

# On the difference between a $\surd$ and a root

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**Abstract.** We propose a theory of root suppletion based on a single syntactic  $\surd$  node. We show that for such a theory to be possible, a distinction must be made between syntactic  $\surd$ s and morphological roots. We argue against standard approaches to root suppletion like Harley (2014), Haugen and Siddiqi (2013)), who differentiate  $\surd$ s in syntax.

## 1 Introduction

In traditional approaches to morphology, the notion of root tends to be described in terms of form, namely as “what is left when all morphological structure has been wrung out of a form” (Aronoff 1994). In syntax, such morphologically defined roots mostly coincided (until recently) with the traditional lexical categories. However, with the progress of structural decomposition, our conception of lexical categories began to change rather profoundly. In particular, what happened is that most of their grammatical properties were transferred from the lexical head onto functional projections. When this happened also to the categorial label (so that the functional categories *a*, *v*, *n*, *p* appeared where the earlier tradition had A, V, N and P), all grammatically relevant information has been dislocated to functional heads (Marantz 1995, Borer 2005). Ramchand (2008) takes the transfer of grammatical properties to functional heads to its logical endpoint by eliminating the  $\surd$  node altogether, with functional heads all the way down instead.

The consequence is that in a number of current approaches, the root has turned into a special kind of a syntactic object. Apart from having no grammatical properties (as these are now seen as properties of functional heads), a large part of the literature proposes that it also lacks phonological and semantic properties. The reasons for this position go back to Zwicky’s *Principle of Phonology Free Syntax* (Zwicky 1969, Zwicky and Pullum 1986), which says that “[i]n the grammar of a natural language, rules of syntax make no reference to phonology” (Miller et al. 1997:68). For instance, there is no rule such that if a verb begins with a labial, it moves to T, etc. If roots have no phonology in syntax, the Principle of Phonology Free Syntax simply follows from this fact.

A similar observation has been made for concepts associated to roots. For instance, whatever the difference between *cat* and *dog* on the conceptual side, this difference does not trigger differential syntactic behaviour. In sum, as Marantz (1995) puts it “[n]o phonological properties of roots interact with the principles or computations of syntax, nor do idiosyncratic Encyclopaedic facts about roots show any such interactions.”

The result is that a number of current approaches use the symbol  $\surd$ , which is an object devoid of syntactic, phonological or semantic properties, and works as a pure placeholder for the insertion of the morphological root. Within this largely consensual position, there is debate concerning the number of such  $\surd$ s. Some argue that there is

only a single  $\sqrt{\phantom{x}}$  (Halle and Marantz 1993, Marantz 1996, De Belder and Van Craenenbroeck 2015), while others propose that there is potentially an infinity of  $\sqrt{\phantom{x}}$ s, individuated through the use of numerical indices (Pfau 2000, 2009, Harley 2014).

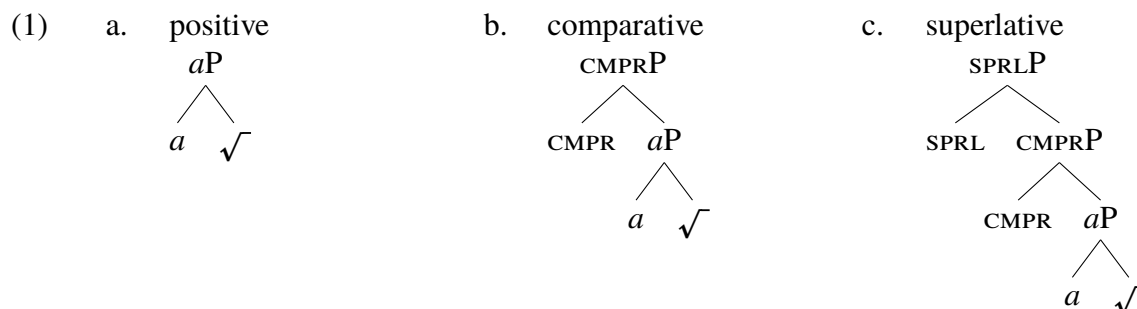
The reasons for proposing the (potentially infinite) number of roots has to do with root suppletion. As has been pointed out already by Marantz (1995), if root suppletion exists, then roots have to be somehow individuated in syntax (the argumentation leading to this conclusion will be presented in section 2). An initial hypothesis for the single  $\sqrt{\phantom{x}}$  proposal has thus been that root suppletion does not exist. However, Haugen and Siddiqi (2013) and Harley (2014) have argued, convincingly to our mind, that root suppletion does in fact exist, which then necessitates the individuation of  $\sqrt{\phantom{x}}$ s in syntax. In order to both individuate roots in syntax, and at the same time avoid assigning them phonology or meaning, Harley (2014) follows Pfau (2000, 2009) in differentiating roots in syntax by a unique numerical index. (The notation  $\sqrt{\text{DOG}}$  is a version of the same proposal.)

The consequences of this proposal are sub-optimal. While the spirit of Phonology Free Syntax is preserved (since e.g.  $\sqrt{95}$  has no phonology in narrow syntax), the architecture of the system is such that syntactic rules can still in principle differentiate between *cat* and *dog*, since they have different numerical indices. The proposal thus does not go all the way to making the phonological and conceptual properties of individual roots irrelevant to syntax in the same way as the single  $\sqrt{\phantom{x}}$  hypothesis.

In this paper, we show how to make the single  $\sqrt{\phantom{x}}$  approach compatible with root suppletion. We achieve this by phrasal spellout. Phrasal spellout allows for the possibility that roots in the morphological sense (i.e., lexical items such as *book*, *smart*, etc., henceforth roots) spell out multiple syntactic nodes, and therefore become different from roots in narrow syntax, henceforth  $\sqrt{\phantom{x}}$ . We show that once this distinction is introduced, a single  $\sqrt{\phantom{x}}$  theory becomes viable again.

## 2 The nature of $\sqrt{\phantom{x}}$

The question whether there is only a single  $\sqrt{\phantom{x}}$  in narrow syntax or an infinity of them is intimately related to the issue of suppletion. In presenting the argument, we shall limit ourselves to the empirical domain of adjectival degrees (positive, comparative, superlative). We do so for the reason that this domain has been recently thoroughly investigated by Bobaljik (2012), both with respect to suppletion as well as the functional heads involved. The core of the proposal in Bobaljik 2012 is that in order to capture certain facts about suppletion (specifically the \*ABA generalisation), the positive degree of an adjective must be contained inside the comparative, which in turn must be contained inside the superlative. A version of this proposal is shown in (1).



