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On synthesis, fusion and the difference between them*

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0 Introduction

This paper is concerned with the nature and typology of morphological concatenations. Section 1 is devoted to the notion of analytic and non-analytic domains introduced in the Government Phonology (GP) tradition by Jonathan Kaye as a way of formalising morphological effects on phonological structure. In Sections 2 and 3, I present an alternative within a Strict CV (SCV) framework, without making reference to domains and brackets. Section 4 discusses ambiguous cases. Section 5 connects the proposal with the dual mechanism model of Steven Pinker and others, showing that the analyticness of certain concatenations can possibly be derived from the fact that they are products of symbolic rules. In Section 6, I provide a brief outline of the classical typological distinction between fusional and agglutinating forms and I suggest a definition of fusion. Finally, Section 7 discusses the difference between synthesis and fusion; I consider the main difficulties and point out that the way we define phonology is crucial for the decision whether a form exhibits fusion or not. The discussion relies heavily on Classical GP as well as SCV formalism, and assumes some acquaintance with the basic notions of these models[1]. I will only discuss aspects which are central to this paper.

Some notes on terminology and notations: I use the term GP to refer to "Classical" Government Phonology (=non-SCV). Orthographic representations are given in italics, whereas phonetic ones are in bold, without brackets.

1 Analytic and non-analytic domains

The first attempt within GP to formalise morphological effects on the phonology was Kaye's 1993 paper (later published as Kaye 1995; as usual, I will use this later version for reference). Kaye proposes that morphology can have two effects on the phonology: *little* or *none*. Specifically, morphological concatenations are of two kinds: *analytic* and *non-analytic*, respectively (1995:302). According to Kaye, non-analytic concatenations differ in no way from morphologically simplex forms in a phonological sense: the phonology treats them as monomorphemic. Their morphological complexity is not "passed on" to the phonology: the phonology, as it were, cannot "see" that non-analytic forms are complex, and, accordingly, treats them as simplex. Analytic concatenations, on the other hand, come down to the phonology as complex: their morphological complexity is phonologically visible. In the GP tradition, the term "synthetic" is often used to refer to morphologically complex non-analytic forms to distinguish them from monomorphemic ones. I will follow this practice: a non-analytic form is either monomorphemic or polymorphemic, whereas a synthetic form

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[1] A presentation of the essentials of both theories would certainly be beyond the scope of this paper. The reader is referred to KLV 1990 or Harris 1994 for GP; the most exhaustive work on SCV is Scheer 2004a, upon which the present analysis is based.

is polymorphemic (but not analytic). The distinction, as pointed out above, is not relevant for the phonology; nonetheless, it *is* relevant for the morphology.

Kaye illustrates the difference between analytic and synthetic concatenations with examples from English verbal morphology. Consider the regular forms *dreams* **dri:mz** and *peeped* **pi:pt** first. Such forms, Kaye says, are analytic, which is betrayed by two facts. First, *dreams* ends in a bogus cluster **mz**, never found in monomorphemic forms. As Kaye's claim is that synthetic forms display the same phonological behaviour as monomorphemic ones, the presence of this cluster excludes the possibility of *dreams* being synthetic. The same does not hold for *peeped*, whose final cluster is permitted in monomorphemic forms as well (cf. *apt*, *adopt*, etc.). Nevertheless, *peeped* must still be considered analytic due to the presence of a long vowel in a (surface) closed syllable, more specifically, before a **pt** sequence: long vowels do not occur in this context monomorphemically. The same is true for *dreams*, though here, of course, it is impossible to tell (empirically speaking) if a long vowel *could* occur in this particular environment in monomorphemic forms, since the cluster **mz**, as mentioned, is always heteromorphemic in English.

As opposed to these examples, consider irregular preterites such as *kept* and *left*: both contain a short vowel before a cluster which appears monomorphemically as well, cf. *apt*, *adopt* and *soft*, *lift*, *left*$_{\text{Adj}}$, etc. The non-analyticness of these forms has an important result: their morphological complexity is not betrayed by their phonetic shape.

Kaye formalises the distinction by assuming that a synthetic form constitutes a single phonological domain. Given a two morphemes A and B, their synthetic concatenation yields the single domain [AB]. Each single domain is shipped off into the phonology as an unanalysable unit. Analytic concatenations, on the other hand, are not single domains. Consider a form like *peeped*, for instance. The fact that the boundary between the root and the suffix is detectable phonologically reflects the fact that *peep* constitutes a domain on its own, i.e., a "domain within a domain": its structure is [[peep]ed], that is, [[A]B]. The entire word is a domain and so is the stem. Note, however, that the suffix is not a domain on its own — there is no pair of brackets including only *-ed*: put differently, *peeped* contains two domains, viz. *peep* and *peeped*. This is because phonological domainhood is defined in GP with reference to stress: a domain must include a stressed Nucleus[2]. Concatenations where both morphemes contain a stressed Nucleus, i.e., are domains, have the structure [[A][B]]. This structure is assumed for compounds (e.g., [[*black*][*board*]]) as well as analytic *prefix-stem* combinations (e.g., [[*un*][*natural*]]). Such forms involve three domains, e.g., *black*, *board* and *blackboard*. Note that the analyticness of these concatenations is shown not only by the presence of a stressed Nucleus in both parts, but also by the existence of monomorphemically illicit clusters straddling the morpheme boundary (i.e., **kb** and the fake geminate **nn**, respectively)[3]. To sum up, morphological concatenations are of the following types:

[2] This is a consequence of the GP interpretation of the Phonological Licensing Principle which requires that all positions within a domain must be licensed except one: the head of the domain (see Kaye 1995:303). The head is the stressed Nucleus.

[3] Kaye claims that structures of the type [A[B]] are not attested. In other words, there are no analytic prefixes which are not domains in themselves. Whether this is true or not is, of course, an empirical question. Proclitics, however, can be analysed in this way, cf. [the [man]]. This concatenation, nevertheless, is not a morphological but a syntactic product. I will neglect such cases here as I am not concerned with syntactic procedures.

(1) (a) Non-analytic domain: [AB]
(b) Analytic domains: (i) [[A]B]
(ii) [[A][B]]

Kaye devotes special attention to emphasising that the brackets merely represent domainhood (1995:302):

> (...) the brackets are not objects in themselves but rather represent instructions as to how the phonological string is to be processed. To explain what I mean let me define two functions: *concat* which takes two arguments which are strings and returns the string which results from concatenating the second argument to the first. For example, concat('abc','def') = 'abcdef'. The second function is *φ*. This function has one argument, a phonological string, and returns the application of the phonology to its argument, also a phonological string. The expression *φ*(X) means, 'apply phonology to the string X'. *φ*(X) returns the phonological string which results from the application of phonology to its argument.

Take, for example, a form such as **lɛft** — either meaning 'the opposite of right' or 'leave-Pret'[4]. As a single domain, the phonological derivation runs as follows (2):

(2) *φ*(**lɛft**) → Output: **ˈlɛft**

That's the end of the story: the form is handed down to the phonology as a single domain, i.e., whether morphologically complex or not, there is but one step: phonology is applied to the string. Compare this to *leaving* — an analytic form, the derivation of which is shown below in (3)[5]:

(3) (a) *φ*(**liːv**) → Output: **ˈliːv**
(b) *concat*((**ˈliːv**)**ɪŋg**))
(c) *φ*((**ˈliːv**)**ɪŋg**)) → Output: **ˈliːvɪŋ**

That is, do phonology on the internal domain (the base here); then concatenate it with the suffix into a complex domain, then do phonology on that domain. Some notes are in order here. First, as already mentioned, the brackets are not objects according to Kaye:

> "[they] are not part of phonological representation. There are no 'boundaries'. The brackets delimit phonological domains which are arguments to functions like *concat* and *φ*" (1995:303).

The consequence of this is that no phonological process can refer to the brackets, in sharp contrast with Lexical Phonology, for example, where brackets are part of the

[4] The difference is immaterial: since *left*, the Preterite of *leave*, is a non-analytic domain, it behaves exactly like the monomorphemic *left*.
[5] Note that the suffix *-ing* appears lexically as **-ɪŋg**: I assume, following Scheer's (2004a:577) analysis of the German velar nasal, that surface **ŋ** derives from lexical **ŋg** sequences. Scheer bases his claims on familiar distributional arguments, which are also valid for English.

representation and may trigger rules. Scheer, however, argues that the Kayean framework does in fact treat "the end of the domain" as a phonological object[6]. We will see shortly why.

Second, the derivation is fundamentally different from classical generative ones. There are no ordered rules. The *φ* function applies *all* phonology to its argument. That is, phonological processes do not apply sequentially, neither selectively: either *all* of them are applied to a string, or none, and all of them are applied whenever the triggering conditions are met (= no ordering).

Third, a very important issue must be clarified: non-analytic forms like *left* 'leave-Pret', *kept, dreamt, vanity*, etc., are not related *phonologically* to *leave, keep, dream, vain*, etc., respectively. They are separate lexical entries. How they are related to each other is a question that is referred to the lexicon, but in no sense can they be derived from a common underlying representation[7].

Let us now turn to the question whether the "end of the domain" is an object. As we have seen, Kaye explicitly denies this: in his interpretation, the brackets representing domain edges are not part of the phonological representation. In GP, Final Empty Nuclei (FENs) may remain empty by virtue of being domain-final: English licenses FENs. The form *kept*, being non-analytic, exhibits a short vowel, since the **p** is in a Coda, and branching Nuclei are not licit within a branching Rhyme. In *peeped*, Kaye claims, the suffix is analytic, the concatenation being of the type [[A]B]. The internal domain is *peep*, ending in a FEN: as the root vowel is not in a closed syllable (the Rhyme is non-branching), it can be long. The **pt** here is, therefore, a bogus cluster. The *φ* function performs phonology on the string, after which the *concat* function adds the suffix; finally, phonology is performed on the entire string *peeped* (where the symbol ø represents a FEN, not a front rounded vowel):

(4) *φ*[**pi:p**ø] → **pi:p**
concat[[**pi:p**ø]**d**ø]
φ[[**pi:p**ø]**d**ø] → **pi:pt**

In order for the procedure to work, however, Kaye must make an important assumption: notably, that associations created in the inner domain must not be undone in the outer domain. Put another way, the results of applying the *φ* function to the inner domain (in this case, *peep*) cannot be modified by the application of the *φ* function to the entire form (i.e., *peeped*)[8]. The procedure, therefore, is *serial*: apply phonology to the innermost domain, then perform morphology, then apply phonology to the result. This is an automatic consequence of the fact that Kaye must make crucial reference to domains.

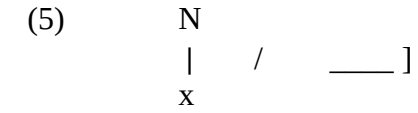
As I already mentioned, Scheer points out that Kaye does, in fact, treat brackets as objects[9]. Brackets are none other than representatives of domain edges. Essentially, Kaye makes reference to domain-final (but not domain-initial) position, since this is where apparent phonotactic irregularities are found, such as monomorphemically il-

[6] Tobias Scheer (personal communication).
[7] See Kaye 1995:310f for suggestions how this might work in the lexicon.
[8] This is a consequence of the Projection Principle.
[9] Many of Scheer's arguments in what follows are to appear in Scheer (forthcoming) in detail. I am not familiar with the exact details, and what I am going to say about his position I received in greater part directly from Tobias Scheer (personal communication). I only use references when this is not the case. I also indicate, of course, when the view I express is my own.

licit clusters (e.g., *dreams*) or long vowels before consonant clusters (e.g., *peeped*). Let us see why "the end of the domain" *is* an object.

