

ON COMPARATIVE SUPPLETION*

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This paper addresses suppletion in the formation of the comparative degree of adjectives and related forms. I set forth to investigate and explain two generalizations concerning the distribution of (root) suppletion in forms that (I argue) are related to the comparative, namely, the superlative degree of adjectives and deadjectival change-of-state verbs. The distribution of suppletion in these forms is shown to be parasitic on suppletion in the comparative adjective. I argue that this is best understood if the superlative adjective and the change of state verb are always derived from the comparative adjective, even where this relation is not morphologically transparent. The paper also briefly considers some theoretical implications of this conclusion for morphology (in particular the formal treatment of suppletion) and semantics (the decomposition of superlatives and change of state verbs). In the course of the investigation, what may be a novel poverty-of-the-stimulus type argument is introduced. Due to the severely limited nature of the relevant data in any given language, the generalizations are not significant language-internally but only when considered from a cross-linguistic perspective. That the patterns (but not the individual forms) are stable cross-linguistically and over time suggests that UG is constrained in such a way that the unattested patterns are impossible. The theory presented here has that effect.

Keywords: suppletion, comparative, superlative, change-of-state, poverty-of-stimulus, lexical decomposition

1. INTRODUCTION

Morphology is sometimes characterized as the domain of the lawless, and among the miscreants, no process epitomizes irregularity more than suppletion—the wholesale replacement of one stem by a phonologically unrelated stem, in some context. In the research reported here, I investigate the nature of suppletion in the formation of the comparative degree of adjectives (*good~better*) and related questions. I demonstrate that there are a variety of extremely robust—arguably universal—generalizations to be made, and submit that the striking patterns of regularity in what otherwise appears to be the most irregular of linguistic domains provides compelling evidence for universal grammar.

The first topic investigated is the relationship between comparatives and superlatives. Extending and refining an observation in Ultan (1972:144), I put forward the generalization in (1).

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(1) *The Comparative-Superlative Generalization (CSG):*

If the comparative degree of an adjective is suppletive with respect to the basic (positive) form, then the superlative is also suppletive.

Examples illustrating the CSG are given in (2)—see Appendix 3 for a fairly comprehensive survey of the phenomenon. The comparative degree of *bad* is *worse*, a canonical example of suppletion. In conformity with the CSG, the superlative degree is not derived from the positive root (**baddest*) but is instead derived from the same root as the comparative: *worst*. Although this sharing of a suppletive root between the superlative and comparative is extremely common, the CSG as stated here also admits cases in which the positive, comparative and superlative have three distinct roots. The Latin adjective for ‘good’ in (2b) constitutes one such case. What the CSG excludes is a pattern where the superlative uses the same root as the positive adjective, while the comparative alone is suppletive (hypothetical: **bonus – melior – bonissimus*).

(2)	positive	comparative	superlative	
a.	bad	worse	worst	<i>*baddest</i>
b.	bonus	melior	optimus	<i>*bon(iss)imus</i> Latin ‘good’

A second generalization considered in this paper is given in (3). This generalization (if correct) is, I believe, novel, although the facts have been sporadically observed for individual languages.

(3) *The Comparative-Change-of-State Generalization (CCSG):*

If the comparative degree of an adjective is suppletive with respect to the basic (positive) form, then the (basic) corresponding change-of-state verb is also suppletive.

The CCSG is illustrated in (4). As noted above, the adjective *bad* has the comparative degree *worse*, involving suppletion. The corresponding change of state verb is *(to) worsen*, not *(to) *badden*, in conformity with the CCSG (apparent colloquial examples of *to badden* are discussed in section 5.4).

(4)	adjective	comparative	verb
	bad	worse	worsen <i>*badden</i>

Complications arise in trying to determine whether the verbal domain has an analogue of (2b), with three distinct roots, for example: *good-better-(to) improve*, or whether such cases involve distinct lexemes merely closely related in meaning, with no formal morphological relation. I return to this point briefly in section 4.3, ultimately setting this aside.

A schematic summary of the attested and unattested patterns is given in (5), where A, B and C are variables ranging over phonologically unrelated roots. For the CSG the three columns are, respectively: positive, comparative, and superlative, while for the CCSG, the columns are positive, comparative, and deadjectival change-of-state verb. The first three patterns are the attested ones, and these conform to the CSG and CCSG. The main focus of this paper lies in excluding the **ABA* pattern while permitting the three attested patterns.

(5)	attested:	A	A	A	“regular”	(English <i>big</i>)
		A	B	B	“suppletive”	(English <i>bad</i>)
		A	B	C	“doubly-suppletive”	(Latin <i>bonus</i>)

unattested:	A	B	A	excluded (CSG/CCSG)
	A	A	C	see §4.1

There is one additional pattern to consider, namely, one in which the comparative uses the same root as the positive adjective, but the superlative alone is suppletive, (AAC e.g., hypothetical **bad-badder-worst*). This pattern is consistent with the CSG and CCSG, as worded above, but is also unattested. I will nevertheless pursue distinct explanations for the lack of **ABA* and the lack of **AAC* patterns, and will defend the decision to keep these distinct in section 4.1.