We go slightly beyond the letter of Bobaljik’s proposal in that we have decomposed his lowest projection, A, reminiscent of the traditional lexical categories, into a  $\sqrt{\quad}$  node and a ‘little *a*’ node, as customary in the literature where  $\sqrt{\quad}$ s are used. However, the reasoning that we will develop here for the  $\sqrt{\quad}$  node would carry over, *mutatis mutandis*, to Bobaljik’s A, which too would have to come in an infinite variety (like  $\sqrt{\quad}$ ).

In the Distributed Morphology (DM) framework, root suppletion is accounted for by contextual specification of Vocabulary Items (VIs), which insert phonology under the  $\sqrt{\quad}$  terminals. For instance, to account for the different forms of the items inserted under  $\sqrt{\quad}$  in the positive vs. comparative, the VIs that apply at the  $\sqrt{\quad}$  node are sensitive to the presence or absence of a comparative (CMPR) node higher up in the structure:<sup>1</sup>

- (2) a.  $\sqrt{\quad} \Leftrightarrow \text{bett- / \_\_\_ ] a ] CMPR ]}$   
 b.  $\sqrt{\quad} \Leftrightarrow \text{good}$

These VIs are not in competition with each other in the positive degree, as there is no CMPR head there (recall (1c)), so that only (2b) meets the structural description, and *good* will be inserted. In the comparative, given in (1b), however, a competition between (2a) and (2b) will arise, since the structure generated in syntax meets the structural description of both rules. The outcome of that competition is determined by the Elsewhere Principle (Kiparsky 1973, Halle 1997:428), which states that a more specific rule takes precedence over a more general one. (2a) thus wins in the competition in the comparative, since it is more specific than (2b). As a result, *bett-* is inserted in the comparative. The CMPR head is spelled out as *-er*, yielding the form *bett-er*, little *a* being silent.

Now the VI in (2b) as currently formulated is just a fragment of the English Vocabulary. If left on its own, it will insert *good* under any terminal  $\sqrt{\quad}$  node. One way of extending our fragment will therefore be to add more roots:

- (3)  $\sqrt{\quad} \Leftrightarrow \text{good, nice, happy, small, intelligent, bad, ...}$

What this (extended) rule achieves is that there is a free choice of insertion of a variety of roots in the positive degree under  $\sqrt{\quad}$ . But now a problem arises with respect to (2a): since it is more specific than (2b), it is also more specific than (3) (which is in relevant respects like (2b)). The result is that *bett-* will be inserted under  $\sqrt{\quad}$  in any comparative structure, an obviously wrong result. This problem in the analysis of root suppletion was pointed out by Marantz (1996), and it is a consequence of the format of the rule (2a): it basically says that *just about any*  $\sqrt{\quad}$  has the form *bett-* in the context of a comparative. Before we discuss possible solutions, notice finally that this problem is actually independent of whether we have a  $\sqrt{\quad}$  node, a lexical A node, or a functional F node at the bottom of the tree; the whole reasoning carries over to these proposals as well.

In an attempt to turn the apparently wrong prediction to the framework’s advantage, Marantz (1997) takes the radical view that root suppletion does not exist. If that is so, the apparent counterexamples like *bad-worse* (or *go-went* and others) must involve the

<sup>1</sup>Bobaljik adopts the adjacency condition on suppletion, and so the CMPR node triggering the application of the rule (2a) appears to be too far away from the  $\sqrt{\quad}$ , being separated from it by the intervening *a*-head. Nevertheless, due to certain intricacies of the ABC suppletion pattern, there is a way to make  $\sqrt{\quad}$  sensitive to the CMPR node despite the nonadjacency even in Bobaljik’s system, as reviewed in (Caha 2017:sect. 3.1). We do not elaborate on this issue here as it is orthogonal to our main point.

functional vocabulary. This entails that unlike in the case of *cat* and *dog*, there is some feature in the syntax that distinguishes functional adjectives like *good-bett* and *bad-worse* from lexical adjectives like *happy* etc., which realise the  $\sqrt{\quad}$  head. If this is so, then *bett-* is not a comparative of *just any*  $\sqrt{\quad}$ , but the comparative of *one particular* functional feature or functional head, and the problem disappears.

However, Harley (2014) argues against this position on empirical grounds (cf. Haugen and Siddiqi 2013), because her facts suggest that suppletion targets not only functional heads, but also  $\sqrt{\quad}$ s. In order to deal with the problem pointed out by Marantz, and without giving up on Phonology/Concept Free Syntax, she claims that  $\sqrt{\quad}$ s are individuated in the syntax, i.e., prior to vocabulary insertion, by means of a numerical index. Once *bett-* is not a comparative of *just any*  $\sqrt{\quad}$ , but a comparative of *one particular*  $\sqrt{\quad}$  with a unique index, the problem also disappears.

Let us show how this works for both Marantz' and Harley's proposal by considering the VIs for the suppletive pair *good-bett* in (4), which are slightly adapted from Bobaljik (2012) to fit the trees in (1) above:

- (4) a.  $\sqrt{\text{GOOD}}$   $\Leftrightarrow$  *bett-* /  $\_\_\_\_$  ] *a* ] CMPR ]  
 b.  $\sqrt{\text{GOOD}}$   $\Leftrightarrow$  *good*

In Marantz' idea,  $\sqrt{\text{GOOD}}$  is a syntactic terminal with a reference to at least one functional feature. Nonsuppletive adjectives are inserted by the free-choice rule (3) (except that it would no longer contain *good* as a choice). As a consequence, the VIs in (4) only compete with each other, not with (3), since the VIs in (4) apply to different syntactic environments than those in (3).

In Harley's idea,  $\sqrt{\text{GOOD}}$  in (4) would be written more accurately as  $\sqrt{93}$  (or any other kind of index that would uniquely identify this root among all others). The pre-syntactic lexicon in this view contains an infinity of different, individuated,  $\sqrt{\quad}$ s (see also Pfau 2000, 2009). Free choice of a root is then not exercised at the point of insertion (as in Marantz' approach), but at an earlier point, namely in the selection of items for the numeration, i.e., when the elements that will serve as the input to the syntactic computation are selected. At the point of insertion, the competition is consequently restricted to the two VIs in (4), modulo the replacement of  $\sqrt{\text{GOOD}}$  by  $\sqrt{93}$ .