As I mentioned earlier, GP assumes that FENs are allowed in English and, generally, in languages which display final surface consonants. They are licensed parametrically *by virtue of being domain-final*; a parameter made available by Universal Grammar, viz. the licensing of FEN, is switched ON. Now, the key to why "the end of the domain" is an object in Kaye's model lies in the status of this parameter. Specifically, GP treats it as a *phonological* one[10]. In other words, it is identical to other parameters *in kind*: it is a decision of the phonology whether it allows FENs or not, much like it is the decision of the phonology of the given language if it allows Codas, branching Onsets or branching Nuclei, etc. There is, however, a serious problem with treating the Licensing of FENs on a par with these parameters. Whether a language allows long vowels etc. is clearly a phonological issue: it is a function of whether Nuclei may branch, which concerns Nuclei in general. FENs, however, are special, precisely *because* they are domain-final. In other words, they are (by definition) adjacent to a morphological boundary. No other parameter makes reference to morphological boundaries. This claim may seem to be false at first sight. A language may allow a Coda-Onset cluster internally, but not finally, for instance (cf. Spanish: *fuente* 'fountain', *parte* 'part', etc. are OK, but no ***nt#, ***rt#,** etc.). But GP does not make reference to the "end of the word" when formulating this restriction: instead, it says that such clusters must be licensed by a following full Nucleus. Indeed, GP (or SCV) *cannot* refer to these clusters being followed by the object "the end of the word" for the simple reason that consonants are *never* adjacent to that object: all words end in a Nucleus, whether empty or not.

Furthermore, the FEN-Licensing parameter was introduced in GP exactly because its silence could not be explained with reference to Proper Government. In other words, it is *the end of the domain* which licenses FENs (where it does), and *the end of the domain* is a morphological object, viz. a morpheme boundary. Thus the FEN-Licensing parameter must inevitably refer to a morphological entity. The brackets, therefore, perform pretty much the same function as the # boundary in SPE. To illustrate this, let us give a more formal formulation of the FEN parameter:

(5)


In prose: a Nuclear position is possible before the end of the domain no matter whether melody is associated with its timing slot or not.

Note that without the bracket, the phonology would interpret (5) as "all Nuclei, whether full or empty, are licensed". This would mean that there is no restriction on the distribution of empty Nuclei — a disastrous consequence indeed.

Scheer argues that this interpretation is wrong. Notably, he claims that a FEN is not *before the end of the domain*: it *is* the phonological expression of "the end of the domain". In order to understand why he makes this claim, a theoretical position essential to his model must be introduced: *Representational Modularity*. The next section introduces this conception, and offers a SCV analysis without employing brackets.

[10] Scheer is not explicit on this point, though he seems to imply it.

2 Representing morphological information in phonology

The conception of grammar known as Representational Modularity (RM) is not Scheer's invention: its chief representative is Jackendoff (see Jackendoff 1992, 1997, for example)[11]. The essence of RM is that phonology constitutes a separate, parallel module from the rest of the grammar, i.e., syntax, semantics, and morphology. The most important difference between phonology and the rest is that it "speaks a different language". The other modules share a common language. Syntax, semantics and morphology all "know" what *number, person, case,* etc. are. Phonology does not understand or use these terms. No phonological process states, for example, "Turn a final labial into a coronal in the Genitive/Plural/Preterite/etc.". Conversely, phonological categories such as *Onset, labial* or *voiced*, etc., are incomprehensible for the other modules and are not used by them, either. There couldn't possibly be a syntactic rule saying "Move α into SPEC CP if it begins with a voiced consonant/branching Onset/empty C/etc.". The point made in RM is that this difference in idiom must be brought to its logical conclusion: intermodular communication is only possible if morpho-syntactic (or semantic) "orders" are *translated* into phonological vocabulary. As Jackendoff writes,

> 'Mixed' representation[s] should be impossible. Rather, phonological, syntactic and conceptual representations should be strictly segregated, but coordinated through correspondence rules that constitute the interfaces. (1997:87f)

Furthermore, he says,

> The theory of Representational Modularity [posits], in addition to the *representation modules* proposed above, a system of *interface modules*. An interface module communicates between two levels of encoding, say L1 and L2, by carrying out a partial translation of information in L1 form into information in L2 form. (1997:42)

I leave aside the question as to how exactly the translation is performed, since it is not relevant for this paper. What matters is that boundary information is to be translated into the phonological idiom. The phonology doesn't understand what a "morpheme boundary" is (nor does it understand what a "morpheme" is, to begin with): it is not a phonological object. Now, Scheer assumes the following: morphology decides if boundary information is sent to the phonology. The phonology does not make any decision: it merely "obeys" morphosyntactic orders. This is not a new conception: it is basically assumed in SPE as well. In SPE, the morphosyntax may choose to represent a morphological boundary as +, =, or #. Phonological rules do or do not make reference to these boundaries. If, for example, a phonological rule does not include # in its structural description, its application will be blocked by the presence of a #, but not by the presence of a +. Indeed, if a rule does not mention any boundary in its structural description, it will apply to all strings enclosed between #'s, no matter whether the string contains a +. This formalism achieves the same effect as Kaye's non-analytic vs. analytic division. Non-analytic domains correspond to SPE #....(+)....# strings. An analytic domain is the equivalent of SPE #....#....#. Yet, rules in SPE may make reference to + (such as Laxing before +*ic*), in which case they will not apply if that bound-

[11] The discussion of RM is based on Scheer 2004b.

ary is absent. No such possibility exists in Kaye's (or whoever else's who does some sort of GP or SCV) model. Synthetic forms will always behave in the same way as monomorphemic ones.

Scheer claims that boundary information (i.e., morphosyntactic division)

1) may or may not be represented in the phonology;
2) it is decided by the morphosyntax if boundary information is represented: phonology is entirely passive;
3) if it is represented, it must be encoded in phonological language.

Objects such as "#" or "]" are not phonological objects: they are neither segments (melody), nor phonological constituents, nor phonological relations. The solution adopted by Scheer is that boundary information is represented by (i) inserting a phonological object into the string, (ii) modifying the properties of objects present in the string. Specifically, this means the following:

1) The "beginning of the word" is translated as the insertion of an empty CV unit into the string[12].
2) The "end of the word" is represented by modifying the properties of the final Nucleus. This boils down to three effects[13]:
   a) Final Nuclei may be externally governed[14] (externally = by morphosyntactic order, rather than "domestic" phonological action, i.e., PG);
   b) FENs may be licensed externally to govern, i.e., to behave as full Nuclei with respect to Government;
   c) FENs may be licensed to license, i.e., to behave as full Nuclei with respect to Licensing.

The essential point is that the representation modified in one or more of these ways is the *input to the phonology*. It is not the phonology which turns, for example, "the beginning of the word" into an initial empty CV. In fact, it does not know that this object *is* the beginning of the word: the empty C and V in this sequence will behave just like word-internal empty C's and V's. The same goes for final position.

Scheer argues that not all languages choose to represent the "beginning of the word" phonologically. If the morphology of a given language selects the option of not sending this boundary information to the phonology, no empty CV unit will be inserted. In such languages, word-initial position is not different from word-internal position with regard to its phonological behaviour[15].

Similarly, if a language does not allow FENs (i.e., all words must end in a pronounced vowel), "the end of the word" as such will have no phonological import: full vowels, whether final or not, behave alike. These facts lead to an important issue: Privativeness. The stance outlined here claims — in contrast with SPE, and, as we'll soon see, Kaye as well — that only those boundaries are represented phonologically which have a phonological effect: why should we represent something that "isn't there" for the purposes of sound structure? Indeed, what Scheer does when following

[12] I leave aside a detailed discussion of word-initial position: it is irrelevant for the present paper.

[13] These three options are subject to an important condition: morphosyntax may only *add* something to the representation. For final Nuclei, this means that properties of lexically empty Nuclei may be enhanced, but not inhibited. The morphosyntax cannot deprive a final full Nucleus of its licensing potential, for instance. See, for example, Scheer 2004b for details.

[14] Scheer uses the term *governed*, rather than *licensed*, to bring out the parallel between FEN and their word-internal governed pairs: they are both silenced. This is problematic, too; I return to it in Section 3, Footnote 22.

[15] See Scheer 2004a:485ff. The claim that the projection of an empty CV pair is parametric is not accepted by all scholars working in SCV, cf. Lowenstamm 1999.

this line of argumentation is that he takes the generally accepted principle of all versions of GP, *Privativeness*, to its logical conclusion.

In SPE, for example, there is no way *not* to represent a word boundary: # is always present. As a result, the theory makes no prediction as to what effects # can have. Kaye's framework, too, suffers from this problem: brackets indicating domain edges are always present. Furthermore, I take the opportunity to supplement Scheer's observation by pointing out that domain-initial and domain-final positions do not behave in a parallel fashion. The domain-final position in Kaye's framework is special: it may serve as the environment of the FEN-Licensing Parameter, which, in turn, identifies the right-hand edge of the domain phonologically (cf. *dream-s*, where the domain edge is shown by the FEN between the morphemes). Domain-initial position, however, never does the same job: "the beginning of the word" is always "[" — whether phonologically relevant or not. This is a logical consequence of the fact that brackets come in pairs (since they enclose domains), so there *must* be a "[" for every "]".

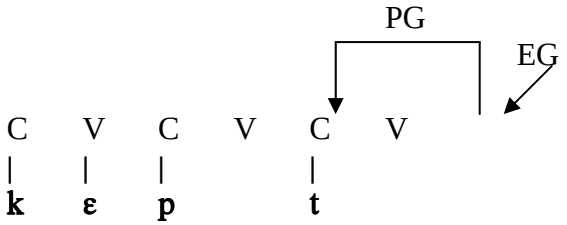
To sum up, Scheer proposes, based on RM and empirical observations about the phonological behaviour of domain edges, that morphosyntactic division *may* be represented phonologically, but whether it is or not is the autonomous decision of the morphosyntax, and it can only be represented in phonological language. Let us now elaborate on how this might be done.

3 A Strict CV alternative

In this section, I present a possible way of interpreting Scheer's proposals. I am not aware of the details of how Scheer implements these proposals in relation to morpheme boundaries[16]. In what follows I offer a possible interpretation and implementation, based on Rebrus's representations of Hungarian synthetic and analytic concatenations[17]. Whether Scheer's solution differs from mine remains to be seen. It is an open question, too, to be verified or falsified by empirical data and theory-internal arguments, if this solution works on a general plane. It seems to yield the correct results for the set of (limited) data I have examined.

Let us assume, then, that a synthetic concatenation is sent to the phonology without any internal FEN(s), while an analytic one will include a FEN before the morpheme boundary[18]. Therefore, the representation of *kept* vs. *peeped* is as follows (I omit word-initial empty CV's throughout this paper for the sake of simplicity, but note that they are present in all English words that are C-initial on the surface). I use the term External Government (EG) to denote morphosyntactic intervention.

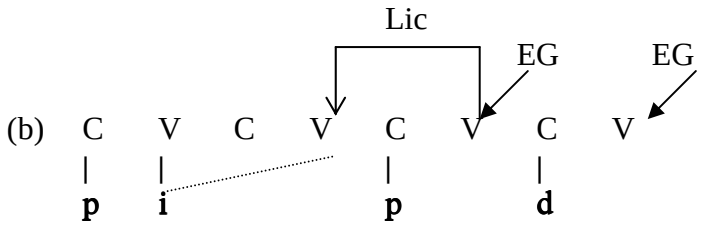
(6) (a)



[16] He has not yet published/circulated anything on the matter. Scheer (forthcoming) will be partly devoted to the morphology-phonology interface, but this book is not available as yet. See, however, Scheer 2004a:583-96 for a treatment of Slavonic vowel ~ zero alternations without reference to domains.

[17] Rebrus 2000:816f, 831f.

[18] I limit the discussion to suffixation, since prefixation is irrelevant for the present paper.