It should be stressed that the fact that the ABA pattern is unattested in any one language is in and of itself almost certainly insignificant. English, for example, has only a handful of adjectives (and adverbs) that have suppletive comparatives (*good/well-better*, *bad-worse*; *much/many-more*, *little/few-less*). Over such a small sample size, the absence of the ABA pattern, or of any other pattern, could be synchronically accidental. What makes the generalizations above of interest is their cross-linguistic scope, holding among genetically unrelated languages. That the ABA pattern is all but unattested (at least in the CSG) among the approximately 175 items from the 50 or so languages covering the known cases of comparative suppletion does seem to be significant, and calls for an explanation.

I suggest that the explanation requires the following two key assumptions. First, I suggest that the superlative adjectives (and deadjectival verbs) properly contain the (feature) structure of the comparative, contrary to standard analyses in the literature in both domains. In other words, a superlative form like *biggest* must have the form [big-CMPR-SPRL] (cf. Stateva 2002), and likewise, the verb *to shorten* must be (something like) [short-CMPR-BECOME] (contra Dowty 1979). The second key assumption is that suppletion is a form of contextual allomorphy, where competing root allomorphs are selected in accordance with Pāṇini's Principle (elsewhere ordering). These assumptions require a realizational theory of morphology, in which the phonological form of words (in this case, choice of root allomorph) is determined after the composition of the morphosyntactic context. In the course of the paper, I will argue that Distributed Morphology ([DM], Halle and Marantz 1993, and related work) has the right properties to accommodate the CSG and CCSG, although the key properties are not proprietary to DM. I will note below where and how pieces of the analysis bear on choices among competing morphological theories.

Before proceeding to the analysis, I provide some general remarks on terminological issues and the composition of the database (section 2). Section 3 constitutes the core of the paper, presenting the analysis, with specific reference to the CSG. I focus there on the evidence in favour of nested structure and comparison of the analysis presented here to conceivable alternatives. In section 4, I address a series of side issues that arise in the course of the investigation of the CSG. In the course of this discussion, I introduce an additional generalization regarding an asymmetry between morphological and periphrastic causatives (the Synthetic Suppletive Generalization) and discuss its implications for the formal treatment of suppletion and blocking. In section 5, I turn to the CCSG, sketching the direction a semantic analysis could take, and considering a variety of *prima facie* counterexamples. Where the CSG is extremely robust, I would describe the CCSG as surprisingly robust, though not without exceptions. Many apparent counter-examples do fall to alternative explanations, with independent support, but a residue remains. After the brief conclusion, four appendices present the data and sources.

2. PRELIMINARIES

The data set for this investigation is given in Appendix 3. The purpose of this section is to clarify terminological usage in this study, and to provide some methodological remarks on the constitution of the data set.

2.1 Terminology

I reserve the term *suppletion* for the wholesale replacement of one root by another, distinct root, within an otherwise regular, systematic relationship, such as the formation of adjectival degrees. I thus exclude “irregular” relationships, namely those that are relatable by (phonological) rule, even where the necessary rules are unproductive (irregular). Thus, the German pair *gut-besser* ‘good-better’ is suppletive, but the pair *hoch* [hox]-*höher* [hœ.er] ‘high-higher’ is not, despite the umlaut and irregular loss of the final velar in the comparative. This usage adheres to the original use of the term *suppletorische* ‘suppletive’ as set out in Osthoff (1899),¹ along with the more formal definition provided in Mel’čuk (1994, 2006) (cf. Corbett 2007). My use of ‘suppletion’ thus corresponds to ‘strong suppletion’ in the framework of *Natural Morphology* (Wurzel 1985), and excludes ‘weak suppletion’ or ‘partial suppletion’ which are here covered by the term ‘irregular’. Coinciding with the terminological distinction is the view (advocated here) that the distinction between suppletion and irregularity is not a matter of degree, but is rather categorical. The CSG and the CCSG regulate the behaviour of suppletive formations (as just defined), but do not (necessarily) apply to irregulars. I return to this in section 4.1, where this restriction is shown to follow from independent theoretical assumptions within DM. Although there are grey areas for the analyst, I have included all questionable pairings in the database, in order to avoid the possibility of having overlooked important counter-examples by virtue of a misclassification as irregular. No such issues arise.

The Danish examples from the appendix, given here, serve to illustrate this point. Suppletion is clear for all of the cases except the ‘much’ paradigm. For that lexeme, it seems not much of a stretch to capitalize on the shared initial CV *me-* and to posit that this set should be seen as irregular, rather than suppletive. Since the superlative (and verb *formere* (*sig*) ‘to increase’) has the same form of the root as the comparative, deciding the issue turns out to matter only for the question of counting the number of relevant forms. Nothing of substance hinges on whether this should be included or excluded under suppletion (see Osthoff 1899 for discussion of *more* and its cognates in Germanic).

(6) Danish

	positive	comparative	superlative
good	god (adv: godt)	bed-re	bed-st
bad / evil / ill	ond / slem / ilde	vær-re	vær-st
old	gammel	æld-re	æld-st
small	lille (sg) / små (pl)	mind-re	mind-st
much	megen (adv: meget)	me-re	me-st
many	mange	fle-re	fle-st
few	lidt	mind-re	mind-st

Another terminological point to note is that I use *superlative* only to mean “relative superlative” (i.e., where the meaning is roughly “more X than anything else”) and exclude the “absolute superlative” (which marks simply intensification: “very X”). The *-issim-o* formations in modern Romance languages are absolute superlatives, and are thus excluded (although their historical source in Latin was a relative superlative, and is thus included).² The CSG does not apply to absolute superlatives; thus one finds Italian *buonissimo* ‘very good / excellent’ < *buono* ‘good’

¹ As a brief historical remark, it is perhaps worthy of note the concept (and term) suppletion (replacing the earlier notion of defective paradigms) were originally proposed in reference to the comparative degree of adjectives in Indo-European languages (Osthoff 1888:442, Osthoff 1899:5).

