Lexicalism and modular overlap in English*

A comment on Sergio Scalise & Emiliano Guevara: *The lexicalist approach to word-formation and the notion of the lexicon*

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This paper argues that the lexicon-syntax divide, essential for the expression in Lexicalism of the Lexical Integrity Hypothesis, is neither robust nor unique. English has compound-phrase hybrids for whose analysis the lexicon and the syntax must constitute overlapping modules. Similar overlap of modules previously thought to be sharply divided is present within the lexicon: stratal integrity fails to account for the occasional failure of strong stress preservation, for the sporadic occurrence of weak stress preservation, for the frequent adoption of stratum-1 phonotactic behaviour by stratum-2 morphological constructions, as well as for the occurrence of stratum-1 constructions displaying stratum-2 phonotactic structure.

1. Introduction

Under the Lexicalist hypothesis in its basic, strong form originating with Chomsky (1970) and Halle (1973), the processes of the morphology, producing complex words, and those which construct phrase-level units constitute distinct modules of the grammar – the lexicon and the syntax respectively. Just as there is assumed to be a clear categorial distinction between words and phrases – for example between members of the categories N and NP – so is there held to be a robust divide between the two modules generating members of lexical and phrasal categories respectively. The presence of such a divide is crucial to the expression in the grammar of the 'Lexical Integrity Principle' (Lapointe 1980, Di Sciullo and Williams 1987, Scalise and Guevara 2005), whereby syntactic processes can manipulate members of lexical categories ('words') but not their morphological elements. This Principle expresses the traditional view whereby words are the basic building blocks of syntactic structure; and it is of course entirely consistent with the equally traditional modular distinction between the derivational morphology and the syntax in linguistic structure.

Weaker forms of Lexicalism have recognized that the inflectional morphology (Anderson 1982), or at least some of it (Booij 1996), applies in interaction with the syntax, such that the morphology mirrors the well-known distinction between lexical and postlexical phenomena drawn on the phonological side (Kiparsky 1982; Booij and Rubach 1987; Mohanan 1986).

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While the recognition of some postlexical morphology endangers the Lexical Integrity Principle no more than does the existence of phonology both within and outwith the lexicon, doubt has been cast on the Principle's validity by Lieber's (1988, 1992: 11ff.) analysis of 'phrasal compounds' – compound words such as those in (1a), containing embedded constituents which at least strongly resemble phrase-level units:

(1)	a.	Charles and Di syndrome	b.	open door policy
		pipe and slipper husband		cold weather payment
		floor of a birdcage taste		severe weather warning
		off the rack dress		sexually transmitted disease clinic

Such constructions must be noun compounds rather than NPs because, firstly, they may have the main stress on their first constituents (for example on *Di*); secondly, they do not conform with the pre-head modification patterns otherwise associated with NPs; and thirdly, their elements are not individually amenable to modification – **a floor of a birdcage salty taste*. Assuming that the first constituents of these compounds are syntactic phrases, Lieber concludes that "[r]ules of word formation must at least be allowed to refer to phrasal categories which are presumably generated as part of the syntax" (Lieber 1992: 14). The same set of arguments may be put forward regarding cases such as those in (1b) (Sproat 1985, Carstairs-McCarthy 2002).

However, the assumption that the first constituents in such constructions are generated in the syntax, rather than in the lexicon, is not really safe. Wiese (1996) has argued that the embedded 'phrases' in (1a) have the status of quotations, which may suggest some sort of lexical storage. And cases such as those in (1b) may be lexicalized phrases (or clichés: Carstairs-McCarthy 2002: 82) – perhaps displaying figurative senses (*open door policy* – compare **wooden door policy*), perhaps being subject to jargon-specific technical definition (such that, for the purpose of benefit payment, *cold weather* denotes a specific average temperature lasting for a specific number of days). Under such an analysis, constructions such as *open door policy* and *cold weather payment* are amenable to the same lexical treatment as Spencer (1988) proposed for apparent bracketing paradoxes such as *Baroque flautist* (vs. **wooden flautist*, where *Baroque flute* is lexical and *wooden flute* phrasal).

Constructions such as those in (1), then, do not necessarily falsify the Lexicalist assumption of a robust lexicon-syntax divide – indeed, as we saw, in some cases of the type (1) a lexical analysis offers some plausibility. Anyone intent on maintaining the Lexical Integrity Principle will therefore have to accommodate apparent bracketing paradoxes of the kind (1b) by demonstrating that their embedded phrases are lexicalized. (Ironically, this includes the name of the Principle itself.) The problem here is that lexicalization is a phenomenon hard to pin down in formal grammar. Some rather less plausible instances of the lexicalized-phrase analysis – some therefore more compelling bracketing paradoxes – will be discussed in § 2.3.2 below within a modular framework which postulates on independent grounds substantial overlap between the lexicon and the syntax.

To establish this framework, I shall in § 2 identify a range of constructions which are themselves compounds in some and phrases in other respects. I shall argue that to do justice to

such hybrid constructions, a formal grammar cannot have the sharp divide between the two modules postulated in connection with the Lexical Integrity Principle. And a formal grammar which thus recognizes modular overlap will then also find it rather less difficult to deal with phenomena as elusive as lexicalization.

I shall argue moreover that the lexicon-syntax divide is not only not a sharp one; it is also not unique. I hope to demonstrate in § 3 that within the lexicon, the 'divide' between the strata shares many characteristics with that between the lexicon and the syntax, including its fuzziness. If we recognize overlap between lexical strata then a number of problems, morphological, phonological and semantic, will fall into place which have proved recalcitrant under the original position of stratal integrity shared by all research promoting lexical stratification (but see early critics such as Aronoff and Sridhar (1985) and Szpyra (1989)).