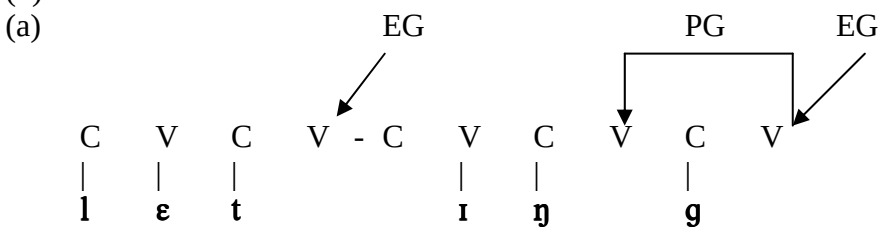
The analytic boundary is directly encoded into the phonological representation via FENs, receiving EG due to morphosyntactic orders. For the phonology, whether an E-Governed Nucleus is final in the string or not does not matter: its properties (whether it can license or govern) are decided by the morphosyntax[19]. In English, FENs are both licensors and governors. This explains why the FEN in (6a) may govern the preceding empty Nucleus, and why, in (6b), a long vowel is possible in the stem: the FEN can license the second V position of the long Nucleus to receive spreading melody (exactly in the same way as in *peep*). Note that no bracketing is necessary, and, accordingly, there is no serialism: the phonological interpretation is done in one go.

One important thing must be pointed out: a restriction on where the morphosyntax may E-Govern empty Nuclei. Such intervention is strictly limited to morpheme edges. In case we talk about concatenations, the morphosyntax may only intervene at positions immediately adjacent to the morpheme boundary. No morpheme-internal intervention is possible. Furthermore, morphosyntax only has access to the skeletal level: subskeletal material (melody) cannot be influenced (see Scheer 2004b for a more detailed discussion).

A final note: though we cannot speak of *domains* any more in the Kayean (technical) sense, I will retain the term as an informal label, together with the terms *analytic*, *non-analytic*, and *synthetic*. Note, however, that domains have no phonological status in the model I adopt. I now proceed to refine the structures with regard to the skeletal structure of suffixes depending on whether they are concatenated with the stem analytically or synthetically.

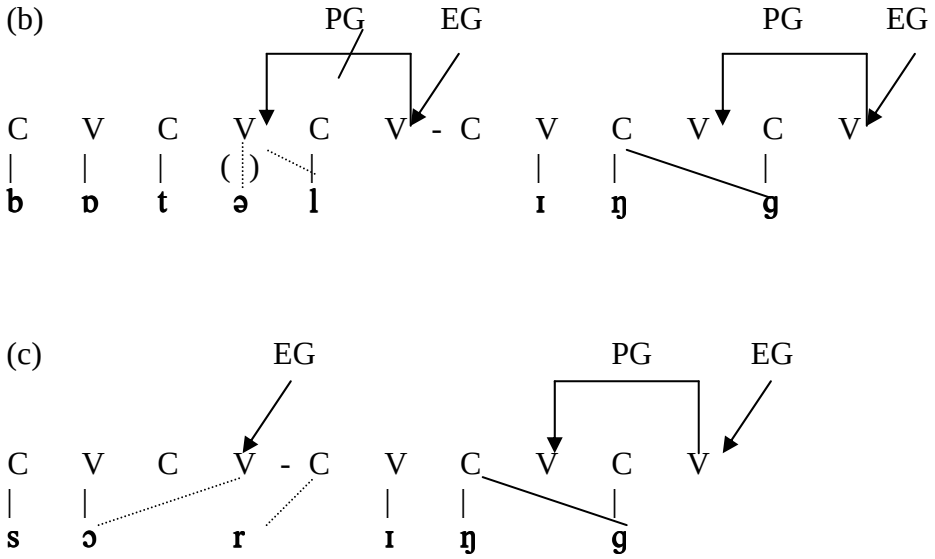
As a starting point, let us see some further English examples, illustrating the behaviour of the suffixal morph *-ing*, which is *always* analytic: it leaves the phonological makeup of the stem perfectly intact. Figure (7) shows the representation of *letting*, *bottling* and *sawing* according to their Southern British pronunciation; I indicate the morpheme boundary with a hyphen for convenience, but note that it is not part of the representation[20]:

(7)



[19] The overall morphosyntax, I mean. That is, if the language gives licensing or governing potential to FENs, it will uniformly apply to *all* FENs: you cannot give such potential to FENs selectively. FENs only differ from full Nuclei in that they may only govern/license a totally empty Nucleus, but not a vowel~zero alternation site (= floating melody): the two are distinct in Scheer's version of SCV.

[20] Following Szigetvári 1999, I assume that empty C's require no intervention to remain silent.



The above data need some comments. First, the suffix *-ing* begins with an empty C. SCV assumes that the skeleton of all morphemes consists of (CV)*, so the assumption that the morpheme *-ing* begins with an empty C is expected. (Though see counter-arguments below regarding synthetic suffixes.) Second, as I mentioned above, surface **ŋ** is derived from lexical **ŋg**, due to familiar distributional restrictions on **ŋ** in English. We can formalise these restrictions by saying that the **g** in **ŋg** must be licensed by a non-empty Nucleus[21]. Otherwise, (7a) needs no special comment. In (7b), the stem-final **-əl** ~ **-l̩** alternation requires some attention. Lexically, there's a floating schwa between the **t** and the **l**. Being followed by a FEN, it cannot receive PG: FENs cannot govern but totally empty Nuclei. There are two possibilities: it is either realised (being connected to the V position: this option is shown in parantheses), or it is uninterpreted phonetically, but in that case, the **l** must spread into the V slot in question, becoming syllabic. In (7c), following usual practice in autosegmental formalism, I represent the stem-final **r** as a floating segment, which attaches to a following C position, if there's one available. The suffix *-ing* begins with an empty C, as all skeletons are made up of strictly alternating CV units in SCV; hence, it does provide the floating **r** with an anchor. Such an analysis is used, for instance, in Harris 1994:248ff (though in a GP framework)[22]. The question if all morphemes do actually begin with a C on the skeletal level will be discussed shortly.

Let us now consider the representation of a concatenation with a vowel-initial synthetic suffix. A good example is *longer* **ˈlɒŋgə** 'long-Comp'. That it is a synthetic

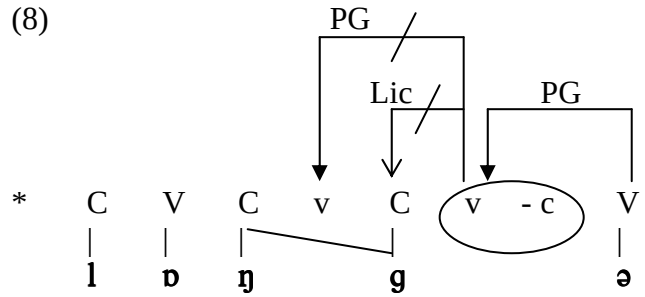
[21] Please note that the **g** is associated with the position of **ŋ**, too. This is because the cluster is a homorganic one, where the two consonants share their place element. Harris (e.g., 1994:69) calls such clusters *partial geminates*.

[22] The reader may have noticed that the **ɔ** in *sawing* spreads into the E-Governed FEN, according to how long vowels are represented in SCV. This gives rise to a difficulty. V positions ought to be *licensed*, not governed, to receive spreading melody. In Scheer's version of SCV, FENs are *governed*, for reasons explained in Footnote 14. It appears that the external influence on FENs is, in fact, neither Licensing nor Government, but something else. This isn't really surprising, though, since Licensing and Government are phonological relations, and FENs receive extraphonological influence. I will retain the term E-Government, but note that EG is used here as a label to refer to a force whose real identity is yet unknown.

concatenation is shown by the presence of **g**, cf. *longing* **ˈlɒŋɪŋ**, with an analytic suffix, or the near-homophonous *longer* **ˈlɒŋə** ‘someone who longs’, where the phonetic makeup of the morphemes is lexically identical (allegedly: but see below), yet the the two *longer*’s are different: in the noun, the **g** is followed by a FEN, which is unable to license it. It appears that in the adjective *longer* the **g** is licensed: but how?

Recall that SCV assumes that all skeletons are necessarily C-initial (and V-final). Let us attempt to represent the synthetic adjectival form *longer* in this way. This is done in (8):

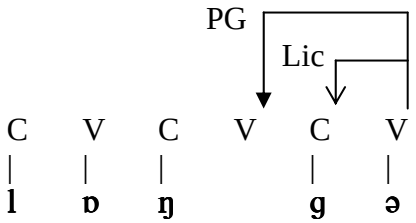
(8)



As the reader can verify, the structure in (8) is ill-formed. The last Nucleus is filled, so it can govern the preceding empty Nucleus — which happens to be the last skeletal position in the stem[23]. A governed Nucleus, however, may not license a **g** in an **ŋg** cluster. Hence, the **g** is expected to drop, but it does not. Moreover, it cannot govern the empty *v* inside the **ŋg** cluster. As a result, (8) cannot be the representation of the comparative form of the adjective *longer*.

Two well-known proposals have been put forward to heal the problem. The first is the application of *Reduction*, which deletes an empty NO sequence (= VC here; indicated by being encircled in (8)) to ensure the regular ON alternation[24]. If the empty VC is erased, the problem is solved: the schwa will be adjacent to the **g**, and, being a full vowel, it can both license and govern. The post-Reduction situation is shown in (9):

(9)



There are problems with this analysis, though, as Szigetvári (1999:102) points out, referring to Polgárdi (1998:37); see these works for details[25]. The chief problem, for our purposes, is that it makes reference to the fact that Reduction happens over domain boundaries — but the essence of non-analytic morphology is that it *does not* project its morphological complexity into the phonology. In other words, synthetic

[23] Note that it is not a FEN, since the morphology does not represent boundary information in synthetic concatenations, cf. also *kept* in (6a).
[24] Harris & Kaye 1990, Gussmann & Kaye 1993.
[25] The point is that Reduction violates the Projection Principle as it alters lexically established relations.

forms should behave just like monomorphemic ones. The presence of the empty VC sequence does betray the complexity of the form, as such a sequence could not possibly exist inside monomorphemic forms. Therefore, if we want to maintain the claim that the morphology has no effect on synthetic forms, the Reduction solution is ruled out. Szigetvári (1999:106), using skeletons made up of VC, rather than CV, units, argues that there is no problem of this kind in his framework: as skeletons end in a C, and begin with a V, the skeleton of *longer* (Adj) will be VCVCVC-VC, which yields the expected structure, and no Reduction needs to be assumed. He points out, furthermore, that non-analytic suffixes are typically V-initial, which is easily accommodated in his theory[26].

In a SCV model, this does not appear to be a possible solution. In what follows I would like to argue that (9) *is* the correct representation for *longer*$_{\text{Adj}}$, but it's not the result of Reduction. Instead, based on Rebrus (2000:816f, 831f) I assume that this representation is the lexical one. I will elaborate on this view in what follows.

This proposal may seem to contradict the basic principle of SCV that the skeleton of each morpheme is composed of CV pairs: taking (9) as an example, we must assume a CVCVC-V skeleton, exhibiting two violations of this principle: the stem ends in a C, and the suffix contains but a V[27].