In sum, in order to deal with suppletion, both approaches must somehow identify the unique lexical item that undergoes suppletion, and limit the competition to those VIs which stand in a suppletive relation to this particular item. Marantz (who works with just a single  $\sqrt{\quad}$ ) makes suppletive items unique by placing them in the class of 'functional' heads. Evidence against this position has been presented by Harley (2014), who argues that suppletive verbs in Hiaki have rich lexical meanings, for which an analysis in terms of functional heads is unlikely. To deal with the issues, she proposes that  $\sqrt{\quad}$ s are individuated by an index. But if  $\sqrt{\quad}$ s really lack any constant substantive property that allows the syntax to identify them, one needs to seriously wonder why they should be differentiated in narrow syntax at all. By making them distinct, Harley allows for a theory where *cat* and *dog* have different syntax after all: there is no conceptual reason why syntax should not be able to make reference to this distinction in its inner workings.

### 3 Cyclicity and Phrasal spellout

In this section, we describe the main features of an account that allows for root suppletion with just a single  $\sqrt{\quad}$  in syntax (or without any  $\sqrt{\quad}$  at all, if  $\sqrt{\quad}$ s are to be eliminated, as in Ramchand 2008). What makes such a theory possible is cyclic phrasal spellout, where suppletive items stand in a containment relationship.

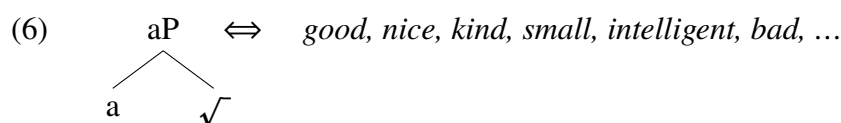
In order to present this idea in an accessible way, we will switch to the suppletive pair *bad*—*worse*, which has been treated by nonterminal spellout also in Bobaljik (2012). We shall then return to *good*—*bett-er* in the following section. The relevant lexical entries (with the required containment relation) are given in (5). Regardless of the treatment of *bad* (to which we return), the important point here is that *worse* spells out a nonterminal node properly containing the structure that *bad* spells out.



Independent support for (5b) comes from the fact that *worse* lacks the regular *CMRP* marker *-er*. This is accounted for if its lexical entry pronounces the terminal where *-er* gets usually inserted, as is the case in (5b). Similarly, the reason why *bad* spells out a full phrase is that it shows no overt *a*, differing from adjectives like *risk-y*, *cheek-y*, etc.

We will get to the technical details of nonterminal insertion shortly, but the main intuition is this: when syntax builds just the *aP* (corresponding to the positive degree), only *bad* will be inserted, because its lexical entry provides an exact match for the syntactic tree. The lexical item for *worse*, in contrast, is not an exact match: it is too big. ‘Too big’ may be understood either in an absolute sense (it is not a candidate for insertion at all), or in a relative sense (it is a candidate, but it is too big relative to *bad*). When syntax builds *CMRP*, only *worse* is an exact match and will be inserted, this time because *bad* is too small (either in the absolute or in the relative sense).

There are several ways of formalising the phenomenon that an exact match gets inserted, and not a lexical item which is either too big or too small. For instance, Bobaljik (2012) relies on the Subset Principle augmented by Radkevich’s (2010) Vocabulary Insertion Principle (VIP). On this account, the Subset Principle makes sure that *worse* is too big for the positive, and the VIP makes sure that *bad* is too small for *CMRP*. Another available option, which we develop and explain later, adopts the Superset Principle (Starke 2009). For now, the main point is that no matter how the ‘too big/too small’ difference gets encoded, we initially run up against the same conundrum as the terminal-based proposal in section 2. In order to see that, let us once again turn to the fact that there are a number of roots in free competition with *bad*:



Again, the problem is that once syntax builds the *CMRP*, all of these are going to be

‘too small’ compared to *worse*. The problem resides in the fact that the lexical entry in (5b) says that whenever the syntax combines the  $\sqrt{\quad}$  node with *a* and *CMPR*, *worse* will be an exact match for such a constituent. Other lexical entries might be candidates for insertion as well, but since they are not an exact match like *worse*, *worse* will win, independently of how the competition is to be implemented.<sup>2</sup>

However, in the new setting based on phrasal spellout, a new type of solution to this problem becomes available, if one more ingredient is added into the mix. The addition that is needed is that spellout proceeds bottom-up, as in Bobaljik (2000, 2002), Embick (2010) or Starke (2009, 2018). We phrase this as (7), noting that (7) need not be seen as an axiom, but rather the consequence of two proposals, which are given in (8).

(7) *Bottom-up spellout*: If AP dominates BP, spell out BP before AP.

- (8) a. Merge proceeds bottom up.  
 b. Spellout applies after every Merge step.

The two proposals introduced in this section—namely the bottom-up nature of spellout and the fact that it targets non-terminals—bring us to a single- $\sqrt{\quad}$  syntax that can accommodate root suppletion. In order to see this, consider the fact that spellout (as it proceeds to higher and higher nodes) must keep track of what it has done at lower nodes, so that it can ship this information to PF at some relevant point.<sup>3</sup> In this type of architecture, the problem is solved if we require that the phrasal lexical item (5b) can apply at *CMPRP* *only if* the lower *aP* node has been spelled out by *bad*. Equivalently, *worse* is inapplicable if (by free choice of root) we have inserted a different lexical entry than *bad* at *aP*.

In order to encode this proposal, let us rewrite the lexical entry for *worse* as in (9), where instead of the *aP* node, we write *bad*. Following Starke (2014), we refer to this device as a pointer. The entry reads as follows: insert *worse* at *CMPRP*, if the sister to *CMPRP* (i.e., *aP*) has been spelled out as *bad* at a previous cycle.