² The relative superlative in Modern Romance is formed periphrastically, with the definite article and the comparative, as in French: *le plus gros* ‘the more big’ = ‘the biggest’. See section 4.3.

despite suppletion in the comparative *migliore* ‘better’. In other words, it turns out that the morphological difference tracks the semantic one. The argument from suppletion is that the superlative properly contains the comparative, but this argument is applicable only to those superlatives that plausibly have a comparative aspect to their meaning, and not to those that simply assert a high degree of the relevant property.

Another point to note is the potential distinction between root-suppletion and whole-word suppletion. Consider the English pairs *good-better* and *bad-worse*. In the latter pair, the unsegmentable suppletive form *worse* appears to express both the root BAD and the comparative degree, and thus might be called whole-word suppletion. On the other hand, *better* appears to be segmentable as *bett-er*, that is, containing a special, suppletive root (*bett-*), but the regular comparative suffix *-er*. (For additional discussion of this difference, with reference to alternative terms for it, see Corbett's 2007 Criterion 1.) Just as in other domains of inflection, the significant majority of examples in the data set investigated here involve root, rather than whole-word suppletion. This is strikingly obvious for the Danish cases (where the regular morphological comparative is *-re* and superlative *-st*). Moreover, the few cases of whole-word suppletion have no special behaviour that I have been able to see, as against the root suppletion cases. For ease of exposition, I will therefore treat root suppletion as the normal case and assume that whole-word suppletion involves root suppletion plus a zero allomorph of the comparative (or special readjustment rule), that is *worse* = [worse-Ø] (but see Chung 2007 for evidence that some instances of word suppletion outside of comparatives require a different treatment).

2.2 The database

The database (given in Appendix 3) contains all cases of suppletion for comparative degree among adjectives that I have been able to find. There are approximately 175 adjectival or adverbial roots, in 49 languages, that undergo suppletion in the formation of the comparative in this database. Alongside these are listed the corresponding superlatives, and (where available) the corresponding change of state verbs. Since descriptive grammars list superlative forms in the discussion of degrees of comparison, but do not typically give deadjectival verbs, the data relevant to the CCSG is less complete. Thus, while the CSG is extremely robust (and thus the conclusions firm), the sections of this paper on the CCSG should be considered more tentative.

The database was assembled in two phases. The initial sample is from Stassen's (1995) genetically and geographically balanced survey of comparative formation in 110 languages. This sample provided a starting point for looking for cases of comparative suppletion. Only 19 of the 110 languages in Stassen's sample have morphological marking of comparative degree (Appendix 1).³

Where the Stassen sample aimed for breadth and balance, the main language sample in this paper aims for comprehensiveness, to the extent feasible. The languages examined for this sample are listed in Appendix 2. This sample consists of all languages identified as having morphological comparatives in the Stassen sample, as well as those identified as having morphological comparatives and/or suppletion in: (i) a review of the literature on suppletion with reference to comparative degree—significant prior works with reference to multiple languages include Osthoff (1899), Ultan (1972), Mel'čuk (1994, 2006) and Wurzel (1985); (ii), a query to Linguist List (17.313, 1/30/2006), and follow-up correspondence with respondents (to whom I am grateful); and (iii), correspondence with scholars working in this area. In addition, for any language identified as relevant, I examined grammatical descriptions of these languages and of

³ Stassen (1985) does not explicitly note the languages that do and do not have a marker of comparison. Ultan (1972), with a 117 language sample, does provide some notes on morphology, but does not systematically distinguish morphological (synthetic) from periphrastic (analytic) comparatives. I examined all of Stassen's examples manually, and then went back to primary descriptions wherever relevant.

closely related languages to the extent available. For the Pama-Nyungan, Indo-Aryan and Tupi-Guaraní languages, this remains a sample, but for all other language families, the majority of (known) languages within each relevant family were examined (pace questions of how to count languages). This sample contained 80 languages, of which 49 showed some measure of suppletion for comparative degree. Appendix 3 gives an exhaustive list of the cases of comparative suppletion in the dataset.

There is one other point worthy of comment that the reader will note in examining the data set, and that is a strong areal bias. This appears to be real, and not an artefact of the sampling method. Note that this distribution appears to be primarily about the existence of morphological comparatives. Suppletion itself is a wide-spread phenomenon—though marginal in any language, there appears to some amount of suppletion in many, if not most, languages (Brown, et al. 2004, Corbett 2007). The property that is areally restricted is the morphological comparative degree of adjectives (Andersen 1983:110, Stassen 1995). These are overwhelmingly limited to what has been called the “Greater European Sprachbund” (Stassen 1995), that is, Indo-European languages and other geographically contiguous families: Basque, Kartvelian, North-West Caucasian, Uralic, and possibly Semitic (depending on how the ‘elative’ is classified—see Appendix 2). The sense of a Sprachbund here is especially striking within Uralic, where Hungarian (Ugric) and the Finnic and Sámi languages have morphological comparatives (with some suppletive forms), while these languages’ closest relatives (the Ob-Ugrian languages, and the Volgaic languages, respectively) do not. The distribution fairly neatly tracks geographical proximity to Indo-European, and not a genetic grouping within Uralic. Since comparative suppletion is effectively limited to languages with morphological (rather than periphrastic) comparatives (see section 4.3 on modern Romance), comparative suppletion is thus limited to this area. Indeed, the handful of languages with morphological comparative formation outside this region (Batak, Arrernte, Ilocano, Guaraní) appear to lack suppletion in this domain.⁴ In light of this skew in the distribution, it is important to exclude a purely historical account of the CSG; this is addressed in section 3.3.