2. The lexicon-syntax 'divide' and modular overlap

I want to demonstrate in this section that certain adjective-plus-noun constructions involving associative adjectives (henceforth 'associative AdjNs') cannot be unequivocally called either 'compound noun' or 'noun phrase': some associative AdjNs have characteristics uniquely associated with the syntax (and not expected in the lexicon), as well as other characteristics associated with lexical but not syntactic provenance. I hope to demonstrate that such hybrid behaviour makes it necessary for the lexicon and the syntax to overlap, and that such overlap, once established in the grammar, will then facilitate simpler analyses for a number of other constructions known to be close to the interface of the lexicon and the syntax.
Before I discuss the possibly-hybrid nature of associative AdjNs I summarise the relevant behaviour expected of compound nouns and noun phrases respectively.

2.1 *Syntax and the lexicon: aspects of expected behaviour*

2.1.1 *Productivity*
Compound nouns share with other morphologically complex nouns the characteristic that they may be the outcomes of fully productive processes; or they may follow unproductive patterns. Thus, for example 'synthetic' compounds such as *train-spotter, watchmaker* etc. implement a highly productive pattern, just as nouns such as *kindness* do, while for example inverted constructions such as *court martial, Princess Royal* are fossilized and unproductive similar to, for example, *width, normalcy* and such like.

There are, on the other hand, no random productivity gaps in the processes and patterns of the syntax. Thus for example the attribute-head pattern of the noun phrase (*beautiful picture, red book*) is fully productive and has no arbitrary collocation restrictions or other gaps.

2.1.2 *Semantic transparency*
Like other complex nouns (for example *kindness, singer* vs. *opportunity, fraternity*), compound nouns may be semantically transparent or to a greater or lesser extent opaque. Transparency is again exemplified by the synthetic compound pattern (*watchmaker*), where the

dependent is recurrently an argument to a predicate contained in the head, and by many other examples of complex nouns. Semantic opacity may range from *silver-fish* (an insect) to *bahuvrihi* compounds such as *hatchback, redneck.*

Syntactic phrases are semantically transparent. The semantic interpretation of a phrase is the product of the lexical semantics of the words involved and of the semantics associated with the particular construction of that phrase. Thus in attribute-head noun phrases, the lexical semantics of the adjectives and nouns involved is amalgamated in such a way that the noun is the head and the adjective the attribute, performing a modifying function in respect of the noun.

2.1.3 *Stress*

Compound nouns have their main stress on either the first ('fore-stress') or the second element ('end-stress') (Bauer 1998, Olsen 2000, Giegerich 2004). For example, synthetic compounds (*watchmaker*) and primary compounds (*engine oil, baby oil*) have fore-stress while lexicalized attribute-head constructions may have end-stress. Thus, *country house*, with somewhat opaque semantics – not every house in the countryside is a country house – has end-stress for many speakers (Giegerich forthcoming).

Phrasal constructions of all kinds have end-stress as the default pattern under pragmatically neutral conditions, that is, in the absence of for example emphasis or contrastiveness. Notably this is the case with attribute-head constructions originating in the syntax – *beautiful picture, steel bridge* (Liberman and Sproat 1992).

2.1.4 *Susceptibility to syntactic operations*

Under the Lexical Integrity Principle, the individual elements of compound nouns are invisible to the syntax. Thus the elements of compounds cannot be individually modified (**a brilliantly white-board, *a white- wall-mounted board*); and their heads are unavailable to the pro-*one* construction (Stirling and Huddleston 2002): **a white-board and a black one *a watchmaker and a clock one, *a butterfly-net and a mosquito one*.

Phrases, on the other hand, are amenable to both operations. For phrasal *white board*, for example, *a brilliantly white board* and *a white wall-mounted board* are possible, as are *a very beautiful picture, a beautiful small picture* etc. Similarly, pro-*one* operates freely in phrasal *a white board and a black one*, *a beautiful picture and an ugly one*, *a steel bridge and a stone one* etc.

Note that, on the criteria enumerated in §§ 2.1.1 – 2.1.3, it is possible for certain constructions to be of either syntactic or lexical provenance. Thus, if a construction follows a productive pattern, and if it is semantically transparent, and if it has end-stress then it is of course a likely candidate for syntactic provenance; but all those features are also available to lexical constructions. The construction's susceptibility to syntactic operations such as pro-*one* will then decide its origin. If on the other hand a construction follows an irregular formal pattern, or if it is semantically less-than-fully transparent or if it has fore-stress then it must be lexical. Under the Lexical Integrity Principle, such constructions are then predicted not to be amenable to the relevant syntactic operations.

2.2 *The hybrid nature of associative AdjNs*

Adjectives may be ascriptive or associative. Ascriptive adjectives "… denote a property which is valid for the entity instantiated by the noun" (Ferris 1993: 24). Such adjectives occur freely in attributive positions (*beautiful picture, small elephant*); and only very few are barred from the predicative position: *self-styled genius – *this genius is self-styled*; *likely candidate – *this candidate is likely* (Pullum and Huddleston 2002: 557). And, as we saw above, such adjectives as well as their heads in NP are amenable to individual modification: *a beautiful small picture, a relatively small elephant.*

Associative Adjectives "… express a property which does not apply to the denotation of the head nominal but to some entity associated with it" (Payne and Huddleston 2002: 556; also Levi 1978, Leitzke 1989, Ferris 1993, Koshiishi 2002) – *dental decay, bovine tuberculosis, vernal equinox.* Such AdjNs usually have NN synonyms: *tooth decay, cattle tuberculosis, spring equinox* and share with such NNs a number of restrictions not present with ascriptive adjectives. Thus, associative adjectives are often confined to an arbitrary set of heads: hence **dental mug*, **bovine grid* and **vernal cabbage* are ruled out. They moreover cannot occur in the predicative position (**this decay is dental*); and neither they nor their heads are amenable to individual modification (**very dental decay, *dental unpleasant decay*). More discussion of such restrictions is provided by Ferris (1993: 19ff.), Payne and Huddleston (2002: 556f.) as well as Giegerich (2005).