(9) 
$$\begin{array}{c} \text{CMPRP} \quad \Leftrightarrow \quad \text{worse} \\ \swarrow \quad \searrow \\ \text{CMPR} \quad \text{bad} \end{array}$$

The insertion of *worse* at *CMPRP* will override the previous spellout *bad*. Overriding is a general property of cyclic bottom-up spellout. When spellout is successful at a given node, this means that a matching lexical entry has been found. This, however, does not mean that this lexical entry is immediately shipped to PF. It is remembered, and it will eventually be sent to PF; but if later on, a lexical item matching a higher node is found, then the first (lower) candidate is not sent to PF at all: only the higher spellout survives.

Recall now that from the perspective of a single- $\sqrt{\quad}$  theory, the problem with suppletive lexical items like (5b) was that they could overwrite just any root. The pointer device introduced in (9) is here to restrict unlimited overriding: *worse* can only override *bad*. Caha, De Clercq, and Vanden Wyngaerd (to appear) encode this by the so-called Faithfulness Restriction:

<sup>2</sup>Our discussion of this issue is indebted to Michal Starke (p.c.).

<sup>3</sup>This could be a phrase or some larger chunk of structure relevant for the locality of suppletion, see, e.g. Embick (2010), Merchant (2015), Moskal and Smith (2016).

(10) *Faithfulness Restriction (FR, preliminary)*

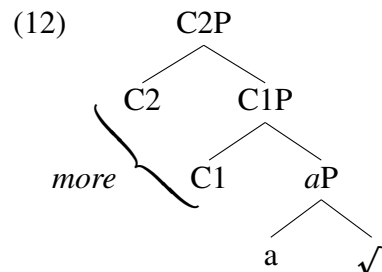
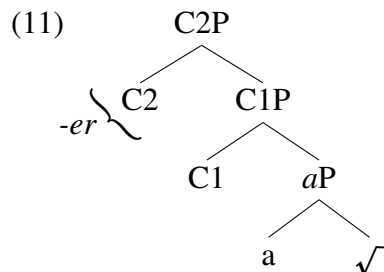
A spellout  $\alpha$  may overwrite an earlier spellout  $\beta$  iff  $\alpha$  contains a pointer to  $\beta$

To conclude, let us stress the crucial point, which is that we now have a way to account for root suppletion with just a single  $\sqrt{\quad}$  (or a single A, or, potentially, just functional heads all the way down). To achieve this, we have introduced a bottom-up phrasal spellout. In this kind of system, insertion at the  $\sqrt{\quad}$  node is free. But once the choice has been made, the Faithfulness Restriction limits the overriding of the initial choice only to items which point to it. This way, we can restrict *worse* to be the comparative of *bad* using a pointer, rather than an arbitrary index on  $\sqrt{\quad}$  in the syntax.

## 4 The nature of roots

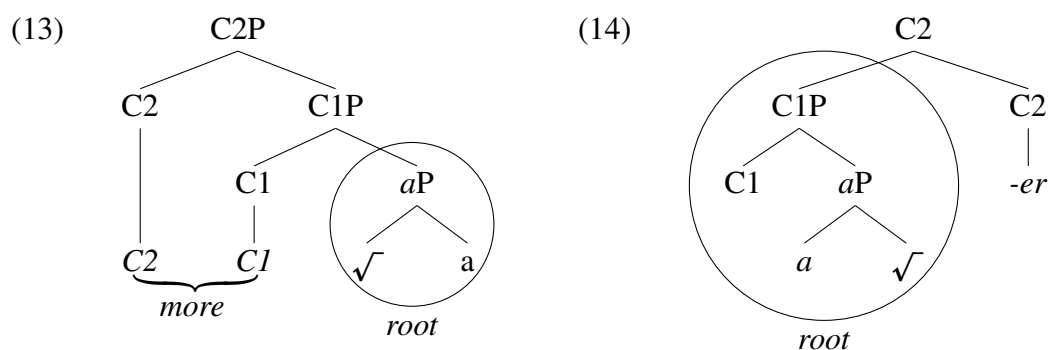
As highlighted above, from the perspective of Phonology/Concept Free Syntax, the zero theory of  $\sqrt{\quad}$ s is that there is only a single  $\sqrt{\quad}$ . This was clearly argued for in the early work in DM (Marantz 1997), and Harley's retreat from this position is sub-optimal. Here, we argue that such a retreat is not necessary if cyclic phrasal spellout is adopted. However, the success of this approach depends in part on how it applies in cases where suppletion is accompanied by regular morphology, e.g. in pairs such as *good—bett-er*: it seems impossible to have *bett-* both spell out CMRP (as required by the single  $\sqrt{\quad}$ -theory), and at the same time, leave CMRP available for the insertion of *-er*.

In this section, we suggest a solution to this problem. The solution is based on the observation (to be illustrated more extensively in sections 5 and 6 below) that in cases where suppletion co-occurs with overt marking, the overt marking tends to be 'reduced', often a substring of a different, nonreduced marker. To see this on an example, let us turn back to English. Here we have *-er* and *more* for the comparative, and *-est* and *most* for the superlative. Clearly, *-er* and *-est* are morphologically reduced compared to *more/most*, if only because they are affixes while *more* and *most* are free-standing items. Further, there are morphological and semantic reasons to think that *mo-re/mo-st* actually contain *-er/-est* as a proper part. Such a containment relation between the two comparative markers can be captured if we decompose the single CMRP node into two heads, C1 and C2, as shown in (11) (cf. Caha, De Clercq, and Vanden Wyngaerd to appear). Full comparative marking can now be analysed as expressing both C1 and C2, as in (12), while reduced marking spells out only C2, as in (11).



We leave it open as to how exactly spellout applies in the case of *more*, as the main focus is on its complement. We only note that phrasal lexicalisation requires C1 and C2

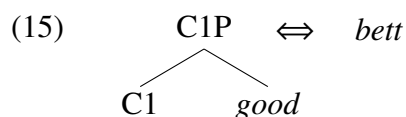
to form a constituent: this could be achieved by head-movement (Matushansky 2013), Local Dislocation (Embick 2007) or by Complex-Spec formation (Caha, De Clercq, and Vanden Wyngaerd to appear). What is crucial is that this type of marking occurs on top of roots which spell out only the *aP* constituent, as shown in (13).



