identify words as much as speakers of, say, Spanish or Dutch (Cutler 2012: 25). This leaves the possibility, exploited by Kunter (2011), of analysing by computer the wave-forms in a very large corpus of spoken English. While this clearly can be done, it is by no means a trivial exercise, involving facilities and expertise which I do not have. In the absence of such data, a small pilot test, with 10 speakers reading a number of sentences twice, showed a great deal of individual variation (some of it due to performance factors, according to participants), but 75 per cent or more agreement for most of the examples tested from the lists above (and in (23) below), but only 40 per cent agreement with the pattern set out in (24) below.

After that digression, let us return to potential factors in stress assignment, of which a third is the semantic relationship between the adjective and the noun. This seems to be parallel to the pairs in (1c)–(1e) with nominal modifiers. This is illustrated in (23), where lexical conditioning could be causing the difference in stress patterns (as shown in (21) and (22)), but the relationship could also be a factor, and in some cases, the relationship difference may look like a matter of polysemy in the adjective. The glosses in (23) are suggestive, and alternative glosses would probably lead to similar conclusions.

(23)	<i>Forestress</i>		<i>End-stress</i>	
	aquatic centre	'centre contains water (for swimming)'	aquatic life	'water contains life'
	dental hospital	'hospital treats teeth'	dental decay	'teeth decay'
	dramatic society	'society is concerned with drama'	dramatic irony	'irony is found in drama'
	medical school	'school teaches medicine'	medical procedure	'procedure involves the practice of medicine'
	musical box	'box produces music'	musical instrument	'instrument produces music'
	nervous system	'the system of nerves'	nervous energy	'energy arises from the nerves'
	operatic society	'society is concerned with opera'	operatic aria	'aria is in an opera'
	primary school	'school is on the first tier of the system'	primary produce	'produce not derived from another product'
	professorial board	'board is made up of professors'	professorial appointment	'professor is appointed'
	solar system	'system has the sun as its main object'	solar energy	'energy comes from the sun'

If there are multiple factors at work here, it is not surprising given that, as already stated, Plag and his colleagues find multiple factors at work in the stressing of N+N constructions, with the stress remaining largely predictable. It is not my intention to suggest that the three factors isolated above are necessarily the only factors influencing the stress in these constructions; the parallel with N+N constructions may be closer than is superficially obvious.

As with N+N constructions, there is variability in stress in some of these instances. Some variability was mentioned in section 3.2. An American colleague of mine has *new year* as an S2 construction with forestress, while I (with a British accent) have it as an S3 construction with end-stress. *Dental floss* and *dental surgeon* vary according to the pronunciation dictionaries. *Social service* has different stress depending on whether it is British or American according to Jones (2003).

One puzzling example is provided by *local time* which, according to Jones (2003), has variable stress. But saying that there is variable stress does not necessarily make clear under what circumstances the variation is found, and in this particular case the environment for the variation is particularly unusual. Although I cannot be sure whether speakers would consistently use the pattern in (24), it seems plausible to me and to others I have asked.

- (24) (a) It is 6pm *l*ocal time
 (b) The local *t*ime is 6pm

This change does not seem to be caused by iambic reversal, and that leaves the syntactic structure as a motivator of the variation. I see no reason why this should be true, and know of no parallel example.

Finally, it seems extremely likely that some notion of lexical integrity is involved in the position of stress. This is the notion that Payne & Huddleston (2002: 448–51) attempt to operationalize by means of a number of syntactic tests, which Bauer (1998) takes issue with. In saying that lexical integrity is involved, I am neither supporting the particular syntactic tests invoked by Payne & Huddleston, nor rejecting the idea that some kind of test may be possible. The reason for not giving this criterion more weight is that I do not yet see how it can be measured or treated as a scientific notion.