The semantics of associative AdjNs ranges from the straightforward, transparent attribution relationship denoting 'associated with' to instances involving (often unpredictable) argument structure similar to synthetic compounds (*watchmaker* again), and instances whose interpretation requires encyclopaedic information similar to primary compounds (*mosquito net, butterfly net, hair-net*). These are exemplified below, in (2a.b.c) respectively.

(2)

a.	b.
urban policeman	papal visit
tropical fish	papal murder
dental appointment	cardiac massage
presidential plane	presidential election

c.
musical clock
electrical clock
criminal lawyer
Foreign Office

I argue in Giegerich (2005) that by virtue of their specific behaviour distinct from ascriptive AdjNs, all associative AdjNs qualify for lexical status, just as their synonymous NNs do, but that not all associative AdjNs are therefore lexical. The unavailability of individual modification and the impossibility of predicative usage of the adjective are features which are fully consistent with lexical status; but they do not enforce lexical status. Those features are, as we saw, also individually attested in *bona fide* syntactic phrases involving for example ascriptive adjectives. And semantic transparency such as is exemplified in (2a) does

not enforce syntactic provenance: as we saw in § 2.1.2, complex words and notably compounds do not have to be semantically opaque.

On the other hand, the semantic patterns (2b.c) are inconsistent with syntactic origin: only (2a), where the associative adjective is simply an attribute to its head, can be generated by the syntax. Attribution in NP does not allow argument structure as in (2b), where *papal visit* may mean 'visit by/to the pope', or interpretation involving encyclopaedic knowledge as in (2c) – compare here the respective roles of music and electricity in clocks (Levi 1978: 52, Giegerich 2005b). Similarly the arbitrary exclusion of *cabbage* as a possible head for *vernal* is inconsistent with syntactic origin.

In Giegerich (2005) – see the detailed analysis offered there – I report that many speakers regard the pro-*one* construction as acceptable in cases such as (2a) but rule it out for (2b.c):

(3) Is he a rural policeman or an urban one?
*Do you mean the presidential murder or the papal one?
*Do you mean the Home Office or the Foreign one?

Such results confirm that cases such as those in (2a), where the associative adjective and the head noun display the transparent semantic relationship of 'associated with', are noun phrases – that is, entities of the syntax – for those speakers who accept the pro-*one* construction for them. Not all speakers did; and for those who did not, all associative AdjNs are lexical in accordance with the Lexical Integrity Principle: as we saw, the behaviour of all associative AdjNs is consistent with lexical origin.

Recall now that, while availability of the pro-*one* construction unequivocally indicates phrasal status, fore-stress may be taken to be an equally reliable indicator of compound status. There does continue to be dispute in the literature as to whether or not end-stress is confined to phrasal constructions, but the literature agrees that fore-stress is confined to compounds (Marchand 1969, Liberman and Sproat 1994, Bauer 1998, Olsen 2000, Giegerich 2004). In line with the Lexical Integrity Principle it follows that no speaker should allow the pro-*one* construction for fore-stressed associative AdjNs. This prediction is as safe as are the two assumptions that it is based on: that regarding the pro-*one* construction and that regarding fore-stress. Interestingly, the prediction is not borne out by speaker behaviour.

Fore-stress is not uncommon among associative AdjNs – see e.g. Olsen (2000) for a substantial list, cited in Giegerich (2005) – including *dental building, dental appointment, mental hospital*, *Medical Faculty*. For those, speakers readily accepted pro-*one*, as in (4):

(4) Is this the medical building or the dental one?
Do you have a medical appointment or a dental one?
Is this the general hospital or the mental one?
Is this the Arts Faculty or the Medical one?

Forms such as those are, then, compound nouns in regard of their phonological behaviour; but the pro-*one* operation can nevertheless identify, and replace, their heads. This fact contravenes the Lexical Integrity Principle: there is no sharp divide between the lexicon and

the syntax. The two modules overlap in that there is a set of constructions which are lexical – perhaps 'lexicalized' – in some and syntactic in other respects. Let us call such hybrid constructions N(P)s.

2.3 *More on N(P)s: phrasal names, lexicalized phrases and phrasal compounds*

2.3.1 *Phrasal names*

The necessity to acknowledge lexicon-syntax overlap as well as the existence of N(P)s in English provides an opportunity to re-analyze other construction types of possibly hybrid nature.

One such type is that of the phrasal name – an AdjN construction commonly used to name for example bird or plant species. Such AdjNs, exemplified in (5a) below, usually have end-stress although some bisyllabic names of this form for common species have fore-stress (*Blackbird, Blue-Tit*). (5b) gives examples of the competing, NN formula for bird names, which seems always to have fore-stress. Standard ornithological handbooks such as Bruun (1978) give hundreds of similar examples.