Note, however, that the basic point in synthetic affixation is that it is indistinguishable from monomorphemic forms. I propose that this claim be taken literally, and no difference between synthetic and monomorphemic forms must be posited. As empty VC sequences are not found in the latter, they are not to be assumed for synthetic forms, either. In other words, I claim that the essence of synthetic morphology is that it may concatenate *incomplete* skeletons. This is in line with the fact that synthetic affixes may attach to bound stems (though they may attach to free ones, too, e.g., *obēse* ~ *obēs-ity*). Analytic ones never do. I suggest that this fundamental property of synthetic morphology is reflected in the possibility of concatenating incomplete skeletons. Put another way, the point is that the full form itself must have a (CV)* skeleton. This has a serious consequence for *longer*: it must be assumed that the adjective *long* has two allomorphs: a free and a bound one, viz. *lonøgø* and √*lonøg*, respectively[28]. The latter occurs in the Comparative and the Superlative. This means that the alternants are not derived from a common initial representation via the phonology: instead, this is allomorphy proper. The boundedness of a root morpheme is represented phonologically by a C-final (incomplete) skeleton. In other words, word-final position is represented phonologically asa FEN; root-final position (with bound roots, of course) translates as final C: this equals the fact that bound roots are not possible skeletons in themselves. Note, however, that this is not the same mechanism as the ones indicating word boundaries: the latter are characterised by the restriction that they may not *deprive* the representation of any of its properties. The analysis of bound roots and synthetic affixes appears to contradict this restriction. I claim, however, that the marking of bound roots by a final -C is not the result of such a mechanism: they are not "deprived" of their final V. Instead, bound roots are, by their nature, not autonomous lexical entries: they always appear in the lexicon in combination with some suffix. Specifically, *longer* is stored in memory as CVCVCV. The

[26] The word *typically* is important, as there are C-initial non-analytic suffixes, cf. *kep-t*, *leng-th*, etc. (at least on the surface: more on this shortly).

[27] Plus a floating **r**, but that is not associated with any skeletal position. In rhotic accents, *-er* is, of course, -VCV. This difference between rhotic and non-rhotic accents is irrelevant: in both cases, the suffix is vowel-initial in this formalism.

[28] I will use the symbol √ to represent bound roots.

bound root **lɒŋg-** isn't stored anyhow, and neither is its suffix, so there's no violation of strict (CV)* structure, because it only restricts the skeletal content of lexical entries. The analysis I propose establishes a clear connection between boundedness and skeletal structure. This leads to a generalisation, described in (10) below:

(10) *The Lexical Entry Principle (LEP)*
Lexical entries are organised along a (CV)* skeleton.

The essence of LEP is that *autonomous* lexical entries must be assigned a skeleton consisting of strictly alternating (CV) units. This concerns both free stems and analytic suffixes. Let us now go on to discuss some problems.

I claimed that bound roots are not independent lexical entries (which is actually in line with Kaye 1995:310ff). This is probably the case in English and all other languages where the regular morphology is typically word-based. The question is whether the same claim can be made about languages such as the classical Indo-European ones, e.g., Latin, Sanskrit, Old Church Slavonic, etc. These languages have very few free roots, these being limited to underived adverbs, certain pronominal forms, and the like. Major categories — verbs, adjectives, and nouns — tend to have bound roots. It would be strange to claim that all inflected forms in these languages are lexicalised. A possible conclusion is that the root, though bound, must after all be given the status of an independent lexical entry. This would contradict the LEP. Yet, I do not think this conclusion is necessary.

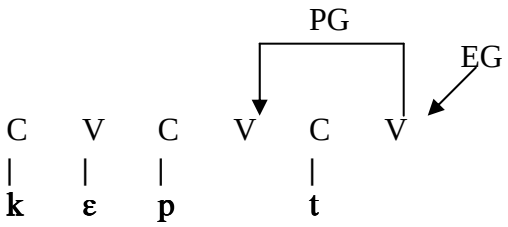
It has been long noted that this type of morphology differs from the word-based one precisely in that it fails to lend itself to Item-and-Process (or Item-and-Arrangement) type analyses: instead, the Word-and-Paradigm (WP) model (basically the model of inflection followed in classical grammars of Latin, Greek, etc.) has been proposed[29]. This means that all word forms are potential full lexical entries, but roots are not. I propose that such morphologies make the possibility of C-final roots a general organising principle, not restricted to particular lexicalised items. There seems to exist evidence that lexemes are not memorised as uninflected roots in such languages. Instead, a particular inflected form is taken as a "base form" which is stored in memory, and other inflected forms are computed on the basis of that form (using other bits of information such as gender, inflectional class, etc.)[30]. In the case of Latin nouns and adjectives, for example, it seems likely that the base form was the Accusative Singular. Speakers stored each noun and adjective in this form, instead of storing the root as a lexical item. It is a remarkable fact about Latin that (aside from recessive, i.e., non-productive, minor paradigms, such as *ē*- and *ū*-stems, which were probably treated as exceptions and hence possibly lexicalised) major (and productive) nominal paradigms can be fully identified based on two bits of information: (i) the AccSg form, (ii) gender. To sum up, a synthetic form need not be irregular or lexicalised, and yet, it is a legitimate claim that bound roots are not independent lexical items in WP-type morphologies, from which it follows that bound roots can be conceived of as ending in a C on the skeletal level: they, as non-entries, are not subject to the LEP.

The question emerges how *consonant-initial* synthetic suffixes, such as English *-t* characterising irregular verbs (e.g., *kept, left*, etc.) fit into the picture depicted above. They seem to be problematic: they are not (surface) vowel-initial. Yet, the

[29] For Item-and-Process, Item-and-Arrangement and Word-and-Paradigm approaches, see Spencer 1991:49-53.
[30] See Bybee 1985:49-79. She does not talk about bound roots, but the model she proposes is applicable to them.

problem is apparent: there is no particular reason to believe that such suffixes are, on the skeletal level, C-initial. Indeed, consider the representation I proposed for *kept* in (6), repeated here as (11) for convenience:

(11)



The representation in (11) infers no obligation on us to analyse the Properly Governed V as belonging to the root. The essence of synthetic concatenations is that they include no E-Governed Nuclei inside the full domain. There is no way to distinguish them from monomorphemic forms. Therefore, the form says nothing at all about whether the empty Nucleus, adjacent to the morpheme boundary, is part of the root or the suffix. It is perfectly possible to say that it is actually suffix-initial. We can, therefore, maintain the claim that synthetic affixes *always* begin with a Nucleus, but that Nucleus can be empty.

Note, however, that we mentioned an observation: notably, synthetic affixes are typically vowel-initial on the surface: i.e., they begin with a full Nucleus. This is indeed the case in the overwhelming majority of cases, i.e., empty V-initial synthetic suffixes seem to be rare. My model, in fact, predicts this: a CV sequence is not a phonotactic domain, but a CC (= CVC, structurally) sequence often is. In other words, languages typically do not show phonotactic restrictions inside CV sequences: in general, any C can stand before any V[31]. This is not true with respect to a consonant cluster. In a synthetic concatenation, the same phonotactic restrictions hold for any (surface) CC sequence straddling the morpheme boundary as for identical sequences within monomorphemic forms. Therefore, it is no wonder that synthetic suffixes prefer to be surface V-initial: the initial (full) V is free to combine with virtually any root-final C. This is not true for C-initial suffixes. As far as I can see, my model predicts this behaviour. By contrast, any alternative which treats (synthetic) *bound root + suffix* combinations on a par with (analytic) *free root + suffix* concatenations fails to make this prediction[32]. In such models, the fact that synthetic suffixes are generally V-initial is merely observed. In the model I propose, it is explained. Observe, too, that C-initial synthetic suffixes (as expected) are often subject to severe restrictions as to what kind of root they can combine with. This is predicted by the framework advocated here. For example, the English synthetic Preterite marker *-t* is restricted to roots ending in **-p, -f, -s, -m, -n, -l**, as in *kept, left, lost, dreamt, meant, felt*, respectively[33].

[31] Called the "Principle of Free Cooccurrence"; see, e.g., KLV:200. There are some (possibly apparent) exceptions. In Proto-Slavonic, for example, CV sequences may not combine palatal segments with velar ones. I analysed this in a GP framework in Kristó 1999. Later, however, I came to the conclusion that such restrictions are probably the result of interaction between melodic primes rather than due to relations holding on the skeletal level; see Kristó 2003. For a general theoretical background, see Scheer 2000b and Ségéral & Scheer 2001b.

[32] This is also valid for Szigetvári's (1999) theory: according to him, all roots are C-final and all suffixes are V-initial. Hence he doesn't make a difference in this respect between synthetic and analytic concatenations, either.

[33] And vowel-final ones such as *taught, brought*, etc., if one accepts the analysis of the final *-t* here as a morpheme. The cluster **-rt**, in rhotic accents, could be possible, but there's no example (the only weak

These **Ct** sequences are found monomorphemically, too, cf. *apt, soft, cost, asymptote, Lent, melt*, respectively[34]. It is open to debate whether forms such as *met, led*, and others in **-t/-d** include a suffix *-t*, which assimilates to a root-final **-d** then the geminate is shortened. This is certainly the SPE-type interpretation. Note, however, that SPE derives the Infinitive and the Preterite from a common lexical representation, an option which is impossible in SCV or GP. If *met, led* &Co. are separate lexical entries, there's no reason to assume a suffix. I prefer the solution that there is no suffix; instead, the preterite is marked by the difference in the root vowel. In this sense, these verbs line up with historically strong ones[35].

4 Ambiguous suffixes: synthetic or analytic?

Kaye assumes that syntheticness vs. analyticness is the property of given affixes. In what follows, I will consider this statement. It may appear, based on some data, that this may not be true: there are cases when a suffix is sometimes analytic, sometimes synthetic, depending on what it is concatenated with. We may conclude that analyticness, therefore, is not a lexical property of affixes: instead, particular concatenations are analytic or synthetic. I will argue that appearances may be deceptive, suggesting an alternative whereby Kaye's claim can be maintained.

Consider first the well-known instance in English of the suffix represented orthographically as *-able* or *-ible*, pronounced **-əbl̩**. In his highly influential (1976) book, Mark Aronoff presents a detailed analysis of this suffix within a classical generative framework (1976:120-29). He observes that the suffix in question shows a dual behaviour phonologically, morphologically, as well as semantically, and proposes that two *able*'s should be posited: *#able* and *+able*. In our terms, there is an analytic *-able* and a synthetic *-able*. Aronoff enumerates phonological, morphological and semantic arguments to support his claim that there are two, homophonous *and* synonymous, suffixes. Often, he says, a given stem may appear in combination with either suffix, e.g., *cómpar+able* vs. *compár#able*. This is reflected in stress placement as well as in the fact that *cómpar-* is not a free stem. Furthermore, the meaning of *compár#able* is transparent ('able to be compared'), while the same is not true for

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irregular verb in **-r** is *hear*, but its preterite is *heard* **hɜrd**, rather than ***hɜrt**). I assume that this is a historical coincidence, much like the lack of irregular preterites in **-kt**, which could be possible (cf. *act*).

[34] *Asymptote* can be pronounced with a **mpt** cluster, too, but the **p** is entirely optional according to Wells 1990. The same goes for *Hampton*, which, though historically polymorphemic, is clearly lexicalised and probably should be treated as monomorphemic in Present-day English. I conclude that **mt** is licit monomorphemically in English (even if rare). This is counter-predicted by Kaye 1995:311, who claims that NT clusters (where N = nasal and T = plosive) must be homorganic within a non-analytic domain. Kaye is actually forced to make this claim for reasons internal to GP theory. SCV (at least in the form I use here) does not make such a prediction.