The reduced marker appears on top of roots which spell out C1P. This is shown in (14), leaving it again aside how the surface order is derived, as this would take us too far afield (see Embick 2007, Matushansky 2013, and Caha, De Clercq, and Vanden Wyngaerd to appear for various possible approaches). The crucial point here is the trade-off between the root and the comparative marker. With spellout proceeding bottom-up, this trade-off is governed by the size of the root. Lexically large roots spell out C1 and combine with reduced markers. Smaller (*aP*-sized) roots must combine with *more*.

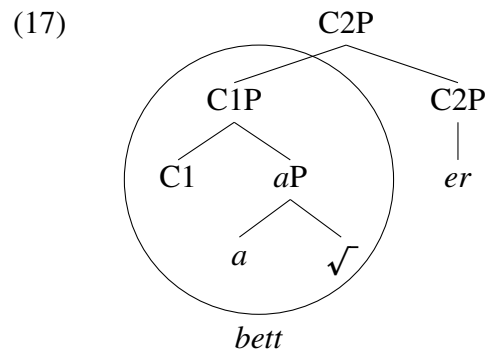
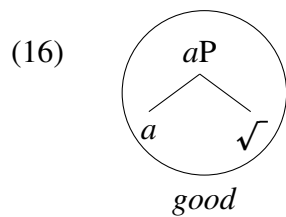
Now that we have established what we mean by full and reduced markers, consider the observation that suppletive adjectives in English only occur with the reduced markers (i.e., *-er/-est*) and never with the full markers (i.e., *more/most*), as observed by Bobaljik (2012). In a theory with a single  $\checkmark$  like the one we have sketched above, this observation follows. In particular, the tree in (13) (with full marking) is correctly predicted to not be compatible with suppletion. That is because the root in (13) pronounces a constituent (*aP*) that exactly corresponds to the positive. Under the single  $\checkmark$  theory, suppletive roots must stand in a containment relation, one overriding the other. Therefore, the comparative root must spell out at least one extra feature compared to the positive, but such a feature is not available in (13), making it incompatible with suppletion.

Turning now to (14), this scenario allows for root suppletion on our account, but does not force it. We first show how root suppletion works, and then we turn to nonsuppletive roots that combine with the reduced marker. Suppletive roots like *bett* will have an entry like (15), with a pointer to a different root.



In this case, *good* first spells out the *aP*, as shown in (16), which is a stage of the derivation that corresponds to the positive. If C1 is added, *bett-* is inserted at C1P. This C1P is subsequently merged with C2, yielding the full comparative structure in (17). For concreteness, we place C1P in the Spec of C2P.

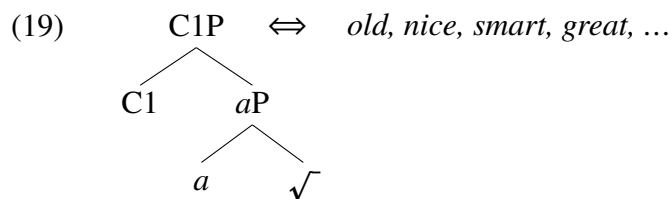




We now turn to nonsuppletive roots that combine with *-er*. In order to show how they are accounted for, we shall diverge from our reliance on a broad spectrum of conceivable approaches to phrasal spellout, and focus on one particular version, due to Starke (2009, 2018). The specific component of this theory which we now need, is a matching procedure based on the Superset Principle.

- (18) *The Superset Principle* (Starke 2009)  
 A lexically stored tree L matches a syntactic node S iff L contains the syntactic tree dominated by S as a subtree

The principle says that if there is an entry like (19), then it can spell out a C1P, as well as *aP* (because *aP* is contained in it).



If a root has such an entry, it can be used both in the positive (i.e., as an *aP*), and, at the same time, appear with reduced marking in the comparative. In English, the adjectives *old* or *nice* would be examples of such roots. The possibility of entries like (19) is what leads us to say that if a root spells out C1P (and thus occurs with reduced marking in the comparative), it does not have to be necessarily suppletive.

To sum up, the theory sketched up to now has two parameters of variation. The first parameter is related to the absolute size of the (morphological) root: it either spells out *aP* or C1P. The second parameter is whether the entry for the root has a pointer in it or not: suppletive roots like *bett-* do (overriding *good*), nonsuppletive roots like *old* do not.

Before we develop this concept further, we need to refine the Faithfulness Restriction slightly. Notice first that the entry for adjectives like *old* in (19) is very similar to the entry we have originally considered for *worse*, recall (5b). The problem with (5b) was that it could spell out the comparative form of just about any root, which is why we introduced the Faithfulness Restriction in (10). The FR states that overriding at C1P only happens if the overrider has a pointer to the overridee. As a result, the entries of suppletive adjectives will always contain a pointer to another entry. The entry for the adjective *old* in (19) does not contain a pointer, so it is not allowed to override other roots.

However, such roots do raise an issue related to overriding and faithfulness. In a

bottom-up cyclic system, the  $\sqrt{\quad}$  is always spelled out first. Here all lexical items that contain the  $\sqrt{\quad}$  node are candidates thanks to the Superset Principle, and we let free choice decide. Suppose we choose an entry like *old*. The next step is to merge little *a* with the  $\sqrt{\quad}$ , forming *aP*, and we again try to spell it out. What we need to achieve is that *old* is inserted at *aP*, forming the positive-degree form *old*.

Strictly speaking at this point, the spellout of *aP* as *old* must override the spellout of the  $\sqrt{\quad}$  node (also *old*), which (due to the Faithfulness Restriction) requires a pointer that *old* lacks. At the same time, we are not literally overwriting one entry by another, since we want to insert at *aP* the very same entry that we inserted at the  $\sqrt{\quad}$  node. This must be legal, otherwise an entry such as (19) would never get to use its lexicalisation potential. In order to allow this, we augment the FR in the following way:

- (20) *Faithfulness Restriction (FR)*  
 A spellout  $\alpha$  may overwrite an earlier spellout  $\beta$  iff
- a.  $\alpha$  contains a pointer to  $\beta$
  - b.  $\alpha = \beta$

The clause (20b) allows the entry (19) to keep overwriting itself all the way to C1P. When C2 is merged, C2P cannot be spelled out by (19), and *-er* is inserted under C2.