(5)	a.	b.
	Green Woodpecker	Eagle Owl
	Grey-headed Woodpecker	Sand Martin
	Snowy Owl	Tree Sparrow
	Arctic Tern	House Sparrow
	Common Tern	Sandwich Tern
	Little Tern	Song Thrush

NN examples such as those in (5b) are clearly compound words on both formal and semantic grounds. AdjNs such as those in (5a) must be of the same, lexical status despite their phrasal appearance: given their naming function, their semantics is indistinguishable from that of NNs and indeed from that of monomorphemic bird names (*Dunnock, Swallow, Osprey* etc.). The relative transparency of such AdjN constructions, and the fact that the head usually identifies a (sub-) family of species and the modifier a particular member species, do not constitute counter-arguments to a lexical analysis: NN compounds such as those in (5b) express in the same way the taxonomic affiliation of the species they denote; and in any case, species names in English are not required to give such information – recall *Osprey* etc. and note the use of Latin terminology in biological taxonomy.

Like associative AdjNs, names such as those in (5a) can only be modified in their entirety: *a juvenile Green Woodpecker* etc. Their elements cannot be modified: **a grass-Green Woodpecker, *a Common juvenile Tern* would be possible in a phrasal sense only: 'a tern which is both common and juvenile (and may be a member of the species Arctic Tern)'. This modification failure is consistent with the lexical status of (5a).

However, once again the pro-*one* construction affects parts that modification cannot reach. *He logged five Arctic Terns and two Common ones. Grey-headed Woodpeckers are hard to distinguish from Green ones.* Such statements are well-formed, unlike for example **a Snowy Owl and an Eagle one.* We know already from § 2.1.4 above that the grammaticality of pro-

one forms depends in some way on the lexicon-syntax distinction. We now note that *Common Tern* is more phrase-like than *Eagle Owl* is, and sufficiently so to count as a phrase for the purposes of pro-*one.* Not sufficiently so to allow individual modification, of course. We conclude, then, that names such as those in (5a) are N(P)s.

2.3.2 *Lexicalized phrases and phrasal compounds*

I return here briefly to constructions such as those in (1b) above, where apparent or real NPs are embedded in compound nouns. I noted there that under the Lexical Integrity Principle, the analyzability of such examples depends crucially on the assumption that the embedded phrases are lexicalized (that is, that they are NPs in historical terms but synchronically Ns). I now want to argue that the embedded constituents may be N(P)s. This will obviously ease the analysis of such examples – the weakening of the theory implied by the assumption of modular overlap will be addressed below – and it will also reduce the burden of proof placed in this argument on the pro-*one* construction. Much of the preceding analysis has depended on the reliability of pro-*one* as an indicator of phrasal status. The following argument will do without pro-*one*.

There is clearly a tendency for constructions such as those in (1b) to originate in specific jargons – for example in those of the health and social services – and for the embedded constituents therefore to have jargon-specific technical definitions; recall the case of *cold weather*. The term 'Lexical Integrity Principle' itself constitutes a similar case of linguistic terminology. And *fresh air*, in *fresh air fanatic,* is a cliché "… even if not precisely an idiom" (Carstairs-McCarthy 2002: 82). A formal model of such constructions, distinguishing sharply between NP and N, faces the problem here of where to draw the line: clearly, lexicalization is a gradient phenomenon. In theoretical terms alone, a three-way distinction NP – N(P) – N, where the half-way house N(P) retains some but not all phrasal characteristics, promises more precision in accommodating the facts. It is also more plausible in diachronic terms to expect an NP gradually to lose its phrasal features under lexicalization, rather than to drop them all at once.

On the empirical side, the restrictions on the nature of the first constituents in such constructions remains an open question. How absolute is the ungrammaticality of *wooden door policy* proposed by Carstairs-McCarthy, for example in *hapaxes*? (*It is our policy never to fit wooden doors in areas liable to flooding. This wooden-door policy …*) Note also the probably unnoticed usage in this article (§ 1) of *lexicalized-phrase analysis*. Is *lexicalized phrase* a lexicalized phrase? There may then also be a *slightly-lexicalized-phrase analysis*, or even a *lexicalized-short-phrase analysis*, where either element of the compound is subject to independent modification while the whole construction retains its compound stress. The practice of hyphenation appears to legitimize more such cases than expected; and while hyphenation for example in NN constructions is inconsistent with phrasal status (Giegerich 2004, *pace* Bauer 1998), it seems here to be little more than a formal, orthographic convention.

The question is, then, does noun compounding have access only to N and N(P) as dependents, such that the hybrid category here called N(P) constitutes the area of lexicon-syntax overlap, or is even NP available to such constructions? Are there perhaps pragmatic scenarios in which an NP can be contextualized as an N(P) in such a construction, as the example of *wooden door* might suggest? The latter seems more plausible than the hypothesis

of unrestricted and non-context-dependent use of NP does; and if that is correct then the preceding discussion of the nature of N(P) would seem to have suggested appropriate constraints on the scope of lexicon-syntax overlap.

3. Lexical stratification and stratal overlap

It is a largely-independent sub-hypotheses of Lexicalism – independent also in the sense that it has attracted criticism independent of Lexicalism – that the lexicon itself may be divided into two or more sub-modules or 'strata' (also known as 'lexical levels' – Kiparsky (1982); Aronoff and Sridhar (1987)). A lexical stratum constitutes a domain for the interaction of specific morphological phenomena with specific phonological phenomena, the former in many cases providing the trigger context for the operation of the latter. In English, the domain of stratum-1 is the recursive morphological category Root, that of stratum 2 the recursive category Word, where the former is bound or free and lacks association with a lexical category, and the latter comprises free forms associated with lexical categories (N, V, Adj) – for details see Selkirk (1982), Giegerich (1999: Chapter 3). In such a 'base-driven' stratification model, a given affix may be confined to a single stratum or, as is frequently the case (Giegerich 1999: Chapter 2), it may be available on both strata. In the latter case, attachment on a given stratum will bring with it certain aspects of behaviour on both the morphological and the phonological side; those in turn then serve as diagnostics for the stratum-1 or stratum-2 provenance of a given morphological construction.