3. THE COMPARATIVE-SUPERLATIVE GENERALIZATION

We are now in a position to return to the main thread, a discussion of the CSG, repeated here:

(1) *The Comparative-Superlative Generalization (CSG):*

If the comparative degree of an adjective is suppletive with respect to the basic (positive) form, then the superlative is also suppletive.

The robustness of this generalization in the data is readily apparent. The overwhelming majority of examples instantiate the ABB pattern, where the comparative and superlative share a common root (as noted by Ultan 1972:144, for a sample of 20 languages). Danish, given above in (6), which has an uncommonly large number of suppletive comparatives, is representative of this common pattern. While almost all cases in the appendix are of this ABB pattern, a handful of examples show a three way distinction (ABC), with a separate root for each grade. The clearest examples are the adjectives meaning ‘good’ in Latin, Welsh and Old Irish, though some Classical Greek forms may also follow the ABC pattern, depending on how questions of many-

⁴ The absence of suppletion in comparative formation is explicitly noted for Arrernte (Strehlow 1942). For Toba and Koba Batak and Ilocano, available descriptions of comparative formation are detailed enough to invite the inference that suppletion would have been mentioned if it had been attested. Notably, in these descriptions, comparative forms for ‘good’ are given and are regular—this adjective is the one that is the most likely to be suppletive; Modern Greek and Mingrelian are the only two of the 49 languages in the sample in which ‘good’ is regular but some other adjective is suppletive.

to-many mappings among the columns are resolved.⁵ Note that Latin, like Danish, shows regular comparative and superlative morphology, with suppletion affecting the choice of root alone.

(7) Latin and Welsh ‘good’

	positive	comparative	superlative
Latin: good	bon-us	mel-ior	op-timus
Welsh: good	da	gwell	gorau

As linguistic generalizations go, the absence of the *ABA pattern (i.e., the CSG) is about as close to a universal as they come. Of the 175 pairs in the dataset, only one case of an apparent ABA pattern is reported, namely, in the paradigm for *many/much* in Karelian (Finno-Ugric), as described in Zajkov (1999:51). There are also two cases of apparent ABA patterns, both in doublets where the ABA pattern exists alongside ABB for the same adjective, namely the Basque forms for ‘good’ (Trask 2003:140) and the Welsh adjective meaning ‘near’ (Rhys Jones 1977:244). I will lay aside the two doublets (and the Karelian example), though acknowledging the potential problem they pose for the status of the generalization if no account is ultimately forthcoming.⁶

As mentioned in the introduction, the account that I will set forth for the exclusion of the ABA pattern has the following two pieces.

The crux of the account is the hypothesis that the superlative properly contains the comparative (which in turn properly contains the basic form of the adjective). Under certain assumptions, this can be seen as an expression of the markedness hierarchy, as proposed for comparatives and superlatives by Greenberg (1966:40-1), Canger (1966) and Ultan (1972). I return to markedness in section 4.1. While the logic of the argument only requires proper subset-superset relations among the relevant features, I will argue further that there is a hierarchical organization to the features, as indicated in (8). This converges with the proposal in Stateva (2002), though I do not commit myself to the particular semantic formalism she offers. I provide specific arguments for nesting, rather than unstructured feature subsets, in section 3.2.

- (8) a. positive adjective [ADJ]
b. comparative degree [[ADJ] -CMPR]
c. superlative degree [[[ADJ] -CMPR] -SPRL]

⁵ I admit to a certain trepidation here regarding the rarity of the ABC pattern, with the rankling suspicion that the prominence afforded this pattern in the literature, including the present paper, is due in part to the position of Latin in the history of grammatical scholarship. *Caveat lector*.

⁶ Regarding the Basque doublet, I have twice presented this material to (audiences including) Basque linguists and both times it was noted that a regular comparative *on-ago* ‘good-er’, formed from the positive root, is often heard in the spoken language alongside the suppletive form *hobe-(ago)*. The apparent problematic ABA doublet may thus be a conflation of an AAA and ABB patterns, a phenomenon well attested elsewhere in the data. Other sporadic cases of putative *ABA do not hold up on inspection. Thus, Ultan (1972:144), gives the German triple *bald-ehere-baldigst* for the adverbs ‘soon-sooner-soonest’ as an instance (the only one he found) of ABA. On the grounds of meaning and distribution, *baldigst* does not appear to be the superlative of *bald*, that is, it does not mean “sooner than all others”, rather, it is restricted in meaning to something like “as soon as possible” (compare the positive adjective *baldig* ‘early’). The superlative corresponding to *ehere* is the regular (am) *ehesten*. There is, then, a question of whether this illustrates an ABB pattern, or the conflation of two distinct lexical items. The adverb *bald* ‘soon’ may be defective (lacking comparative and superlative forms), while *ehere* (the regular comparative of the somewhat old-fashioned *ehe* ‘before’) is close enough in meaning to be used to translate English ‘sooner’ in some contexts. As such a conflation is the presumed source of suppletion, there is a thorny grey area here, but so long as *baldigst* is not the superlative, there is no counter-example here whichever way the matter is resolved. My thanks to Susi Wurmbrand for an extended discussion of this example.