Finally, in order to capture the full spectrum of adjectival roots in English, we must introduced roots of two more sizes. To see that, consider again *aP* sized roots:

- (21)  $aP \Leftrightarrow \textit{good, intelligent, \dots}$
- 

The reason for claiming that these roots spell out the entire *aP* (as opposed to spelling out just the  $\sqrt{\quad}$ ) is the existence of morphologically complex positive-degree adjectives, like *slim-y*, *happ-y*, *cheek-y*, etc., where arguably, *-y* spells out little *a*. Since the *aP*-sized roots are not further decomposable, but distribute like positive degree adjectives, we treated them as spelling out the *aP*. But for the morphologically complex adjectives, where *-y* spells out the little *a*, we must specify the root only for  $\sqrt{\quad}$ .

Another possible type of root is a root that spells out the whole C2P. This root spells out both C1 and C2, and hence it appears with no comparative marking whatsoever. Such roots come again (in principle) in two flavours. One type of such roots has a pointer to a different root, as in (22), and then the root works as a suppletive counterpart of a positive root. A case in point is the entry for *worse*, which contains a pointer to *bad*.

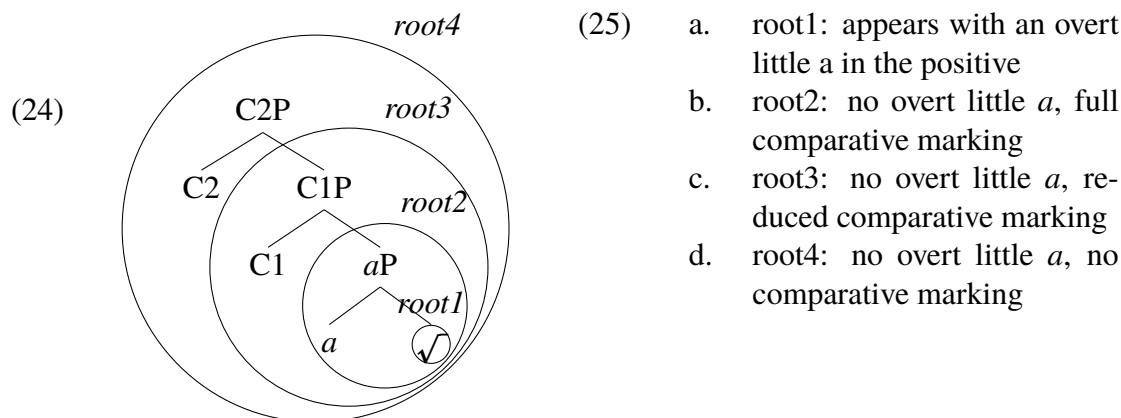
- (22)  $C2P \Leftrightarrow \textit{worse}$
- 

- (23)  $C2P \Leftrightarrow \textit{root}$
- 

The other type is as in (23), without a pointer. English has no such adjectives, but we

find cases like this in certain varieties of Czech, to be discussed in section 5 below.

In sum, the approach sketched in this section distinguished the  $\sqrt{\quad}$  (a syntactic node) from the morphological root, which spells out the  $\sqrt{\quad}$  node and potentially other nodes. This allows for a variety of roots in the morphological sense, while still maintaining a single  $\sqrt{\quad}$  in syntax. The variety of roots that our theory makes available can be visualised as a set of concentric circles, encompassing various sizes of structure, as shown in (24):



From the perspective of suppletion, we note that roots that reach up to the comparative zone (namely size 3 and 4) may work as suppletive comparatives of positive roots (those of size 2). The crucial theoretical possibility allowed by the split CMPR system is the existence of suppletive roots of size 3, corresponding to *bett-*: these can both work as suppletive counterparts to positive-degree roots of size 2, and, at the same time, combine with an overt comparative marker, namely *-er*. This extends the reach of our theory to examples where suppletive roots combine with overt markers. At the same time, we make a prediction that in such cases, we will observe a certain type of ‘reduction’ of the relevant marker. In the remainder of the paper, we present two case studies which further illustrate and refine the reduction effect under suppletion.

## 5 Czech

The first case study concerns the interaction between comparative marking and suppletion in Czech. We start from the fact that the traditional descriptions recognise three different allomorphs of the comparative (see Dokulil et al. 1986; Karlík et al. 1995; Osolsobě 2016). We give them in the first column of (26). The actual comparative marker precedes the dash, the *-í* following it is an agreement marker. Note that (26b,c) represent an increasingly ‘reduced’ realisation of the full marker *-ějš-*, seen in (26a).

(26)

	allomorph	POS	CMPR	SPRL	GLOSS
a.	<i>ějš-í</i>	chab-ý	chab-ějš-í	nej-chab-ějš-í	‘weak/poor’
b.	<i>š-í</i>	slab-ý	slab-š-í	nej-slab-š-í	‘weak’
c.	<i>-í</i>	hez-k-ý	hez-č-í	nej-hez-č-í	‘pretty’
d.	<i>-í</i>	ostr-ý	ostr-í	nej-ostř-í	‘sharp’

On the first two lines, we illustrate the *ějš-í* and *-š-í* allomorphs with two adjectives that are semantically and phonologically similar. We do so to show that the allomorphy is

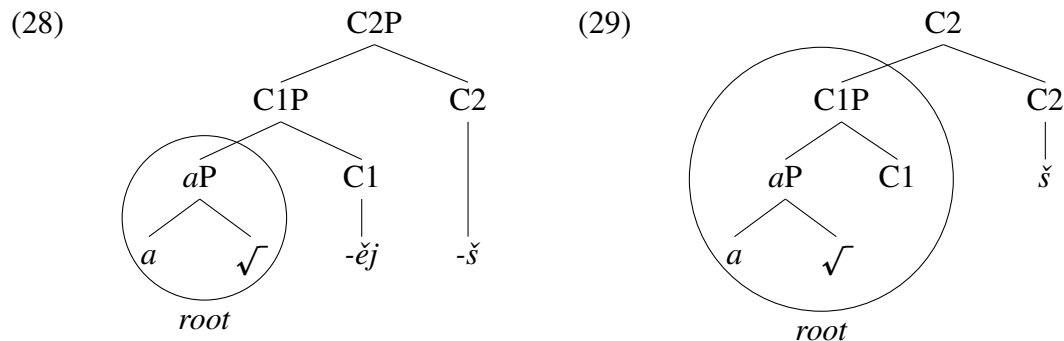
not driven by phonology or semantics. Rather, the distribution is governed by arbitrary root class: *-ějš* is the productive allomorph, while *-š-í* is restricted (occurring with 72 out of 5440 adjectives sampled in Křivan 2012).