[35] Similar restrictions seem to be valid for the Classical Latin NomSg suffix *-s*, as in *rēx* (= *rēg-s*) 'king', *princep-s* 'prince'. It is combined, for example, with *-t/-d*-final roots in such a way that the dental stop is "dropped", e.g., *mīles* 'soldier' (cf. AccSg *mīlit-em*), *lapis* 'stone' (cf. AccSg *lapid-em*). Note also the vowel alternation in 'soldier'. Not unexpectedly, the clusters **ks** and **ps** are monomorphemically licit (though rare, but I assume this is due to historical coincidence), cf. *sex* '6' and *laps-us* 'fault'. No **ts** cluster is attested monomorphemically (**ds** is out on independent grounds since the **d** would be automatically devoiced before a **s**, cf. *rēx* **re:ks** 'king-NOMSG' vs. *rēg-em* **re:gẽ** 'id.-ACCSG'). No wonder that this suffix (the only C-initial nominal suffix of Latin attaching to C-final roots) is recessive, and in Vulgar Latin, it is replaced by *-is* added to the Acc stem, i.e., VL NomSg **mīlitis*, **lapidis*.

cómpar+able (it can also mean 'equivalent'). Such differences are not limited to these particular words. Most importantly for us, *#able* always attaches to free stems, while *+able* does not.

Recall the analysis I proposed for *longer*$_{\text{Adj}}$. I claimed that it is a lexical entry. This means that its morphemes are not concatenated by the productive morphology. In fact, to take this argument to its logical conclusion, I suggest that this word is not concatenated anyhow: it's listed. The morphology in such cases serves as a *parser*, not as a concatenator. This idea is by no means mine: Aronoff himself argues (1976, *passim*) that derivational morphology, i.e., word formation, is word-based, and that words which are apparently "formed" by concatenating bound stems with an affix are not morphological products but lexical entries, and the morphology is merely used to analyse such sequences. Rebrus (2000:832) also proposes (in his analysis of Hungarian morphophonology) that synthetic affixation should be referred to the lexicon, whether inflectional or derivational.

In fact, there are so many instances of non-uniform behaviour with regard to suffixes that for a great many of them, one would be forced to assume two, homonymous and synonymous morphemes — like in the case of *+able/#able*. There is a problem with this, however. Notably, homophony itself is a widespread phenomenon in language; but it does not normally go hand in hand with synonymy: instead, what one normally calls a pair of homonyms is *same signifiant but different signifiés*. In English, for instance, the regular plural suffix is homonymous with the 3Sg marker in the Present Indicative of verbs. Aronoff's solution is, therefore, rather unusual, since such pairs are homonymous *and* synonymous. However, he is forced to claim what he does by a simple fact: the theoretical framework he uses. The different behaviour of *+able/#able* &Co. must be encoded in the suffixes themselves in the form of boundary diacritics. As these diacritics are part of the structure of the suffixes, they are, after all, not homonymous in a structural (abstract) sense[36].

In the framework I adopt here, positing two synonymous *and* homonymous morphemes is not inevitable. Capitalising on the observation that *+able* (i.e., the synthetic *able*) always co-occurs with non-entries, i.e., it is always part of a lexical entry[37], we can claim that *-able*, whenever it is concatenated with its stem morphologically, i.e., the stem is an autonomous lexical entry, is always analytic. Using Aronoff's formulation of word formation, one may represent this affixation process as follows:

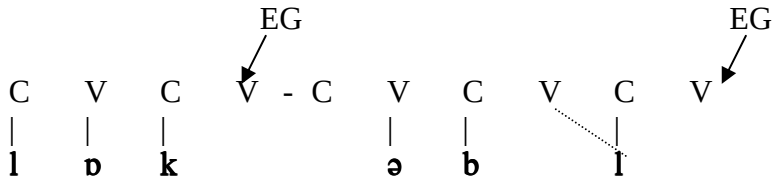
(12) $[[X]_{\text{Vt}}\text{able}]_{\text{Adj}}$ 'able to be X-ed'

In prose: add *-able* to a transitive verb to form an adjective with the specified meaning.

As X is always a free word form, it is subject to the Lexical Entry Principle: its skeleton must be (CV)*. The representation of *lockable* is as in (13):

[36] It must be emphasised, though, that Aronoff explicitly denies the interpretation of boundary markers as *phonological* objects (1976:121f).
[37] And, as such, it is V-initial on the skeletal level, combining with C-final stems.

(13)



I assume that all regular morphology (whether inflectional or derivational) in English is always analytic. Let us check, however, the Comparative and Superlative of adjectives: considering *longer* (and other adjectives in *-ng*), one must treat the suffixes (viz. *-er* and *-est*) as synthetic. They also attach to free stems, though: cf. *nicer/nicest, freer/freest,* etc. It might seem that it is analytic here. Recall, nevertheless, that I have not claimed that synthetic affixes always attach to bound roots: they can do so, but this is not obligatory. I proposed merely that analytic affixes may not attach to bound roots. Considering forms like *nicer, freer,* etc., it must be observed that we cannot really tell if they are synthetic or analytic forms based on their phonetic shape. Both analyses yield the same result. In other words, such forms do not display any monomorphemically illicit sequence. For example, the form *freer* ˈfriːə, might as well be monomorphemic, cf. *Korea* kəˈriːə. The only way to decide if *-er/-est* can be analytic is to find forms which can *only* be analysed as analytic. One instance when the question can be unambiguously settled is a stem ending in a syllabic consonant. If the syllabic consonant can be retained in the suffixed form, the suffix can only be analytic. The suffix *-ing* serves as a good illustration, cf. *travelling*, phonetically ˈtrævl̩ɪŋ. It is not so easy to find adjectives, liable to suffixal comparison, that end in a syllabic consonant, however. One such rare adjective is *simple*. Here, the Comparative andSuperlative forms are ˈsɪmplə and ˈsɪmpləst, with a non-syllabic l: indeed, these forms are not possible with a syllabic one[38].

Note also that these adjectival suffixes are very restricted in their use: they can only be used with maximally disyllabic stems, and even there, they are on the retreat: it is not at all unusual nowadays to hear form such as *more happy*, *more rare*, or even *more nice*. Based on these observations, I conclude that the affixal expression of comparison is basically irregular in Present-day English. In other words, the only productive pattern is with *more/most*. I regard, therefore, all suffixed comparative/superlative forms as lexicalised, i.e., historical residues which are gradually disappearing from the language. There is no morphological rule for them comparable to (12).

5 The Words-and-Rules model

The above line of argumentation about the lexical vs. morphological status of affixation is by no means forced upon us by the theory itself. It is supported by a great number of psycholinguistic experiments, too. To illustrate this, let me briefly describe a model of grammatical organisation known as the *dual mechanism model* or *words and rules model*. Its best known representative is probably Steven Pinker, known primarily as the author of the bestselling book *The language instinct* (though the book is not about this model). The theory, which I will refer to as the Words-and-Rules Model (WRM) from now on, was originally proposed by Pinker & Prince 1988, although the

[38] A possible counterexample is *commoner/commonest*, where the schwa is retained. It must also be added, however, that these forms are increasingly recessive nowadays, being replaced by *more/most common*. The adjective *evil*, for example, cannot take a suffix at all.

basic idea goes back to much earlier (in fact, Aronoff's 1976 theory is probably the first well-known application). The most exhaustive and accessible exposition is Pinker 2000.

The claim of the theory is actually very simple: it states that inflected forms (and derived ones as well, though Pinker is mostly concerned with inflection) are produced in two ways. Irregular inflection is retrieved from the memory, while regular inflection is the product of the application of general, symbolic rules. The term *symbolic rule* means that the rule is not applied to individual lexemes: instead, it applies to a category, "with blind necessity"[39], as it were. In fact, the morphological rules of Aronoff are such symbolic rules. Pinker is mostly concerned with verbal inflection. To use Aronoff's formalism, we could, for example, formulate the regular English Preterite formation as in (14):

(14) $[[X]_V ed]_V$ 'X-Preterite'

As the reader can see, this rule applies to any verb. It is possible to interpret this in an extreme way, in line with traditional generative assumptions: *all regular forms are always generated* "on line", and never stored in memory. This interpretation is, however, probably wrong, for reasons I will discuss below[40]. Irregular forms are retrieved directly from the lexicon. To return to the comparison of adjectives, there is no active morphological rule for it: it is performed by the syntax in regular cases, and suffixed forms are stored in memory, retrieved from there if needed.

There are some problems, though. First, if symbolic rules are "blind", why cannot they generate forms such as **bringed*, **teached, *comed*, **eated*, etc.? There are two solutions I am aware of. The first one is proposed by Aronoff (1976:43): *blocking*, which means that the general morphological process is blocked by the existence of a lexical entry with which it would be entirely synonymous. As for derivation (which is what Aronoff is concerned with), we can cite the non-existent adjective **ungood*: it is not "wrong" because it is structurally ill-formed, but because there is already a word, viz. *bad*, which means precisely the same. The same is valid for non-forms such as **eated*: it is blocked by the existence of *ate*. The blocking solution, however, suffers from a serious flaw, at least in case we want to maintain that symbolic rules are indeed symbolic, i.e., blind to lexical identity. Specifically, it assumes that the general rule must check the lexicon before applying to see if there's something to block it. This means, however, that the rule is not blind after all, and must make crucial reference to the lexical identity of the base X. This fact apparently invalidates the whole WRM.

Yet, there's another solution, which I find convincing. This solution[41] uses blocking, too, but removes an age-old assumption about the application of lexical retrieval (= irregulars) versus on-line generation (= regulars): that their application is an "either — or" choice, i.e., either one or the other is applied to produce an inflected form, depending on the lexical identity of the base. Proponents of WRM claim that this is not the case: the two mechanisms, retrieval and generation, are invoked simultaneously, and the faster one wins. To take an example, the speaker wants to express 'walk-PRET'. Search for a possibly existing lexical entry and generation of a regular form start at the same time; as there's no lexicalised form, retrieval fails to come up with

[39] The formulation "with blind necessity" — "mit blinder Notwendigkeit" — goes back to the Neogrammarians: they applied it to the operation of sound laws.
[40] I must emphasise that Pinker et al. do not adopt this interpretation.
[41] See, e.g., Aronoff & Anshen 1998, Pinker & Prince 1991, Pinker 2000.

anything, so the regular form *walked* will be produced. In case there *is* a lexicalised form, as in the case of *go*, retrieval produces the form *went* before the regular morphology manages to assemble a form **goed*. The reason why lexical retrieval is faster is that the item *went* is frequent: it is retrieved fast and easily. The explanation relies on a well-known fact about irregulars: they are among the most frequent items in the language[42]. Crucially, if an irregular item is not frequent enough to make retrieval the sure winner of the race, regular forms can be produced. Indeed, there are several verbs in English (and probably all over the place) which have two preterites: an irregular and a regular one, such as *dreamt ~ dreamed*. The appearance of *dreamed* is easily explained with the "race between the mechanisms" model. That is, blocking may not be a principle of grammar at all: it may be but a side-effect. The fact that **goed* et alia are always blocked is a consequence of the invincibly fast retrieval of *went* (except in child language, where regular forms are generally produced at a given stage of acquisition)[43].

As I mentioned, there is a (still widespread) view that regular forms are *never* memorised but always generated on line. In fact, it appears that this view is not correct. For one thing, if it is the case that "memory is constantly working alongside rules" (Pinker 2000:137), it would be strange if regular forms could not be memorised, especially very frequent ones[44]. Moreover, as Pinker (ibid.) points out, WRM only claims that "people don't *depend* on stored past-tense forms, not that they are *incapable* of storing them" [emphasis original]. Second, the phenomenon of lexicalisation assumes lexical storage. Let me elaborate on this. Lexicalisation is understood in the following sense: morphologically complex forms acquire unpredictable properties, i.e., they become arbitrary[45]. For example, *readable* has become lexicalised in a semantic sense: it is opaque. Specifically, it "ought to mean" 'able to be read', based on the semantics of the base and the suffix, but it does not: instead, it means, 'enjoyable as a reading'. If one assumes that regular formations are never stored, we encounter a problem I call the *Lexicalisation Paradox*[46]: if *readable*, to use this particular example, is always generated on line (and then erased from memory), how can it acquire an unpredictable meaning? It cannot. This paradox is, however, apparent: if one assumes that regulars may be stored, there's no paradox: *readable*, a stored item, may take on peculiar properties. Aronoff (1976:18) gives an excellent formulation:

> Words, once formed, persist and change; they take on idiosyncrasies, with the result that they are soon no longer generable by a simple algorithm of any generality. *The word gravitates toward the sign* [emphasis mine - L.K.](...) Words, though they may be formed by regular rules, persist and change once they are in the lexicon (...)