Before I enumerate those diagnostics of stratum 1 and stratum 2, I note one parallel here between the lexicon-syntax 'divide' discussed in § 2 above and the stratal divide about to come under scrutiny here. This parallel concerns the availability of a particular concatenation phenomenon on either side of the 'divide'. In the former case, the concatenation of words gives rise to compound words if conducted on (stratum 2 of) the lexicon, and to phrases if carried out in the syntax. In the latter case, a given affixation process may produce both stratum-1 forms (complex roots) and stratum-2 forms (complex words), in each case with all the properties associated with the respective stratal affiliation. In the former case, we saw there to be a fuzzy divide between the two sets of properties associated with compound words and phrases respectively. We have cause, then, to expect the same fuzziness in the distinction between stratum-1 and stratum-2 forms.

3.1 *Stratum 1 and stratum 2: aspects of expected behaviour*

3.1.1 *Productivity and semantic transparency*

Stratum 2 is assumed to be the site of the productive derivational morphology of English: here are located processes such as the attachment of adverb-forming *-ly*, of noun-forming *-ness*, adjective-forming *-less* and adjective-negating *un-*. Connected with the productivity of the process is the semantic – and, to be discussed below, phonological – transparency of the relationship between base and derivative (Aronoff 1976: 45): complex words such as *nicely, kindness, homeless, unpleasant* etc. are entirely transparent.

In contrast, stratum-1 forms are not the outcomes of productive morphological processes. Derivatives originating on this stratum are listed, perhaps because the morphological process behind them is no longer productive, perhaps because the relationship between base and derivative is opaque. The former type is exemplified by *width, warmth* etc., where *–th*, forming abstract de-adjectival nouns, is no longer productive. As for the latter type, *–ity*, also usually in the business of forming abstract de-adjectival nouns, occasionally gives rise to derivatives denoting count nouns: *opportunity, fatality*.

3.1.2 *Phonological transparency*

Stratum-1 derivatives are potentially subject to a number of phonological processes resulting in various kinds of phonological distortion of the affixation base. Among these are the various tense-lax and height discrepancies between the stressed vowels of base and derivative, often the residues of the Great Vowel Shift, as first formulated by Chomsky and Halle (1968: 178ff.) and adapted to Lexical Phonology by McMahon (1990; 2000: Chapter 3) and Giegerich (1999: Chapters 4f.): *wide – width, serene – serenity, Anderson – Andersonian* etc.

Moreover, stratum-1 derivatives behave phonotactically as though they were morphologically simple items. Thus, given that sonorant syllabicity is possible in English only on the right edge of words, base-final sonorants cannot be syllabic under stratum-1 affixation (*metre – metric, baptism – baptismal, kindle – kindling*$_{N}$) while on stratum 2, base-final syllabicity is retained: *metering, bottling, buttery* etc. – see again Giegerich (1999), as well as Mohanan (1985). And geminates are tolerated only if they arise in stratum-2 processes: *keenness, soulless, night-time*.

Finally, stratum-1 derivatives are independently subject to right-to-left stress assignment sensitive to syllable weight, while stratum-2 suffixes are invisible to the processes that assign word stress (Siegel 1974). As a result, stratum-2 affixation is stress-preserving – it leaves stress unaffected: *ríde – ríder – ríderless* etc. – while stratum-1 affixation is non-stress-preserving. Forms such as *atómic, solémnity* show no trace of the stress pattern associated independently with their bases: *átom, sólemn*.

3.1.3 *Embedding and affix ordering*

The original 'Affix Ordering Generalization' (Siegel 1974, Selkirk 1982) is now as discredited as is the affix-driven stratification model on which it was based: while many textbook examples of ill-formed affix order – **homelessity* etc. – have been shown to be amenable to alternative explanation (e.g. Giegerich 1999: Chapter 3), the basic fact that a given affix can occur on both strata has put paid in general terms to the diagnostic value of such instances of affix stacking failure. Nevertheless, the serialism of lexical stratification predicts that no stratum-2 form can occur inside a stratum-1 form. Just as words – the recursive formal unit of stratum 2 – contain roots, but roots – the recursive unit of stratum 1 – cannot contain words, so too will formally or semantically distorted morphological constructions occur inside regular constructions (*metrically, fraternizing* – stratum-2 suffixes underlined). Such serialism is enforced in the grammar by the Elsewhere Condition (Kiparsky 1982, Giegerich 2001). Similarly, the model predicts that phrases cannot occur inside words – but recall the fuzziness of the word-phrase distinction encountered in § 2 above. Increasing domain size under

embedding – roots embedded in words, words in phrases – corresponds then to increasing transparency of constructions, such that at the root level, complex forms may be entirely opaque (*fraternity*), as morphologically simple forms at any rate are, while at the phrase level they must be entirely transparent (*white board*).