On the third line, we illustrate the zero allomorph, and two facts should be noted. First of all, the positive and the comparative are not homophonous: their morphological identity is obscured by phonological interactions with the agreement markers. Specifically, the agreement marker *-í*, found in the comparative, triggers the palatalisation of the base (*k* goes to *č*), while the elsewhere agreement marker *-ý* does not palatalise the base (see Caha, De Clercq, and Vanden Wyngaerd to appear for a discussion of the palatalisations). As a result, the forms are distinct. The second fact to be noted is that in the standard language, this type of marking only occurs after a particular little *a* marker, namely *-k*. This morpheme is similar to the English *-y* in that it sometimes occurs after nominal roots (e.g., *sliz-k-ý* = ‘slim-y’) and sometimes after cranberry type of morphemes (e.g., *hez-k-ý* = ‘prett-y’). Because of its limited distribution, it is not clear whether the  $\emptyset$  allomorph needs to be recognised as a separate marker, or perhaps dismissed as a special realisation of *-š* after *-k*. We do, however, recognise the zero as a relevant allomorph to consider, because in the dialects of North Eastern Bohemia (Bachmannová 2007), one finds it also after nonderived adjectives, as shown on the last row.

Given that *-š* is a substring of *-ějš*, it is tempting to decompose *-ějš* into a C1 *-ěj* and a C2 *-š*, as suggested by Caha, De Clercq, and Vanden Wyngaerd (to appear). Independent evidence for this analysis comes from comparative adverbs, seen in the second column of (27). Here the *-š*-part of the comparative adjective is systematically missing, while *-ěj* is preserved. This confirms an analysis where *-ěj* and *-š* are independent morphemes.

(27)	CMPR ADJ	CMPR ADV	
	chab-ěj-š-í	chab-ěj-i	‘weak’
	rychl-ej-š-í	rychl-ej-i	‘fast’
	červen-ěj-š-í	červen-ěj-i	‘red’

Given our model with two comparative heads, the facts are easily captured if *-ěj* and *-š* spell out C1 and C2 respectively. With *aP*-sized roots, both markers surface, see (28). With roots of the size C1P, only *-š* appears, as in (29).



Zero marking arises when the root spells out all of the projections, as in (23). Recall that (23) was presented as a logical option allowed by our system, and though it was not attested in English, we need it to account for *ostr-ý* ‘sharp’ in (26).

Given our theory, comparative suppletion requires a root that is at least of the size C1P (so that it applies at a different node than the positive, which spells out *aP*). We now predict that root suppletion should be incompatible with *-ěj-š*. To verify this, the table (30) presents an exhaustive list of suppletive adjectives based on Dokulil et al. (1986:379) and Osolsobě (2016). The table shows that the prediction is borne out: all suppletive adjectives require the ‘reduced’ *-š* allomorph.

(30)	POS	CMPR	GLOSS	POS	CMPR	GLOSS
	dobr-ý	lep-š-í	‘good’	špatn-ý	hor-š-í	‘bad’
	velk-ý	vět-š-í	‘big’	mal-ý	men-š-í	‘little, small’
	dlouh-ý	del-š-í	‘long’			

We submit these facts here as an important confirmation of the current model, which predicts that when there are two or more ways of marking the comparative, suppletion is incompatible with the full marker. With reduced markers, we find both suppletive and regular cases, depending on whether the entry of the size C1P has a pointer or not.

It is thanks to phrasal spellout and the post-syntactic lexicon that the single  $\sqrt{\quad}$  approach can be maintained against the surface diversity of morphological roots. Roots can be stored in the lexicon without functional structure, with (more or less) functional structure, and with or without a pointer, resulting in the different types of roots that we observe. Crucially, suppletive forms can be linked to their base form without having to change the properties of  $\sqrt{\quad}$  as such.

## 6 Latin

Latin provides further evidence for the correlation between reduced marking and suppletion predicted by our theory, but in contrast to Czech, it shows the effect in the superlative. The regular marking of comparative and superlative is shown in (31a).

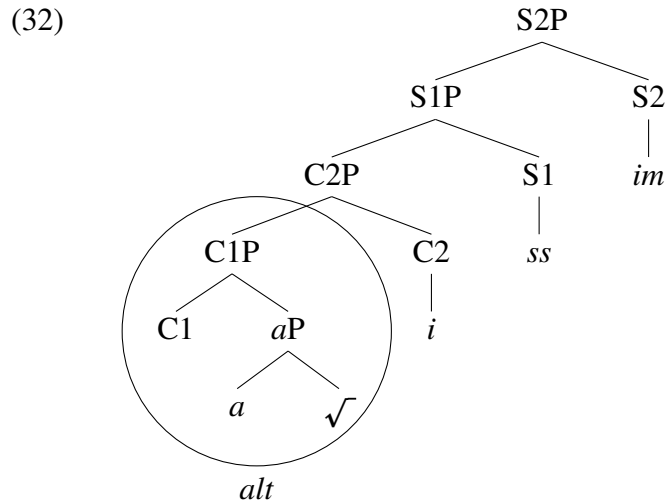
(31)	POS	CMPR	SPRL	GLOSS	marking in SPRL
a.	alt-us	alt-i-or	alt- <b>i-ss-im</b> -us	‘tall’	full marking
b.	mal-us	pe- or	pe- <b>ss-im</b> -us	‘bad’	SPRL lacks <i>-i</i>
c.	bon-us	mel-i-or	opt- <b>im</b> -us	‘good’	SPRL lacks <i>-i-ss</i>
d.	magn-us	ma-i-or	max- <b>im</b> -us	‘big’	SPRL lacks <i>-i-ss</i>
e.	parv-us	min- or	min- <b>im</b> -us	‘small’	SPRL lacks <i>-i-ss</i>
f.	mult-us	plūs	plūr- <b>im</b> -us	‘much’	SPRL lacks <i>-i-ss</i>

We segment the regular superlative into five morphemes (De Clercq and Vanden Wyngaerd 2017). The first morpheme is the root (*alt*), and the last one (*-us*) is agreement. The reason for treating the three middle markers *-i*, *-ss* and *-im* as separate morphemes is that they can be missing in the irregular forms shown in (32b-f). These represent an exhaustive list of the suppletive cases given by Gildersleeve and Lodge (1903:46).