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[42] Pinker 2000:123f provides a striking fact about English, based on a corpus of 1 million words of text: the ten most frequent verbs are *all* irregular (not surprisingly, *be* leads with 39,175 occurrences, *get* is the last one with 1,486).

[43] The side-effect status of blocking may not be entirely true, though. Notably, it has been observed that language avoids total synonymy, and blocking is probably a derivative of this avoidance (Aronoff & Anshen 1998:240). Yet, pairs such as *dreamt ~ dreamed* are synonymous. I suspect that blocking is the result of an interaction of (at least) these two factors.

[44] One often memorises sentences, too, though they are undoubtedly generated. Or, to take another example, think of the words of TV advertisements which one hears all the time: we often memorise them, even if we do not intend to do so. In other words, whatever is frequent enough will be stored.

[45] *Lexicalisation* is often used in another sense which is also called *lexical coding*, i.e., the fact that there is a lexeme for a particular concept in a language.

[46] Kristó 2004:267f.

The emphasis in the quoted passage is important. I understand it in the sense that the word, once stored, tends to become a Saussurean, i.e., arbitrary, sign: arbitrariness, a truly basic principle, constantly attracts items as a kind of "black hole"[47].

To sum up this lengthy discussion, there seems to be abundant evidence, structural, semantic, and psychological, to support the assumption that in languages such as English the regular morphology is always analytic, while irregular morphology is synthetic (the latter point is explicitly made by Kaye 1995:311). This property of English morphology is, in the light of WRM, not accidental. As I mentioned earlier, Scheer assumes that morphology decides if boundary information is shipped off into the phonology or not. Putting the overall picture together, it seems that the morphology, after all, may not be an autonomous decision-maker. Instead, regular morphology (at least inasmuch as it operates symbolically) cannot choose not to represent boundary information phonologically, for the simple reason that it takes the symbolic form exemplified in (12) and (14), the latter repeated here as (15) for convenience:

(15) $[[X]_V ed]_V$ 'X-Preterite'

Such rules are word-based: they do not manipulate stems. X is an autonomous lexical entry, represented phonologically in accordance with the Lexical Entry Principle, requiring that all entries have a (CV)* skeleton. If X ends in an empty V (FEN), so will it if concatenated with *-ed*. The regular morphology may not modify this property of the base. (Similarly, -ed is an entry, subject to the LEP: it begins with a C and ends in an E-Governed V.) I assume that this is probably cross-linguistically true for all regular word-based morphological processes that are statable as a symbolic rule[48].

Recall, however, our discussion of Word-and-Paradigm type morphologies. Can we claim that in such systems, there are symbolic rules? Take Latin nominals, for instance. Following Bybee, I assumed that a particular inflected form is used as a "basic" one: it is in this form that the word is stored in memory. I presume that it is the AccSg for each nominal. Now, in order to know what the Nominative Plural of 'apple' is, you need two bits of information: the AccSg form (*mālum*), plus the fact that it is a Neuter noun. Based on this information, one can predict the NomPl, which happens to be *māla*. The same AccSg form, combined with "Masculine", identifies the lexeme 'mast, pole' and yields the NomPl *mālī*. An AccSg form *terram* 'earth' (Feminine) leads to NomPl *terrae* (<ae> = **ai**); etc. Crucially, since I assume that the root is not a lexical entry on its own, there's no way to say that the NomPl of, e.g., 'apple' can be formed using a symbolic rule such as the one in (16):

(16) $[[X]_N a]_N$ 'NomPl of X', where X is a Neuter o-stem noun.

Note that X not being a lexical entry, (16) is not possible. WP-type inflection, however regular, must make reference to the basic *word form* to identify the *paradigm*.

[47] It is impossible not to quote Saussure himself here (1983:68): "No one disputes the fact that linguistic signs are arbitrary. But it is often easier to discover a truth than to assign it to its correct place. The principle stated above is the organising principle for the whole of linguistics (...) The consequences which flow from this principle are innumerable. It is true that they do not all appear at first equally evident. One discovers them after many circuitous deviations, and so realises the fundamental importance of the principle." It is hardly possible for a linguist not to be moved by the depth of insight expressed by these words of the greatest master of linguistic thought.

[48] Rebrus, Siptár, Szigetvári & Törkenczy 1996 suggest that in a rich inflectional morphology like that of Hungarian, things may not be as simple as that. See also Rebrus 2000.

Furthermore, root-based morphology, by definition, means that (bound) roots are not assignable to a syntactic category: it is only by virtue of being combined with a stem-forming element that they acquire "nounhood" or "verbhood", etc[49]. This, nevertheless, is not tantamount to the claim that Latin and similar languages do not have *any* symbolic rules at all (syntactic rules, for example, certainly are symbolic).

6 Morphological typology

The final part of this chapter is devoted to two problems which are interrelated: the nature of fusional vs. agglutinating concatenations as well as the domain of phonology. The division of morphologies into fusional and agglutinating is one of the oldest classifications in linguistic science, going back as early as the first half of the 19th century. The classification, as well known, sets up four language types, viz. *isolating, agglutinating, fusional*, and *polysynthetic*. I will be concerned with *agglutination* and *fusion* only, since isolating languages (ideally) have no morphology (apart from, possibly, compounding): there is a one-to-one correspondence between words and morphemes. Polysynthesis is probably but an extreme case of fusion, i.e., its independent status is dubious, and it does not occur in the languages under investigation, anyway.

It soon became clear, though, that languages do not quite fall neatly into any of these idealised types. Sapir 1921 attempts to make the classification more detailed by separating several aspects of typology, thereby making it possible to categorise a language in a more precise way. He, however, was concerned with the general architecture of particular languages, a problem I do not wish to deal with, so his model is not quite relevant for us. The same goes for later attempts such as Greenberg 1960. The history of the issue is presented in some detail in Goyvaerts 1975.

Considering the fact that the agglutinating/fusional division of affixation is received wisdom in linguistics, being referred to and used all the time, it is somewhat surprising to discover the terminological and conceptual confusion surrounding it. Some definitions will suffice to illustrate the point. Bybee (1985:45) defines the difference as follows:

> In *agglutinative* languages, morphological boundaries coincide with phonological boundaries (especially syllable boundaries) to an extent that makes segmentation of morphemes transparent. In *fusional* languages, there is greater fusion of morphemes characterized by sandhi at boundaries, allomorphy, and simultaneous expression, all of which make morphological segmentation more opaque.

Bybee's definition is mainly phonology-based. By contrast, let us quote the position of Malmkjær (1991:273):

> An agglutinating or agglutinative language is one which attaches separable affixes to roots, so that there may be several morphemes in a word, but the boundaries between them are always clear. Each morpheme has a reasonably invariant shape. (...) An inflecting, flectional or

[49] In Aronoff's 1976 generative model, it is actually possible to state such rules, provided one assumes a truncation rule deleting the AccSg marker. Under such an analysis, $[X]_N$ = the AccSg form, a full entry, and it is concatenated with the selected NomPl suffix; then the AccSg suffix is truncated, so: *māl-um* → *māl-um-a* → *māl-a*. I don't know if the use of truncation rules can be independently motivated for Latin nouns. For truncation rules, see Aronoff 1976:88-97. Aronoff 1994 offers a detailed (different) analysis of Latin inflectional morphology.

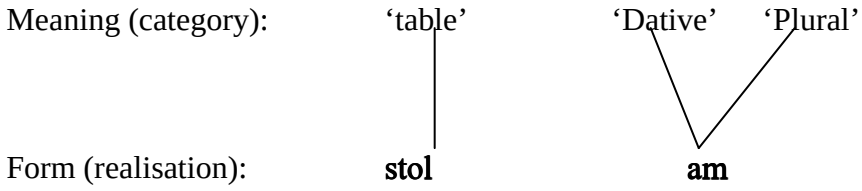
> fusional language[50] is one in which *morphemes are represented by affixes* [emphasis mine — L.K.], but in which it is difficult to assign morphemes precisely to the different parts of the affixes.

This formulation seems at first sight not to differ in essence from Bybee's. Yet, the highlighted part (*morphemes are represented by affixes*) makes it clear that Malmkjær understands the term *morpheme* in an abstract sense, i.e., corresponding to a *function* or *inflectional category*, such as Accusative or Plural, for instance. This is not true for Bybee's formulation, which implies a definition of *morpheme* in a more concrete sense: a morpheme must have phonetic shape. This is in line with Bybee's general position on grammar. Crystal (2003:233f) bases his definition of fusional (inflecting, in his terms) languages on an abstract interpretation of the term *morpheme*, as opposed to *morph*, saying that words in such languages

> typically contain more than one morpheme, but, unlike in agglutinating languages, there is no one-to-one correspondence between these morphemes and the linear sequence of morphs (...) the inflectional forms of words may represent several morphological oppositions (...)

Comrie (1989:43f) defines the difference along the same lines, although he does not adhere to the abstract interpretation of morphemes, saying that "the expression of different categories within the same word is fused together to give a single, unsegmentable morph". Note the use of the term *category* rather than *morpheme*. Comrie (ibid.) uses Turkish and Russian as examples for an agglutinating vs. a fusional language. The DatSg and DatPl forms of Turkish *adam* 'man' is *adam-a* and *adam-lar-a*, respectively: the Dative is expressed uniformly by *-a*, and *-lar* is the regular exponent of Plural. In other words, Turkish nouns do not really have a DatPl form as an autonomous member of the paradigm; indeed, there are no paradigms in the WP sense. Compare this to Russian, where *stol* 'table' has a DatSg *stol-u* and a DatPl *stol-am*: the suffixes simultaneously express Number and Case (and, in the case of *-u*, Gender as well). This is what is meant by Comrie's definition of fusional morphology: categories are "packed together" in one morph — hence the term *fusional*. The simultaneous expression of categories in one morph has also been called *cumulative/multiple exponence*, and such morphs are referred to as *portmanteau* morphs[51]. We may represent this as in (17):

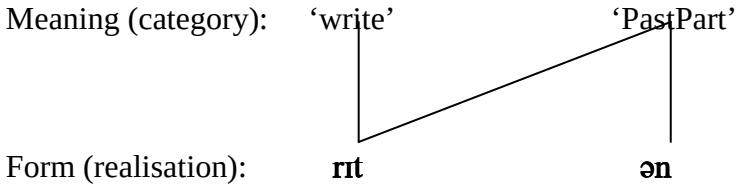
(17) *Multiple exponence*



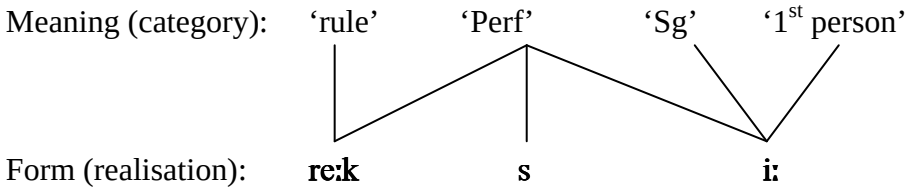
[50] All these terms are in use with the same meaning. The terms *inflecting* or *flectional*, however, can give rise to misunderstanding, because they imply that the language in question has inflection in general, and that's also true for agglutinating languages. I use *fusional*, therefore.
[51] See Spencer 1991:51, for example.