Not only the behaviour of stratum-1 and stratum-2 forms under embedding but also, more importantly perhaps for present purposes, the availability of certain phonological processes to stratum 1 but not to stratum 2 represents a powerful argument in favour of lexical stratification – on each stratum, a specific morphology and a specific phonology apply in tandem. (See for example Booij (1994) for a summary of this position.) Also, the phonological distortion concomitant to the stratum-1 morphology is in turn said to be linked to the lack of morphological productivity found on that stratum (Anshen and Aronoff 1981). However, given that the stratal distinction draws on (at least) three different parameters – morphological productivity, semantic transparency and phonological transparency – we may expect forms to display a mixture of stratum-1 and stratum-2 characteristics. Such hybrids might arise, for example, if for some reason the base-distorting stratum-1 phonology affects a form which is otherwise the outcome of a productive process, and semantically transparent; or of course a formally-regular complex word may lose its semantic transparency and require separate listing without adopting other stratum-1 characteristics. Such 'lexicalization' in the traditional sense of Lipka (1994), Lipka, Handl and Falkner (2004) and distinct from my usage of the term in § 2 above, is known diachronically to obscure the form or the meaning of morphologically complex words: in our terms, it represents the transition of a morphological form from stratum 2 to stratum 1. But a cause-and-effect relationship between phonological and semantic obscuration has not been and probably cannot be established: one can happen without the other. I hope to show below that to capture the effects of such gradual diachronic change in the synchronic grammar, that grammar must have overlapping lexical strata. I will then argue, as I did in my discussion of lexicon-syntax overlap in § 2, that once established in the grammar, modular overlap will offer new analyses, unavailable to proponents of stratal integrity, of some long-standing and recalcitrant problems.

3.2 *Evidence for stratal overlap*

3.2.1 *Stress preservation and its failure*

Recall from § 3.1.2 that stratum 2 is stress-preserving (*ríderless*) while stratum 1 is non-stress-preserving (*solémnity*). However, counterexamples to both have been noted in the literature– cases where stratum-2 stress preservation ('strong' preservation, as it preserves the main stress) fails, and cases where in multi-syllable stratum-1 forms the main stress of an embedded root seems to survive in the form of an otherwise inexplicable secondary stress ('weak' preservation). I want to show in this section that both irregularities are amenable to a single account if we allow stratal overlap.

3.2.1.1 *Optional failure of strong stress preservation*. Burzio (1994: 247ff.) notes a number of instances where, in terms of lexical stratification, stratum-2 forms display the stress behaviour associated with stratum 1 in that they fail to preserve the main stress of the base. Hence the

following stress patterns, with primary stress as indicated and secondary stress invariably on the initial syllable – even where the base word would have non-initial stress (*eleméntary*) – are common variants of synonymous, stress preserving pronunciations (*eleméntarily*).

(6)

èlementárily	còmplementárily
èlementáriness	òrdinárily
nècessárily	mòmentárily
àrbitrárily	dòcuménted
àrbitráriness	dòcuménting

Under a stratum-1 stress regime of right-to-left main stress assignment, all these forms would be entirely regular; and of course the base-driven stratification model, where a given affix is not confined to a single stratum, would permit us to assign such forms individually to stratum 1 purely on the grounds of their phonological behaviour, even though *-ly, -ness* etc. are fully productive on stratum 2. But such a solution, amounting to a treatment of such forms as individually listed in the lexicon, is implausible. Firstly, there is no reason other than phonological for such listing – no semantic opacity, for example, that would set such forms apart from their equally common stress-preserving alternatives (*eleméntarily* etc.): this is just speaker-specific variation in stress. Secondly, the stress pattern of these forms is itself not strictly speaking irregular: it is merely that of the 'wrong' stratum. What seems to drive this preservation failure and the adoption instead of the Latinate stratum-1 pattern is the Latinacy of the base itself, paired perhaps with the large number of syllables following the stress of the base. Certainly, the phenomenon seems to affect all forms ending in *-arily* and *-ariness.* What we have here is simply stratum-1-like stress behaviour on the part of an identifiable set of stratum-2 forms. This means that the stratum-1 stress phonology – weight-sensitive right-to-left assignment – is available to, and hence overlaps with, some the stratum-2 morphology. I return to the analysis of these cases in § 3.2.1.3 below.

3.2.1.2 *Unexpected weak stress 'preservation'*. Kiparsky (1979), observing different placement of secondary stresses in forms such as *sensàtionálity* and *Tìconderóga*, claimed that weak preservation is the norm on (what the present model refers to as) stratum 1, and that stress assignment in stratum-1 complex forms must therefore be cyclic. However, recent work by Collie (2005) has shown that the empirical validity of this claim is highly doubtful: secondary stress in mono-morphemic words is in fact variable – (7a) below – and so is, in many cases, secondary stress in stratum-1 derivatives: (7b). The behaviour of the two sets is therefore not really as systematically distinct as Kiparsky believed; and the case for weak preservation, and hence for the cyclicity of stratum-1 stress assignment, is itself weak.

(7) a.

Còriolánus ~ Corìolánus
Lòuisiána ~ Louìsiána
Tìconderóga ~ Ticònderóga

b.	expèriméntal ~ èxperiméntal	(expériment)
	co-òperátion ~ cò-operátion	(co-óperate)
	illègibílity ~ ìllegibílity	(illégible)

Drawing on Selkirk's (1980) templatic approach to word stress, Collie argues that in monomorphemic cases such as (7a), secondary stress on either of the first two syllables is well-formed so long as a light syllable is not selected in preference over a neighbouring heavy syllable. This then also accounts for the initially-stressed (non-preserving) variants of stratum-1 complex forms in (7b); but it leaves the weakly-preserving variants given there, with secondary stress on light second syllables, unexplained. Again, stratal overlap offers a solution.

3.2.1.3 *A unified account*. There is ample evidence suggesting that right-to-left, weight-sensitive stress assignment Latin-style is associated with stratum 1: this accounts for both stratum-1 *sólemn, solémnity* and stratum-2 *ríderless*. But there is no reason to believe that the left-to-right assignment of stress, rhythmically motivated and similarly favouring heavy syllables, also happens on stratum 1. Indeed, the fact that stratum-2 prefixes can receive such stress (*ùnpredíctable*) suggests stratum-2 provenance. Let us assume that the two mechanisms simply assign stress, not differentiating at the point of assignment between primary and secondary stress. This then means that all the examples in (7) and, under the provision of stratal overlap, those in (6) receive their right-hand stress through the stratum-1 mechanisms while the left-hand stresses in (6), variably in (7a) and on initial syllables in (7b), are provided on stratum 2.