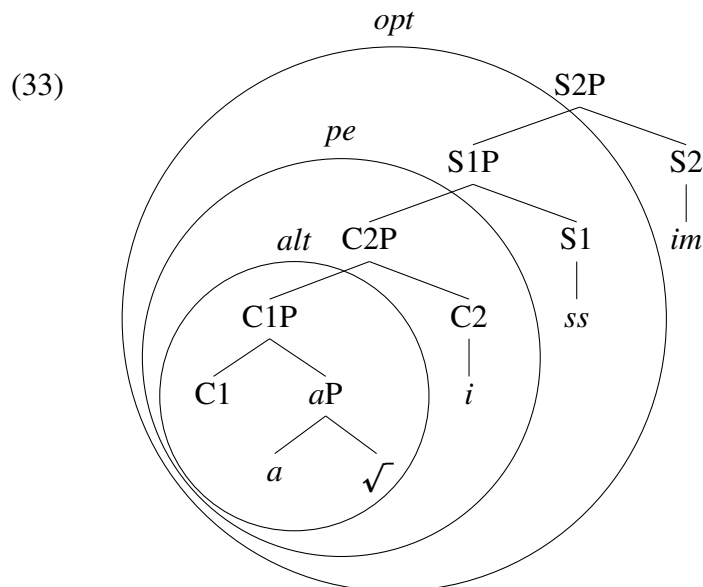
We analyse *-i* (the first of the post-root morphemes) as a comparative marker, i.e., as a morpheme identical to the *-i* of the comparative *alt-i-or*. We treat *-i* in the same way as the English *-er*, namely as the spellout of C2. Consequently, we analyse *-or*, which follows *-i* in the comparative, as an agreement marker. We do so because the masculine

form *alt-i-or* ‘taller, m.sg’ alternates with the neuter *alt-i-us*. As a C2 marker, *-i* is compatible with suppletion. In (31c), for instance, the positive degree root *bon-* realises *aP*, the suppletive comparative root *mel-* realises C1P, and *-i-* is the marker of C2.

The remaining two morphemes mark the superlative, which we then split into S1 and S2, analogously to *CMPR*. The structure of *alt-i-ss-im(-us)* thus looks as follows:



Against this background, consider the fact that the superlative marking with suppletive roots is *always* reduced, see (31b-f). There is not a single suppletive root in Latin which keeps all the three pieces in place, as indicated in the final column of (31). Specifically, we see two classes of suppletive roots. The majority of suppletive roots lacks the C2 *-i* as well as the S1 *-ss*, and we would thus analyse them as spelling out S1P. However, *pe-* lacks only the *-i*, which, on the assumption that *-i* is C2, leads to the proposal in (33).



This picture has implications for the analysis of the comparative. Specifically, all suppletive roots which spell out a projection larger than C1P should make *-i* disappear not only in the superlative, but also in the comparative. This is true for the adjectives *min-or*

‘smaller’ and *plus* ‘more’, as well as, arguably, *pe-or* ‘worse,’ where the glide in the comparative *pe[j]or* results, on our analysis, from phonological factors (hiatus filling). Note that *plus* lacks the agreement marker *-or*, and Gildersleeve and Lodge (1903:46) analyse it as a neuter form, with the masculine cell left blank. Here we treat *plus* as spelling out minimally S1P, lacking *-i* in the comparative, and in the superlative also *-ss*. We leave the reasons for the lack of agreement in the comparative open to interpretation.<sup>4</sup>

The (c) and (d) cases of (31) warrant some further comment, since they have *-i-* in the comparative but lack it in the superlative. This is because they instantiate an ABC-pattern, with two different suppletive roots: one of size C1P (explaining the presence of *-i-* in the comparative), and another of size S1P (explaining the absence of both *-i-* and *-ss-* in the superlative). These suppletive roots successively point to one another, e.g. the lexical entry for *opt-* contains a pointer to *mel-*, which itself contains a pointer to *bon-*.<sup>5</sup> This case study also illustrates how  $\sqrt{\quad}$  and roots should be treated differently. Whilst there is only one  $\sqrt{\quad}$  in syntax, there are many different types of roots in the lexicon, which store  $\sqrt{\quad}$  with (or without) other pieces of structure. The trade-off between the size of roots and the superlative degree morphology in Latin shows that suppletion follows from the size of stored items in the lexicon and not from the nature of the  $\sqrt{\quad}$ .

## 7 Conclusion

This paper proposes an approach that reaches an important theoretical goal, namely to allow for root suppletion within a theory of narrow syntax that is phonology/concept free, and which dispenses with indexed  $\sqrt{\quad}$ s. By dispensing with indexed  $\sqrt{\quad}$ s, the theory is also compatible with approaches where  $\sqrt{\quad}$ s are dispensed with all together (Ramchand 2008). What makes this type of theory available is a bottom-up phrasal spellout, where  $\sqrt{\quad}$ s are kept distinct from morphological roots. The latter come in a variety of classes, each class associated to a particular amount of functional structure.

We have further explained why and how such a theory is compatible with the fact that suppletion often co-occurs with overt marking. In order to test the predictions, we looked at the details of comparative/superlative suppletion in English, Czech and Latin. What we found is that suppletion in these languages is inevitably correlated with the reduction of overt morphology, which supports the empirical predictions of the model.

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<sup>4</sup>Note that *plus* and *plur* are two shapes of a single root, with *s* undergoing rhotacism in intervocalic positions, which happens also in the comparative when inflected, cf. *plur-is* ‘more, GEN.SG.’

<sup>5</sup>We take *s* in the superlative *maks-im-us* ‘biggest’ to be a part of the root, given that it is not a geminate like the superlative S1 marker. The comparative *ma-i-or* ‘bigger’ could arise from the root *mag-*, as suggested in Bobaljik 2012, with the root final *g* first assimilating to *j* (yielding *maj-j-or*), which is then reduced due to degemination. Bobaljik (2012) concludes from this that this adjective has a regular AAA pattern, and hence, that is irrelevant for suppletion. However, this move requires the parsing of the positive as *mag-nus*, which we see little evidence for. We therefore treat it as an ABC pattern (*magn-ma(g)-maks*).

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