The second piece of the analysis is the proposal that the rules for suppletion have the form of context-sensitive rules of exponence, introducing distinct root formatives in different contexts. Specifically, the contexts make reference to the structure in (8), and admit of underspecification. The ordering in (9) follows from the regular logic of Pāṇinian /Elsewhere ordering.⁷

- (9) Rule 3 $\sqrt{\text{ADJ}} \rightarrow C / [[_ \text{CMPR}] \text{SPRL}]$
Rule 2 $\sqrt{\text{ADJ}} \rightarrow B / [_ \text{CMPR}]$
Rule 1 $\sqrt{\text{ADJ}} \rightarrow A /$ <elsewhere>

Note that since the rules involve underspecification in the statement of their contexts, it follows that the context must be established prior to the application of the rules. This necessitates a *realizational* theory of morphology (see Stump 2001:1-9, for a typology of morphological theories).

The rule schema defines the possibilities illustrated in (10) with reference to examples discussed above. For an adjective that has only a single root in all contexts, there is a single, context-free rule, as in (10a). Note that such an adjective may be irregular, as the result of subsequent readjustment rules, but as all three forms share a root, it is not suppletive. The ABB pattern arises for an adjective that has two rules, namely, a context-sensitive rule applying in the comparative (rule 2), alongside the default, context-free rule, (10b). In such a case, the comparative root will necessarily be used for both the comparative and the superlative; this rule wins out over the default in both contexts as it is more highly specified, and it is compatible with both contexts, given (8). Finally, (10c) illustrates a case with three distinct roots.

- (10) a. $\sqrt{\text{BIG}} \rightarrow /b\text{ig}/$ [English]
 b. i. $\sqrt{\text{GOOD}} \rightarrow /b\text{ed}/$ [___ CMPR] [Danish]
 ii. $\sqrt{\text{GOOD}} \rightarrow /g\text{od}/$
 c. i. $\sqrt{\text{GOOD}} \rightarrow /o\text{p}/$ [[___ CMPR] SPRL] [Latin]
 ii. $\sqrt{\text{GOOD}} \rightarrow /m\text{el}/$ [[___ CMPR]
 iii. $\sqrt{\text{GOOD}} \rightarrow /b\text{on}/$

It is instructive to compare the rules in (10b.i) and (10c.ii). These rules are formally identical, differing only in the phonological matrix introduced. Yet the Danish rule (10b.i) applies to derive both comparative and superlative forms, while the Latin rule in (10c.ii) applies only in the comparative, and not the superlative. This highlights the important consequence of underspecification—no rule can specifically refer to just the comparative environment (to the exclusion of the superlative). To the extent that a particular rule does in fact only apply in the comparative, this can only arise when application of the rule in the superlative environment has been bled by a more highly specified rule.

It is for exactly this reason that the *ABA pattern cannot be stated. Any rule that introduces a suppletive root in the comparative would also pick out the superlative (yielding ABB) unless there it is bled by an even more highly specified form (yielding ABC).⁸ This point sets the

⁷ The root symbol and ALL CAPS are used throughout to indicate the abstract root (lexeme) prior to vocabulary insertion.

⁸ Two additional points should be made here. First, the question of whether it is possible for an adjective to have Rule 1 and Rule 3, but lack a Rule 2 (thus yielding AAC) is left aside here and taken up again in section 4.2. Second, nothing yet said excludes an “accidental” ABA pattern, arising from the application of three formally distinct rules, where the phonological content of the “C” form (superlative) is accidentally homophonous to the positive (default) form. Thus, the phonological pattern *good-better-goodest* could in fact arise, but *good* in *good-est*

second criterion for distinguishing among theoretical proposals, beyond describing the attested cases. Any theory that allows for a suppletive form that directly picks out just the comparative will allow generation of the ABA pattern. Since that pattern is unattested, such a theory overgenerates, where the current proposal adequately describes the attested patterns and excludes the unattested one.⁹

3.1 Nested Structure (I): against the standard view

In the preceding paragraphs, I have demonstrated how the account works to derive the attested patterns, while excluding unattested *ABA. At this point, I turn to showing that familiar proposals that do not assume a subset:superset relation between the comparative and the superlative fail to exclude the unattested *ABA pattern. Properly speaking, this section deals only with the question of whether the features defining the comparative are contained in the superlative. I will express this in terms of the hierarchical structure in (8), although the argument for nested structure is not presented until the next section.

Across frameworks, many familiar treatments of degree constructions, especially for English, treat the comparative and superlative as related, but distinct constructions, both directly attached to the adjective root, reflecting the apparent surface structure of the English forms. On most formal analyses, the comparative and superlative are distinct morphemes, in complementary distribution with one another, and combining directly with the adjective (or some projection thereof), as shown in (11). On many proposals, the two share a defining property (they are degree heads, for example), and differ only in value (structures on the right in (11)).¹⁰

- | | | | | |
|------|--------------|----------------|----|------------------|
| (11) | Comparative: | [[ADJ] -er] | or | [[ADJ] DEG:CMPR] |
| | Superlative: | [[ADJ] -est] | | [[ADJ] DEG:SPRL] |

Faced with the prevalence of ABB patterns in suppletion, such as the Danish ‘good’ pattern, analyses based on (11) have essentially two options. These analyses may state a disjunctive context for the suppletive roots (12a), or they may appeal to underspecification and make reference to the shared property of the two elements, codified as DEG (12b).