For the cases of weak preservation in (7b), two options then seem to be available. The first of these involves re-introducing the cycle into stratum-1 stress assignment as a non-obligatory device – against the spirit of phonological and semantic opacity prevalent on stratum 1, at heavy cost in terms of the complexity of the grammar, and in any case unavailable to Optimality-Theoretic accounts of the phenomenon even in most recent versions of Stratal OT (Kiparsky 2000, Bermúdez-Otero 2003). This option clearly has to be disfavoured.

The second option is to regard the weak 'preservation' effect as an illusion. This effect only ever occurs on the first or second syllable: English does not allow word-initial sequences of unstressed syllables. There is then no reason to insist that this stress is the derivational residue of earlier right-to-left assignment of stress to an embedded form. It may as well be the result of stratum-2 left-to-right assignment, as it is in any case in *Ticònderóga*. The reason why, exceptionally, a light syllable may be preferred over an initial heavy syllable in such cases is then simply that under stratal overlap, the embedded form *experiment* is still structurally visible at the point of left-to-right stress assignment on stratum 2. Speakers then put that stress in *expèrimental* where in the corresponding, listed stratum-1 item *experiment* they would expect it to fall. This dependence of stress assignment on the recognition of the embedded form accounts very straightforwardly for the haphazard nature of weak 'preservation' – no recognition, no preservation – and the deployment of a stratum-2 device is consistent with the assumption of opacity that characterizes the phonology of stratum 1. Note finally that dealing with the weak preservation effect in the stratal overlap area of the lexicon

will then leave the straightforward left-to-right stressing, in (6), (7a) and the non-preserving variants of (7b) as the mainstream stratum-2 default.

I suggested above that right-to-left and left-to-right stress are equal in 'strength' at the point of assignment. This is neither controversial nor dependent on the representational devices used. A unified account of strong preservation failure (§ 3.2.1.1 above) and weak 'preservation' depends on the simple assumption that the contouring of stresses – such that in all the cases observed above the left-hand stress is secondary to the right-hand stress – is a stratum-2 matter. This must be so for two reasons. Firstly, under the analysis offered here the left-hand stress is itself a stratum-2 phenomenon – including the weakly 'preserved' stress. Secondly, as Liberman and Prince (1977) were the first to point out, the mechanism providing contours of secondary and primary stresses in words (Liberman and Prince's 'Lexical Category Prominence Rule') is the same as the mechanism responsible for the stress contours of compounds, including the fore-stress pattern of two-element compounds. And as we know, compounds are the products of stratum 2.

The finer details of stress preservation and its possible failure in English clearly suggest overlap of lexical strata. Such a model finds it easy to account for stratum-2 forms adopting stratum-1 phonological behaviour, and it makes reasonable predictions about the stratum-2 stress phonology spotting transparent stratum-1 morphological relationships. In fact, stratal overlap facilitates a clear distinction between stratum-1 right-to-left (Latinate) stress assignment and stratum-2 left-to-right (essentially Germanic) stress assignment. Given the typical etymologies of the two strata, this makes sense.

3.3 *Further support for stratal overlap*

Strong preservation failure was interpreted in the preceding section as the adoption of stratum-1 phonological behaviour by stratum-2 morphological forms. In contrast, if we factor out the secondary-primary stress contour (as I demonstrated), the weak 'preservation' effect may be viewed as stratum-2 phonological behaviour by stratum-1 morphological forms. I will conclude my account of stratal overlap by discussing some further, unrelated examples of both types.

3.3.1 *More stratum-2 forms with stratum-1 phonology*

As noted in § 3.1.2, stratum-1 forms have the phonotactic (and more generally, phonological) structure of morphologically simple items while on stratum 2, phonotactic configurations may occur in the vicinity of the internal morphological boundary which would be impossible in the absence of the boundary. Stratum 2 is simply morphological concatenation without phonological adjustment. Thus, the /dt/ and geminate /tt/ sequences in *bed-time* and *night-time*, the geminates in *soulless, keenness* as well as sequences such as the /tl/ in *weightless*, the /nl/ in *keenly* etc. are only possible in the presence of an internal boundary. While such clusters are relatively stable in diachronic terms (but see Götz (1971), Faiβ (1978) on diachronically 'obscured' compounds), geminates are known occasionally to simplify: Jones (1997) offers pronunciations not containing geminates for *fully* and *wholly* (and probably more). This degemination could be accounted for by regarding these forms as stratum-1 products; but as in

the case of *necessarily* discussed earlier, there is no reason other than the phonology to treat such items as 'listed': their semantics is fully transparent. Once more, stratal overlap allows us to express phonological 'lexicalization' in the traditional sense (Lipka 1994) without forcing us to make unwarranted claims on the semantic side.