Fusional morphology tends to exhibit interaction across morphs, too. This is called *extended* or *overlapping exponence*, and Spencer (1991:51f) illustrates it using the English Past Participle *written* (reproduced here as (18); the Latin Present Perfect Sg1 form *rēxī* 'I (have) ruled' illustrates both in abundance (19)):

(18) *Extended exponence*



(19) *Multiple as well as extended exponence*



In (18), we can see that 'PastPart' is realised not only as a suffix but as a different allomorph of the root, too. In (19), 'Perfect' is expressed by a suffixal morpheme as well as a root with long vocalism plus the selection of Person/Number suffix (cf. *rĕg-ō* 'I rule', with a short vowel in the root and an Imperfect Present suffix *-ō*)[52].

To sum up, fusional morphology has traditionally been identified according to two criteria: (i) (morpho)phonological behaviour, (ii) the lack of biunique correspondences between function and form (fusion). The following discussion proposes that fusional morphology be defined on the basis of (ii) only.

As a start, I give a working definition of fusion. First, however, a clarification is needed. I use the term *morpheme* in a non-abstract sense, i.e., morphosyntactic categories such as Accusative or Plural are not morphemes: a morpheme must have phonological substance. Accordingly, the Russian DatPl suffix *-am* is one morpheme, since it cannot be segmented according to the two categories it signifies. A possible formulation of fusion is found (20)[53]:

(20) *Fusion means the exponence of two or more meanings in one morpheme.*
It can manifest itself in two ways:
a) *Affixal fusion:* an affix morpheme represents two or more meanings.
b) *Radical fusion:* a root morpheme represents two or more meanings.

[52] The devoicing of the final plosive of the root is, of course, the result of an automatic phonological process, having nothing to do with the morphology.
[53] From now on, I will use the terms *form* and *meaning* in the following sense: *form* is understood as a phonetic string (morph); *meaning* includes grammatical categories (e.g., Accusative) as well as lexical meaning.

Affixal fusion is exemplified by Ru *-am* ‘DatPl’. As the reader can see, it always involves non-lexical meanings, i.e., morphosyntactic categories, in the case of inflectional morphology[54]. Radical fusion is exemplified by *written*, where the root √**rɪt** fuses ‘write’ and ‘Past Participle’. In this case, it is accompanied by extended exponence, since ‘PastPart’ is also expressed by suffixation. This, however, need not be the case: in the case of *wrote*, there is no suffix, and the root itself expresses ‘write’ as well as ‘Preterite’. An important note is in order here: extended exponence, it appears, necessarily implies fusion. If this was not the case, we would have instances where a single meaning is represented by two morphemes, and neither morpheme expresses any further meaning. This does not seem to hold, at least for inflectional morphology[55]. Extended exponence, therefore, can be treated as a side-effect of the *simultaneous presence* of radical fusion and affixal realisation.

Let us now turn our attention to the highly problematic question of when one can talk about radical fusion. To understand why the question is problematic, consider the variation in the phonetic shape of a root caused by its being concatenated with a suffix. First, there are purely phonologically governed alternations. In English, for instance, the phonetic form of the morpheme *tell* differs in *telling* vs. *tells*: the former contains a clear **l**, the second a dark **ɫ**. Could we say, for instance, that the variant **tɛɫ** fuses ‘tell’ and ‘3SgPresInd’? No, because the variation is an automatic consequence of an independent (and mechanical) phonological process, and as a result, **tɛɫ** does not *identify* ‘3rdSgPresInd’. This is not even a case of allomorphy: the morphology does not know about the alternation.

Let us now consider the adjective *long* and its comparative form *longer*. The latter is pronounced with a **g**, the former without it. I discussed this phenomenon earlier, and came to the conclusion that *longer* is lexicalised, rather than being the product of the active morphology. In this case, however, one might rightfully ask, if we could say that the allomorph √**lɒŋg** is, in fact, a simultaneous representative of ‘long’ as well as ‘Comparative’. In order to understand what is at stake, consider the long-vowel variants of certain Latin roots in the Perfect, such as in *rēxī*. This is not the only verb which uses a lengthened root in forms of the Perfect, cf. *vēn-ī* ‘I have come’ (vs. *vĕn-iō* ‘I come’), *vīd-ī* ‘I have seen’ (vs. *vĭd-eō* ‘I (can) see’), etc. In the Latin case, the long root variant is clearly associated with the Perfect. The lengthening is not a consequence of the fact that it is concatenated with a given suffix; indeed, notice that ‘see’ and ‘come’ do not use a suffix *-s* to denote ‘Perfect’. As a result, the term “lengthening” is not quite appropriate: the vowel does not lengthen. Its length is lexically given. I assume that √*vĕn* and √*vēn* (and similar pairs) are, in fact, different morphemes. This assumption may sound radical, but let me elaborate on it. Allomorphs of a morpheme ought to have an identical meaning; √*vĕn* and √*vēn* do not, because the former means ‘come-IMPERF’ while the latter means ‘come-PERF’. *The aspectual difference is lexically encoded in the root.* In other words, this is an instance

[54] Affixal fusion in derivational morphology is much rarer: generally, derivational morphemes express one meaning. Counterexamples include, for example, agentive suffixes distinguishing natural and/or grammatical gender, such as French *-eur* ‘agent-Male’ vs. *-rice* ‘agent-Female’. I will neglect derivational morphology here.

[55] It may hold, however, for semantically opaque derived forms such as *cómparable* ‘equivalent’. This is a matter of analysis. Within the domain of inflection, circumfixes could serve as an example, but only if we treat them as two separate morphemes rather than a single discontinuous one. I leave these questions open.

of suppletivism[56], much like E *sing* and *sang*: 'come' in Latin is expressed by two morphemes.

Returning to *longer*, the same cannot be claimed. The bound root √**lɒŋg** does not lexically encode 'Comparative' — it is found in the Superlative, too; cf. also *simple* **ˈsɪmpl̩**, whose bound variant, √**sɪmpl**, is found not only in the Comparative and the Superlative, but in the adverb *simply* as well. In these cases, the alternation is a consequence of the fact that the bound root sits together with a suffix within a synthetic domain, and the difference in phonetic interpretation follows from this. As I said earlier, I regard the variants **lɒŋ** and √**lɒŋg** as allomorphs, the context for the allomorphy being the lexical vs. morphological nature of the concatenation.

7 Fusion versus synthesis

Let me now attempt to define what a fusional concatenation is. I propose that *a morphologically complex word form is fusional if and only if it exhibits fusion, either affixal or radical, as defined above*. This definition omits morphophonemic criteria, and it has an important consequence: the terms *fusional* and *synthetic* are not synonyms. It may be true that fusional morphology tends to be synthetic, which is probably a reflection of the fact that fusion in the morphological sense (which inevitably involves function or meaning, as it follows from the very definition of fusion) is preferably *not* projected into the phonology (by *not* marking boundaries); but there is no equivalence. Neither is *agglutinating* the same as *analytic*. An agglutinating concatenation is one which fails to exhibit any fusion; an analytic concatenation is one whose phonology reflects its morphological complexity. Let me now give some examples to convince the reader that the Kayean classification *analytic/synthetic* is not a reincarnation of the old *agglutinating/fusional* division: instead, using the definitions I have provided, it is possible to draw a line between the two. (The line, alas, will not always be clear in practice, but the principle should be clear; I will return to the problematic cases later on.)

First, consider the English 3SgPresInd suffix *-(e)s*, as in *eats, watches, bleeds*, etc. According to the Kayean classification, the suffix is analytic, just like the homophonous nominal Plural *-(e)s*: the allomorphy it exhibits is phonologically conditioned, and, more importantly, its concatenation with the base yields monomorphemically impossible sequences, such as **dz, mz, ts**, etc., as in *bleeds, comes, eats*, respectively[57]. Yet, it exhibits multiple affixal fusion: it simultaneously expresses Person, Number, Tense and Mood. It is universally accepted that multiple exponence is symptomatic of fusional affixation, and I have adopted this view as well: as a result, we have an analytic non-agglutinating suffix. Note that the Plural *-(e)s* is agglutinating, as it only expresses Number.

For a reverse situation, consider the Hungarian nominal Plural, realised (in regular cases) as *-k* or *-ok/-ek/-ök*, cf. *hajó-k* 'ships', *pár-ok* 'pairs', *kép-ek* 'pictures', *kör-ök* 'circles'[58]. This suffix is *par excellence* agglutinating in the sense that it only expresses 'Plural', and it takes further suffixes to mark cases, cf. *hajó-k-nak* 'ship-DatPl', compare *hajó-nak* 'ship-DatSg' (just like Turkish). On the other hand, it be-

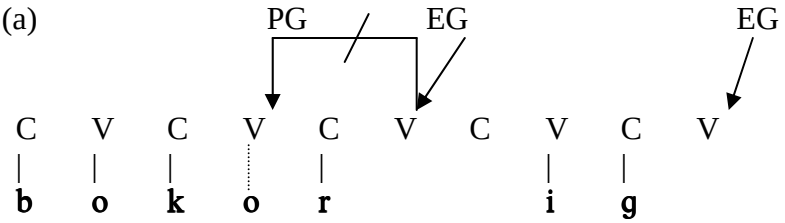
[56] Suppletevism is understood, of course, in a non-historical sense, i.e., phonological unrelatability.

[57] Though *watches* and other cases where the base is sibilant-final are problematic, since there is obviously a melodic restriction at work. I leave this question open.

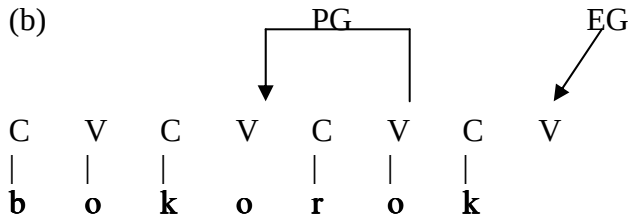
[58] The analysis of Hu data is based on Rebrus 2000. The acute accent indicates length; <ö> and <ü> are, of course, **y** and **ø**, resp. Note that the choice between *-ok/-ek/-ök* is dictated by vowel harmony; the details are irrelevant.

haves synthetically in many (if not all) cases. For example, if the last syllable of the stem contains an alternating vowel (floating segment), it regularly remains silent in the plural, e.g. *bok<u>o</u>r* 'bush' ~ *bokørok* 'id.-PL', *tük<u>ö</u>r* 'mirror' ~ *tükørök* 'id.-PL', etc. (where the **ø**, of course, indicates zero, not a front rounded vowel). Compare this to the Terminative suffix *-ig*, e.g., *bokorig* 'bush-TERM', *tükörig* 'mirror-TERM'. The latter behaves just like English *-ing*: it's analytic, which is why the *o/ö* surfaces (attaches to its V position): it is followed by a C + an E-Governed FEN: and FENs cannot govern floating melodies. In *bokrok*, however, it is followed by a C + a full vowel *within the same domain*, hence it is properly governed and must remain silent (this is exactly parallel to E *travelling* vs. *simply*). Let me give the full representations for the sake of clarity[59]:

(21) (a)



(b)



Here, then, we have a situation where an agglutinating suffix is synthetic. It would not be possible to claim that √**bokr** is an exponent of the category 'Plural': it is found with all synthetic affixes.