- | | | | |
|------|----|---|----------------------|
| (12) | a. | $\sqrt{\text{GOOD}} \rightarrow \text{bed-} / \text{ ____ } \{-\text{CMPR}, -\text{SPRL}\}$ | Disjunctive Context |
| | b. | $\sqrt{\text{GOOD}} \rightarrow \text{bed-} / \text{ ____ } \text{DEG}$ | Shared Property: DEG |

Both approaches falter in the same way. Both overgenerate and fail to exclude the *ABA pattern. Regarding (12a), I take it as uncontroversial that a theory that can state a disjunctive context can

would have to be treated as (synchronically) phonologically unrelated to *good*. I will assume that this is systematically excluded in the course of language acquisition, in other words, while homophony may be posited in general, even within inflectional paradigms, no learner will posit homophonous forms that have not only the same form but also express the same features, differing only in context. Equivalently, if one treats the rules of exponence as rewrite rules, no rule has the form $X \rightarrow X$ in some context. All rules effect some change. So far as I can tell, this additional assumption will be needed on any theory that tries to explain the *ABA pattern. As Curt Rice points out (personal communication, 2006), it is important to keep the issue here (identity among roots) distinct from the issue of whole word homophony at play in discussions of paradigm (dis-)uniformity and homophony avoidance.

⁹ As a technical curiosity, I note that the argument would work as well if the pattern in (8) and rules in (9) were reversed, with the superlative as the default form, contained in the comparative, which is in turn contained in the positive. The key to excluding *ABA is having the comparative “in the middle” as it were. In addition to grounds of general (semantic) plausibility, the arguments in section 3.2 seem to run against such a backwards nesting.

¹⁰ In the semantics literature, the received wisdom for superlatives is (11). Stateva (2002) is an important exception, positing the nested structure (see that work, pp. 14-21 and 35-36, for references to the literature). For recent morphological analyses that assume (though not crucially) structures like (11), see Embick and Marantz (to appear), Embick (2007).

also state a simple context. Thus, [__CMPR] would be a legitimate context for a suppletion rule, however those are formulated. Without nested structure, though, this will pick out just the comparative, and will generate the ABA pattern. Reference to just the shared property as in (12b) would seem to undergenerate, as it excludes the Latin *bonus* pattern ABC.¹¹ Capturing that pattern requires that the rules of suppletion (again, however they are to be formulated) can refer selectively to at least one value of DEG. Thus, the context for Latin *op-* might be described as [__DEG:SPRL]. If this is possible, though, there is no intrinsic reason why [__DEG:CMPR] might not serve as a legitimate context. In the absence of an ABC pattern, this will yield *ABA, again, overgenerating.

The conclusion, then, is that not only does the nestedness assumption allow for a description of the facts, this assumption is a necessary component in any account of the absence of the ABA pattern. Another way of rephrasing this conclusion draws out its theoretical implications more starkly. In order to exclude the ABA pattern, it must be the case that no language has a simple morpheme, SUPERLATIVE, that attaches directly to (non-comparative) adjectives. Appearances notwithstanding, there is no morpheme *-EST*.

3.2 Nested Structure (II): overt nesting

The preceding sections have shown that there is a strong argument to be made for assuming that the superlative contains the comparative, which in turn contains the positive form of the adjective. Technically, the argument does not hinge on whether the relevant features are nested, as I have assumed, or simply collected together in unstructured sets, thus [ADJ], [ADJ CMPR] and [ADJ CMPR SPRL]. It is the subset:superset relations among the feature sets that are crucial to the argument.

Nevertheless, there is strong independent evidence in favour of the nested structure posited in (8). This evidence comes from an implicational universal noted by Ultan (1972) extending observations of Greenberg (1966:40-1) and Canger (1966). In many languages, the comparative and superlative share morphology. Whenever there is a transparent derivational relationship among the two, it is always the case that the superlative is derived from the comparative, and never the other way around.¹² This embedding holds regardless of whether the degree constructions are expressed morphologically or periphrastically, or via a combination of the two.

The transparent relationship between comparative and superlative is illustrated for a variety of languages in (13). Note that among the modern languages (13a), this structure occurs in both Indo-European and non-Indo-European languages.¹³ Indeed, this nested structure is what is

¹¹ As Jessica Rett observes (personal communication, 2006), (12b) also overgenerates, in that comparative and superlative pattern together in forming a unique context for suppletion, but to the exclusion of the other morphological degree constructions (equative, excessive etc). If these also contain a DEG element, reference to this element alone does not correctly describe the context for suppletion in any language that has such morphemes, see Ultan (1972).

¹² In Ultan's survey, more than half of the 30 languages discussed in this context share morphology between the comparative and the superlative. Some languages, such as Arabic, draw no distinction. Note that when the affixes involved are on the same side of the stem, it is nearly always the case that the comparative is closer to the root than the superlative. I am aware of two (related) exceptions to the affix-ordering observation: in Estonian, the comparative is formed with the suffix *-(e)m* (added to the genitive stem); the superlative is normally formed periphrastically but some adjectives have a morphological superlative in *-im*, thus: *suur* 'bad', CMPR: *suure-m* SPRL: *suur-im* (Tauli 1973:85). In this case, the distinctive mark of the superlative (the vowel *-i*) occurs closer to the stem than the comparative *-m*. The same holds for Karelian (comparative *-mma/-mpa*, superlative *-i-mma/-i-mpa*, except in the nominative singular; Zajkov (1999:50).