A similar case is presented by base-final syllabic sonorants – retained in stratum-2 suffixation (*metering, buttoning, summery*) but prevented on stratum 1 by the mechanisms of syllabification present there: *metrist, cylindric, baptismal* (Giegerich 1999: 263ff.). However, a large number of apparently stratum-2 forms once again show stratum-1 phonological behaviour. Among these are some well-documented cases with concomitant semantic opacity (8a); but for others again no case for individual listing can be made on semantic grounds (8b):

(8) a. twinkling ('short while')
kindling ('chopped wood used to start a fire')
lightning ('electric flash')
coupling (device connecting railway carriages')
sprinkler ('device for watering fields or extinguishing fires')

b. smuggler
wrestler
fiddler

In contrast, less common forms such as *bottler* ('someone working in a bottling plant'), *haggler, wriggler* etc. are regularly trisyllabic. Adopting an earlier analysis by Chomsky and Halle (1968: 86), Mohanan (1985) takes the view that unlike its participle-forming counterpart, gerund-forming *-ing* (*twinkling, kindling* etc.) is attached on stratum 1; but that cannot be the reason for the nonsyllabicity of such sonorants: observe for example the sonorant syllabicity in *No loitering!* Semantic opacity rather than gerund status is the cause for the stratum-1 provenance of such forms. So, the examples in (8a) have semantic reasons for being listed, and hence for being stratum 1 constructions.

For (8b), again no such case can be made. The difference between bisyllabic *smuggler* and trisyllabic *bottler* is perhaps one of frequency, but not one connected with semantic transparency. While Lipka (1994) does consider frequency as a possible cause of lexicalization, the stratum-1 analysis of *smuggler* on the grounds of its phonology alone, proposed in Giegerich (1999: 34), is clearly inferior to the analysis facilitated by stratal overlap. As I noted for other cases before, stratum-1-like phonological behaviour alone does not constitute a good case for the individual listing of such forms. Rather, we are dealing once again with a stratum-2 form that is simply subject to the phonology of stratum 1.

3.3.2 *More stratum-1 forms with stratum-2 phonology*

I return finally to compounds. There is no dispute in the stratification literature that regular compounds are formed on stratum 2 – among those are synthetic compounds such as *watchmaker, train-spotting*, primary compounds (*mosquito net, baby oil*) and attributive constructions such as *peanut oil, olive oil* – see Giegerich (2004, forthcoming) especially on

the distinction between the latter two categories. All such constructions have in common that they are endocentric and right-headed. All have fore-stress with the possible exception of attributive constructions; but the possible end-stress associated with those is also available in the lexicon (Olsen 2000, Giegerich 2004).

There are however a number of compounds that are either exocentric or left-headed; and neither the exocentric (*bahuvrihi*) pattern – *redneck, shit-head, hatchback* – nor the left-headed pattern (*Princess Royal, court martial*) are productive. Such forms are either deliberately 'coined', or they are old loans from French. Certainly they are not formed by the compounding mechanisms found on stratum 2: they constitute listed and hence stratum-1 forms. But the problem with a stratum-1 analysis of such compounds is that they do not have the phonotactics associated with stratum 1: clusters occurring at boundaries, such as the /dn/ in *redneck*, the /th/ in *shit-head* etc., do not conform with the monomorphemic phonotactics of English that is obligatory in stratum-1 complex forms. Rather tentatively, I suggest that such forms originate on stratum 1 but that they are subject to the phonotactics of stratum 2 – again a possible case of stratal overlap. This analysis is supported by the fact that such irregular compounds can enter into regular compounding but cannot have regular compounds as their constituents: *redneck fan, hatchback driver* are well-formed but **rearhatch-back, *lawcourt martial* are impossible. This pattern is predicted by an analysis which treats *hatchback* and *court martial* as stratum-1 and regular compounds, such as *rear-hatch* and *lawcourt* as stratum-2 forms.

4. Conclusion

The lexicon-syntax divide, central to the expression of the Lexical Integrity Principle, which in turn played a major part in the original, 'strong' Lexicalist Hypothesis (Chomsky 1970), is neither unique nor robust. It is not unique in that it is paralleled by a very similar divide between the two strata of the English lexicon; and like the latter, it is not robust in a grammar modularized in this way. Certain borderline phenomena can be accounted for only if the relevant modules are allowed to overlap.

What is at stake regarding the lexicon-syntax divide is the distinction between compound and phrase – essentially the distinction between the lexical category N and the syntactic category NP. I hope to have shown that this distinction is itself fuzzy: associative AdjNs, phrasal compounds and phrasal names, for example, are compound-phrase hybrids which for present purposes I called N(P)s. It is unsurprising that there should be such hybrids in a language such as English, where compounds and phrases are distinct (when they are) not in terms of their inflectional morphology – compare here for example German *Schwarzdrossel* 'blackbird' and *schwarze Drossel* 'black thrush' – but in terms of complex syndromes of syntactic, semantic and phonological properties. Essentially, not all those properties draw the dividing line in exactly the same place. It is then also unsurprising that a long and honourable Anglist research tradition should have failed to agree on how to formulate the compound-phrase distinction, from Koziol (1937), Jespersen (1942) and Marchand (1969) to more recent

work such as Bauer (1998), Liberman and Sproat (1992) and Olsen (2000) – to name just some of many.

Similarly, the stratal distinction in the English lexicon – essentially one between an irregular, root-based and a regular, word-based morphology – has to be regarded as fuzzy if it is to account for borderline phenomena. The root-word distinction itself is not a sharp one in English, given again the deficiencies of the inflectional system. And again it is unsurprising that properties depending on this distinction should themselves lack sharp definition and moreover fail to provide a single dividing line – such as that between listed and rule-governed forms (a dichotomy that is itself open to question (Langacker 1987: Chapter 1), and those between phonologically and semantically opaque as opposed to transparent forms.

This discussion has been rather more attentive to the phenomena warranting modular overlap than to the treatment of such overlap in formal grammar. Inasmuch as appropriate formalization is possible, overlap between the syntax and the derivational morphology does not threaten the basic distinction between these two modules in formal grammar any more than the fuzziness of the stratal divide undermines the basic soundness of some form of lexical stratification. Things are merely not quite as straightforward as we first thought. That, too, is unsurprising really.

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