6 What is a compound?

One question that all this throws into relief is the question of the nature of a compound. Specifically, we need to know whether there is anything in the nature of a compound which the differences in stress patterns are reflecting, or whether one stress pattern can be said to be a marker of compound status. Virtually any conclusion here is controversial – a surprising statement, given how many discussions of compounding in Indo-European languages there have been over the last century or so. For Bauer (2019) compounds are MWEs, on the basis that their elements are representatives of lexemes, while for Moon (2015) they are not, on the basis that they are ‘words’. For some, compounds are syntactic structures, for some they are morphological structures (‘words’) and for others they are both (for discussion see Bauer 2017). Whichever of these classifications appeals, there are still questions of what the core of a compound is: is it a construction type or is it something to do with lexical integrity and lexicalization? Furthermore, there is dispute as to what allows us to identify a compound (or, indeed, a word).

Although one of the major functions of compounds seems to be to provide a construction which allows classification, this feature is not unique to compounds. Many languages have constructions with adjectives, with possessives, with modifying prepositional phrases that allow classification – and English has all of these (Bauer & Tarasova 2013; Bauer 2017). So while classification may be a feature of compounds, it is not necessarily a defining feature. Lexical integrity applies to a whole host of MWEs, to a greater or lesser extent, so even though compounds typically show lexical integrity, again it is not something which allows us to define compounds. Even the

notion of two (or more) words forming a new lexical unit does not appear to be a sufficient definition, as illustrated by the examples in (25), some of which may be compounds, and some of which would not usually be seen as compounds.

- (25) (a) a yes-no (question)
(b) a Model T
(c) a salad-salad
(d) an Oxford college
(e) chicken Kiev
(f) girl Friday
(g) the London–Edinburgh train
(h) une pomme de terre (French: ‘an apple of earth’, i.e. a potato)

Without some answer to the question of what a compound is, fundamentally, it is not easy (maybe not possible) to say whether a given construction is or is not a compound. This is a trivial conclusion, and one which is dependent on the state of the art in morphological studies. A better answer may be possible in a few years. However, we can still ask whether there is any evidence that forestressed A+N constructions are in some way more compound-like than end-stressed ones. Here there is, it would seem, less basis for optimism. What we have seen with A+N constructions is that there is little reason to assume that they are all parallel, and even those which carry forestress do not all behave in the same way. At the very best, therefore, to call forestressed A+N constructions ‘compounds’ is to be unclear. Some of the things that forestressed A+N constructions may have in common, they share with their end-stressed equivalents, or they share with other constructions. If there is such a thing as a compound, then we do not have a really good definition of it (although there is widespread agreement on compounds involving several lexemes, inflecting globally, when that is a relevant consideration, and being available for semantic lexicalization); lumping another set of constructions into this ill-defined set is not helpful in defining the new set or in firming up the definition of the old set. Determining what constitutes a compound is a vital first step to determining whether forestressed A+N constructions are compounds, but we also need some reason to think that such constructions share features with compounds, and stress is not a reliable feature to initiate such a comparison.

7 Discussion

For Giegerich (2015: 18), end-stress has a correlation with ascriptive use of the adjective (i.e. non-associative use), which can ‘be paraphrased as predicates’ (Giegerich 2015: 16). Where the meaning of forestressed and end-stressed phrases is contrastive, Giegerich sees a difference between ascriptive and associative usage.

To some extent, the same thing seems to happen with the *medical school* examples (C3), although there is no apparent contrast with C2 constructions. Where predicative usage of the adjective is possible (and thus ascriptive use of the adjective?), forestress is not possible. Hence the difference between, for instance, *nervous system* and *nervous client*. In some cases, some care is required, though. The difference between a *French*

teacher with forestress ('person who teaches French') and a *French teacher* with end-stress ('teacher who is French') is that *French* is a noun in the first example, but an adjective in the second. Similarly, the difference between *The name of Society shall be the University of Lancaster German Society* (www.lancaster.ac.uk/socs/germanso/constit.htm) and *German society in the 1920s is to be interpreted primarily as a post-war society* (Ziemann 2003) is that where there is forestress, in the first example, there is a noun, whereas the second, end-stressed, example contains an adjective. A similar point can be made with reference to pairs such as *driving lesson* ('teaching someone to drive a car') versus *driving rain* ('heavy, horizontal rain').