¹³ The superlative formatives include a variety of elements. In some languages (including Latin, Greek and Sanskrit), the affix deriving the superlative is also used in the formation of ordinals. In Ubykh the *a-* prefix is the

reconstructed for Proto-Indo-European (13c); the first part of the superlative in **-is-tos* is the zero-grade of the comparative **-jes/-jos* (Seiler 1950:6, cf. Bopp 1856:374-415 for comparative remarks).¹⁴

(13) Morphological Superlatives with transparent nested structure (sample):

		comparative	superlative
a.	Czech:	-ši	nej-...-ši
	Latvian:	-âk	vis-...-âk
	Hungarian:	-bb	leg-...-bb
	Persian:	-tær	-tær-in
	Lithuanian:	-iau(s)	-iausia(s)
	Ubykh:	ç'a-	a-ç'a-
b.	Gothic	-iz-a	-is-ts
	Latin ¹⁵	-ior <-ius	-is-(t)imus
	Sanskrit	-(i)yās	-iṣ-ṭhas
		-tara	-tama ? <-tara-ma
c.	Proto-Indo-European	*-jes/-jos/-is	*-is-tos

The nested structure is also transparent in many languages employing periphrasis in the construction of the superlative, such as the modern Romance languages, modern Greek, Irish and others. In these languages, the superlative is formed by adding the definite article (or in Romanian, the definite determiner-like element *cel*) to the comparative, whether the comparative is itself periphrastic (14a) or morphological/suppletive (14b).¹⁶ Indeed, textbook presentations for these languages note that the superlative is derived from the comparative.

(14)	French:	positive	comparative	superlative
	a. 'big'	gros	plus gros	le plus gros
	b. 'good'	bon	meilleur	le meilleur

Various other strategies exist for deriving superlatives from comparatives, including reduplication of the comparative adverb in Tswana (Ullan 1972:140)—although this may be an absolute comparative), and use of the genitive form of a universal quantifier with the

definite article. Morphemes etymologically related to the quantifier *all* are also used to form superlatives, as in Baltic and Armenian. The source of the Slavic *naj-* prefixes is taken to be a locative element (Vasmer 1964-1973: 432). These differences in the formation of the superlative are set aside in the present study.

¹⁴ The *-s-* in the English superlative *-st* is in fact the reflex of the comparative morpheme, though the structure is long since transparent. Note that although I posit a decomposition of superlative that includes the comparative in all languages with a superlative degree, thus including modern English, I am not claiming that the *-s-* in *-st* is synchronically the exponent of the comparative morpheme. It is worth noting in this context though that the restrictions on which adjectives in English form a comparative with *-er* as opposed to periphrastically are inherited by the morphological superlative *-est*. Thus: *smart-er*, *smart-est*, vs. **intelligent-er*, **intelligenst-est*. This inheritance can be seen as a consequence of the nested structure, since superlative formation is fed by comparative formation on the analysis presented here.

¹⁵ On the segmentation of the Latin and Sanskrit affixes, see Hühner and Holzweissig (1912:551). Debrunner and Wackernagel (1930), in addition to Bopp.

¹⁶ This occurs prescriptively at least in English as well, for the superlative meaning when only two elements are compared. Thus prescriptively, referring to a couple (Pat and Sam), one finds *Sam is the taller*, and not *#Sam is the tallest*.

comparative (roughly ‘bigger of all’), as in Russian (Garde 1998:239) and Estonian (Tauli 1973:210). Note that the Estonian example is particularly relevant since the standard of comparison is not normally expressed with a genitive (using instead an oblique case or adpositional phrase, Ultan (1972:147), and thus this is a device particular to the formation of the superlative.

Of course, not all languages show transparent nesting of the sort in (13). One might then ask whether the nested structure is a point of parametric variation, or the nested structure in (8) is universal (among languages having a superlative), with the comparative morpheme simply lacking overt expression in the superlative context in languages like English. The CSG, I suggest, is decisive here. If only those languages with transparent morphology had nested structures, then only those languages would be expected to obey the CSG. But the fact is that (essentially) all languages obey the CSG, regardless of the overt morphological relationship between comparative and superlative degrees. Even languages without a transparently nested structure in the overt morphology must have that structure underlyingly, or the ABA pattern would be incorrectly admitted as a possibility. I conclude that the nested structure in (8) is thus the only option; all languages that have a synthetic superlative and comparative degree have the same pieces in the same hierarchical relationships, with variation limited to the morpho-phonological expression of those pieces.¹⁷