The above examples are but illustrations; further empirical evidence is needed to support or falsify my claim. Let me now turn to problematic cases. I take the English irregular weak preterites, such as *fed* or *kept*, as an example. Consider the former first, i.e. *fed* (cf. *feed*). The only difference between the Present and the Preterite is in the root vowel, much like in the case of strong verbs: there is no overt suffix. It appears that this form is, therefore, fusional: the single morpheme **fɛd** means both 'feed' and 'Preterite', exemplifying radical fusion. Take now *kept*: what do we do with this form? As there *is* an overt Preterite suffix, whether the vowel difference is a simultaneous *signifiant* of 'Preterite' or just a side-effect of the concatenation boils down to the answer we give to the following questions:

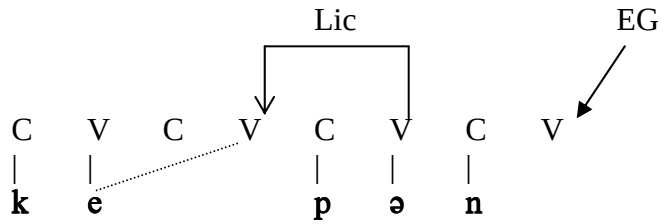
1) Can the difference be exhaustively derived from the fact of *kept* being synthetic? In other words, is the difference in the form of the root an automatic consequence of the syntheticness of the concatenation (as in the case of *long* ~ *longer*)? If so, the form is not fusional. If not, a further question must be considered.

[59] The **o** in *-ok* is analysable as a floating segment itself; this is not important for us here.

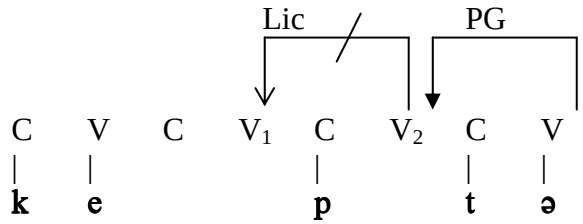
2) Is the **iː ~ ɛ** alternation unique to the Preterite or not, in a parallel fashion to the short ~ long difference in the Latin Imperfect ~ Perfect roots? If yes, the form is fusional; if not, the problem is rather complicated.

Let us consider *kept* in this light. Our answer to the first question, given the framework we have adopted, is a definite "no". There is no possibility to derive √**kɛp** from **kiːp**, or vice versa, or to derive both from a third form. The simple reason for this is that the vowels are qualitatively too different. Phonology, in our model, may not modify melody in this way unless there is an environment providing melodic trigger. It is perfectly possible, for example, to phonologically express an alternation between a high front and a mid front vowel if there is an adjacent segment with an appropriate melodic content. For example, imagine a language in which a mid front vowel of the root alternates with a high front one if there is a high front segment in the following syllable. In fact, Germanic exhibits precisely this kind of process. In Proto-Germanic, an *e* became *i* if the following syllable contained an *i* or a *j*[60]. The root *√*et* 'eat', for instance, appeared in this form in the infinitive **etana*[61]. In the 2nd and 3rd person of the SgPresInd, on the other hand, it appears with an *i*: **it-is*, **it-iþ*, respectively. As long as the alternation is phonologically transparent, one can analyse it within SCV or GP easily: the element **I**, present in the vowel of the suffix, creates a natural phonological environment for the raising of *e* to *i*[62]. But in the case of *keep ~ kept*, there is no such environment. The phonological treatment of this alternation is therefore ruled out by the Non-arbitrariness principle assumed both in SCV and GP: phonological events must have phonological causes. Note that in the SCV version I adopted, the length difference itself is not problematic. Indeed, the Middle English (ME) ancestral forms *kēp(en)* and *kĕp(te)*, displaying the same vowel (= **e**) qualitatively speaking, can be derived from a lexical form containing a long vowel, assuming that the Preterite form is synthetic; the alternants are shown in (22):

(22) (a)



(b)



[60] See Lass 1994:24f.

[61] In fact, traditional reconstructions would give the infinitive form **etanam*. I am reluctant to accept this reconstruction, for the simple reason that there is no proof in the Germanic languages for the final *-m*. It is reconstructed because PIE did have it: but this is no reason to assume it for PGmc. Reconstruction should go backwards, not forwards, in time (see, e.g., Hall 1950 for arguments).

[62] I leave aside the question of how exactly this process would be formalised in GP.

The **e** in *kĕpte* may not spread into the empty V_1 position because V_1 is unlicensed: V_2 is properly governed, which is why it cannot license V_1. In ME, therefore, we can exclude the possibility that the Preterite form *kĕpte* is fusional: the shortness of the vowel is an automatic consequence of the syntheticness of the form. In MoE, however, this solution is not available: *keep* and *kept* are not related to each other phonologically. Hence we must ask ourselves the second decisive question: is the alternation unique to the Preterite?

At first sight, the answer is no: the same alternation occurs in the PastPart, as well as in many other instances, cf. *serēne ~ serĕnity, deep ~ dĕpth*, etc. Yet, as I pointed out already, there are instances (e.g., *fĕd, mĕt*, etc.) when the alternation *is* the only exponent of the Preterite. I would therefore make a tentative suggestion that I term the *Uniform Interpretation Principle*:

(23) *The Uniform Interpretation Principle (UIP)*
If a morphosyntactic category *x* for a given word class *Y* is expressible by radical fusion *only*, where α is the alternation formally realising the fusion, then all occurrences of α for members of *Y* specified for *x* are to be interpreted as realisations of the same fusion.

Specifically, as the **iː ~ ɛ** alternation (= α) may for a given word class *Y* (= a lexically defined subset of Verbs) serve as the sole exponent of the Preterite (= *x*), as in *fed, met*, etc., the vowel alternation in *keep ~ kept*, as well as *dream ~ dreamt, leave ~ left*, etc., is to be interpreted as the realisation of radical fusion. Preterites of the *kept* type, therefore, are understood as instances of extended exponence.

To mention an example of the same kind from another language, I suggest the same treatment for Umlaut as the expression of 'Noun Plural' in German. As the vowel alternation can serve as the only exponent of 'Plural', as in the case of *Vater* **ˈfaːtɐ** 'father-NomSg' ~ *Väter* **ˈfɛːtɐ** 'father-NomPl' etc., I take it to be as the exponent of the same category even if there is an overt suffix, cf. *Stuhl* **ʃtuːl** 'chair-NomSg' ~ *Stühle* **ˈʃtyːlə** 'chair-NomPl'. Note that Umlaut is by far not unique to noun plurals in German.

The principle I propose may seem to be but a tricky "way out" of the trap. Yet, it embodies a very strong claim: notably, that for speakers of English the vowel alternation is as much part of the expression of the Preterite as the presence of the suffix. Intuitively speaking, this sounds reasonable, and it has an advantage: it can be tested (i.e., verified or falsified) psycholinguistically[63]. Furthermore, it is not even a new idea: instead, it is but one instantiation of a recurrent theme, the most famous expression of which is the "once a phoneme, always a phoneme" principle. Once radical fusion, always radical fusion.

We are still left with a few unresolved cases. English abstract nouns in *-th*, for instance, always show vowel alternations if the base adjective has a long vowel, including **iː ~ ɛ**, as in *deep ~ depth*. Yet, the suffix is always present. Is suffixation with *-th* an instance of fusion or not? We could say it is by relaxing the UIP, claiming

[63] Umlaut in nominal plurals in German has been spreading. The word *Baum* 'tree' (cognate with E *beam*) "ought" to have a Pl *Baume*, but it has *Bäume* with Umlaut (it did not have it in Middle High German (*boum ~ boume*). In colloquial German, one often hears the noun *Hund* 'dog' in the Plural form *Hünde*, not yet accepted in the literary language. These are but two examples, and the spreading of Umlaut may support UIP. Indeed, it is in line with Kuryłowicz's laws of analogy.

that if the alternation *can* serve as the unique exponent of some meaning, it is always to be interpreted as an instance of fusion (for any instance independent of class membership or morphosyntactic/lexical meaning). I am not sure whether this relaxation is desirable, and I leave the question open.

This, however, is not the end of the story. I have argued for *kept*-type preterites being fusional based on the following assumption: alternants are not related to each other phonologically. I assumed a SCV perspective during the discussion. Nevertheless, the question whether particular alternants are relatable to each other phonologically is theory-laden. As I relied heavily on phonological relatability when defining fusion, it is impossible to avoid this problem.

Consider the model of SPE. In this model, *keep* and √*kep* are derived from a common underlying representation via phonological rules proper. A simplified SPE-type derivation of both forms is given in (24):

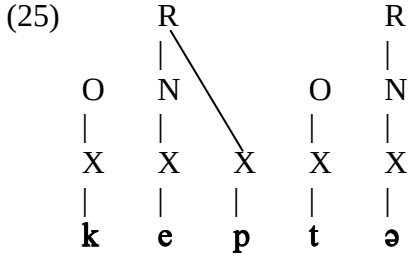
(24)	***UR***	**keːp**	**keːp + t**
	PCS	N/A	kept
	VS	kiːp	N/A
	Voicing assimilation	N/A	N/A
	SR	**kiːp**	**kɛpt**

The crucial point is the following: if one adopts a model like classical generative phonology, *kept*, very simply, is by no means fusional. The reason for this is that the phonology is responsible for the difference in form: as we can see from (24), the SR's of the root are derived from an identical UR. Morphologically speaking, there's no difference: the root alternants are not different morphemes — not even "real" allomorphs, in fact! By contrast, I claim that (using the SCV model as I have done) the alternants are, in fact, separate morphemes.

So far, this is probably not very surprising: SPE and SCV are a world apart in their conception of what phonology is and what it is not, which is why the difference is almost self-evident. I would like to point out, however, that even seemingly little divergences may count. Specifically, I proceed to compare the status of ME *kĕpte* with regard to fusion in the light of SCV vs. GP. The basic assumptions as to what constitutes the domain of phonology are, by and large, common to both theories. Yet, if one attempts to derive ME √**keːp** as in *kēpen* and √**kep** as in *kĕpte* in a Kayean GP framework, one runs into difficulties. First, let me remind the reader that in the model I assume the two ME root variants are relatable phonologically, cf. (22). Let us now try to do the same in a GP formalism.

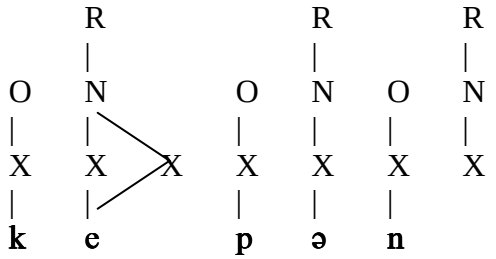
First, *kĕpte* must be considered synthetic: otherwise, we would have no reason for the shortening. If, however, it is synthetic, it must be represented as in (25):

(25)



Note that monomorphemic occurrences of **pt** are Coda-Onset clusters in GP; accordingly, they must be represented as such in synthetic domains. Compare this to the GP representation of *kēpen* in (26):

(26)



There is a fundamental problem with relating the two forms to each other phonologically: such a step would clearly violate the Structure Preservation Principle, since constituent structure should be altered. The Nucleus in the root should be deprived of its second X slot, and the **p** would have to move from an Onset into a Coda. Therefore, a phonological derivation of the root alternants from a common underlier is rendered impossible.

As the alternants are not relatable phonologically, the vowel alternation will inevitably be interpreted as lexically given. As a result, one must rely on the Uniform Interpretation Principle. As in ME (at least in early ME) there are no forms in which the shortening alone denotes the Preterite (Preterites such as *fed, met* had a geminate, i.e., **fed-də, met-tə**), we come to the conclusion that the ME forms are not fusional. Accidentally, therefore, SCV and GP arrive at the same result, but only accidentally, because the two theories predict the possibility of different results, and it is only due to the UIP, a principle independent of GP or any other phonological theory, that GP yields the same result as SCV.

8 Conclusion

I hope to have presented a plausible and coherent model of how morphology and phonology interact, based on Kaye's and Scheer's models as well as the Words-and-Rules approach of Pinker and others. I proposed a definition of fusion, but it must be noted that it is not in itself sufficient to decide on particular cases: it must be supplemented by a theory of phonology. The choice of different theories may yield different results, but this is, after all, not surprising: theories exist to make predictions. It is only natural that different theories do not predict the same outcome.

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