However, to the extent that ascriptive versus attributive usage of adjectives correlates with stress, in the same way that Giegerich claims ascriptive versus attributive use of noun modifiers correlates with stress, it seems that there is a generalization over N-bar structures which is not necessarily anything to do with morphological status (compound or phrase), but has to do with the semantico-syntactic structure of the N-bar. The difficulty seems to be one of determining when forestress can apply to attributive instances. Most attributive adjectives take end-stress, and a minority take forestress. Most basic adjectives (the *black* and *blue* types) can take either, determined by not very clear criteria (Giegerich 2015: 124 calls forestress here 'sporadic' – but four potential reasons for forestress were mentioned above in section 5). Where N+N sequences are concerned, forestress seems to dominate in the ratio of approximately 2:1 (Kunter 2011: 131). The three do not seem, superficially at any rate, to be determined by the same set of criteria. On the other hand, individual lexemes seem to be important for all three.

To the extent that the label 'compound' seems to be justified here, it seems that it distinguishes S1 and C1 from the other types of construction. But to use the term 'compound' here is redundant. As is shown by table 7, this division is already made by the distinction between classifying (or categorizing) modifiers and descriptive modifiers. To add the nomenclature of 'compound' to the discussion is just to provide two motivations (classifying and compound) to the single semantic outcome, something which offends against Ockham's razor. We do not need competing explanations for a single phenomenon if they do not provide extra information. This suggests that none of the constructions discussed in section 3 is a compound (or needs to be labelled as such).

This does not necessarily imply that there are no compounds in English. It is perfectly possible that N+N constructions do form compounds (and there may also possibly be V+N compounds, although there are few of these). In Bauer (2017) it is suggested that compounds form a construction type that allows non-canonical modification. Precisely the set of A+N constructions then produces difficulties, since adjectives do canonically modify nouns. If A+N constructions are not compounds, Bauer's suggestion is on a firmer footing.

If such a hypothesis is accepted, then stress assignment may be a problem over N-bars (or over N-bars and compounds if compound is retained as a category). A benefit of this for morphologists is that stress assignment is not purely a morphological problem, but one which affects syntax, too. To the extent that similar problems of description affect morphological and syntactic structures, the common treatment of morphological and

syntactic phenomena becomes more justifiable. Some morphologists, specifically those who see morphology as being governed by syntactic principles, will see this as a benefit; others, possibly the majority, will see any such link as irrelevant. Accordingly, it is not the intention to give too much weight to this point here. The reason for raising it at all is that semantic effects that are spread over several modules of the grammar cannot be dealt with by local (e.g. purely lexical) rule types, but require some more general explanation.

A potential problem for this solution is typological. If other Germanic languages have A+N compounds, defined partly by forestress, why should a superficially similar construction in English not belong to the same typological category? The answer, it seems to me, is that the category in other Germanic languages and the category in English are not really equivalent. While in other Germanic languages adjectives in compounds show no inflection, English is poor in inflection on adjectives, and the lack of comparative marking on relevant adjectives in English might be attributable entirely to the fact that the relevant adjectives are not gradable, rather than to an overall ban on inflection. North Germanic languages have constructions which (at least for nouns) define the single word, and A+N forestressed nouns are single words: single word nouns take the post-posed definite article. English has no equivalent construction, and the spelling of some of the relevant constructions, which might be used as a criterion, is inconsistent. We must not see the similarities and ignore the differences without considering the implications of this.

Overall, at the present moment, the syntax-only solution to A+N constructions seems to me to have the most advantages (and is supported, for completely different reasons, by Spencer 2003). Further research may show that it is not an ideal, perhaps not even a tenable, solution. In either case, more work on these constructions is needed.

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