This conclusion has implications for the semantic analysis of degree constructions, which I will touch upon only briefly here. A common property of the standard analyses of superlatives in the formal semantics literature is the positing of a superlative morpheme *-EST*, which attaches directly to (gradable) adjectives as in (11) (see e.g., Heim 1999, 2000; the exception of note is Stateva 2002, who argues for embedding, as here). The morphological evidence (the CSG, and the nesting patterns) indicates that this is incorrect, and that the superlative is derived from the comparative. In effect, *-EST* “more than all others” must be composed of *-ER* “more” and *-T* “than all others”. To the extent that the components of the meanings posited for *-EST* can be divided in this way, the issue may be one of notation.¹⁸ However, Stateva (2002:68-76) provides an overview of some of the differences between superlatives and comparatives that would need to be addressed in any theory relying on a nested structure. In particular, she argues that previous work is correct in providing a quantificational account of comparatives, but that the arguments in favour of treating the comparative as a scope-bearing element do not extend to the superlative. If the superlative is indeed derived from the comparative, it would *a priori* be expected to inherit the scopal properties of the comparative. A range of considerations suggests that it does not (see also Sharvit and Stateva 2002).¹⁹

¹⁷ For a language like English, one might thus posit a zero allomorph of the comparative, that is conditioned to apply in the context of the superlative (cf. Stateva 2002:74). Alternatively, a readjustment rule could delete the comparative morpheme in the context of the superlative. Care must be taken to avoid having the deletion of the comparative bleed the context-sensitive root allomorphy rules in (9). The point of the paper is that the comparative is present for these rules, even when it is not overtly expressed. The correct result (absence of bleeding) follows automatically if vocabulary insertion in complex words proceeds root-outwards (see arguments to this effect in Bobaljik 2000) or if all readjustment rules follow vocabulary insertion rules (as in DM, see section 4.1 below).

¹⁸ Nothing in this paper precludes the possibility that the nested structure, in a language like English, is not [[[big]-ER]-T], but rather [[big]-[ER-T]], i.e., in which the comparative and superlative combine together prior to their combination with the adjective. What is crucial for such a proposal to work is that the comparative component be visible for conditioning root allomorphy in the suppletion cases. This observation will be relevant again in the discussion of the deadjectival verbs in section 5.

¹⁹ Although Stateva adduces examples of overt nesting from Serbo-Croatian and Old Church Slavonic (patterning with (13a)) to support a nested proposal, in the end she retreats from nesting, positing instead that the comparative morpheme that is contained in the superlative is distinct from the true comparative (Stateva’s *-er* versus *-ER*). It is crucial to the results described in the text above that if there is such a difference between the two types of comparative, this distinction must be invisible to the rules of contextual allomorphy (else a rule could apply only in

One might turn the tables here somewhat, and ask if there is any known syntactic or semantic difference in superlative constructions that is a function of whether or not the superlative transparently contains the comparative. Given that superlatives in a number of languages do contain the comparative quite transparently, one might ask if there is anything special in the syntax or semantics of these superlatives that is “missing” in languages like English, where the comparative marker itself is (synchronically) absent. I am aware of only two relevant studies, and both find no differences. The first study is Stateva (2002), in which English is compared to various Slavic languages and no difference is noted between nesting and non-transparently-nested languages. Implicitly, at least, (see especially p. 74) Stateva makes the considered claim that there is no semantic or syntactic consequence of having the comparative morpheme null or overt in the superlative. Similarly, Herdan and Sharvit (2006), who discuss the distribution of Negative Polarity Items in English and Romanian, show that the distribution is in all relevant respects the same across the two languages, even though the Romanian superlative transparently contains the comparative (which is periphrastic), while English does not. It appears, then, that while there are syntactic and semantic differences between comparatives and superlatives, those differences arise even when the nested structure is transparent, and thus the general (tacit) assumption that the differences are attributable in part to the absence of a comparative morpheme in the superlative is not correct.

Further discussion of the semantics would take us too far beyond the scope of the present article, I close merely by noting that a compositional semantics for the nested structure seems attainable, but is not without challenges.

3.3 **ABA: UG versus historical accident*

In the preceding sections I have proposed an explanation of the CSG for which the key factors lie in grammatical properties common to all languages, thus UG. Specifically, I have argued that the absence of the **ABA* pattern is unexplained unless one assumes both that superlatives are always derived from (i.e., structurally contain) comparatives, and that the rules that introduce suppletive roots are context-sensitive rules with the possibility of underspecification. The argument is especially interesting for those languages, like English, for which the nested structure is not morphologically transparent. The reason this is interesting is that this forms a poverty-of-the-stimulus type argument, one that is worth dwelling on for a moment. The argument is as follows.

One key property of the proposed explanation of the CSG is the nested structure. Superlatives are derived from comparatives. This must be true even for a language like English. However, for English, the fact that this is systematic is simply not learnable from the data. In the first place, English lacks the transparent structure seen in many other languages (in (13)), so the pattern cannot be learned on easy morphological grounds. In the second place, only two adjectives in English undergo suppletion in the formation of the comparative (*good-better*, and *bad-worse*); other languages (Hungarian, Estonian, Persian, Sanskrit, Modern Greek, Portuguese) have only one suppletive adjective. There are simply not enough relevant data points internal to any of these languages to speak of a pattern, let alone to attribute the pattern to, say, statistical inference. So the argument from suppletion (the CSG) cannot be applied (or used by the learner) internal to any given language. And yet, if the nested structure were not imposed upon the learner, we should expect the *ABA* pattern to arise.²⁰ Thus, we have a component of the analysis,

the context of the comparative, and not the superlative, voiding the main result). The need to posit systematic homophony across languages suggests a missed generalization, though this will necessitate a semantics different from that proposed by Stateva.

²⁰ Crucially, the argument here is not that the *ABA* pattern would be unlearnable. On the contrary, suppletion being a property of high frequency vocabulary items, the pattern *good-better-goodest* should be easily acquired (the discussion at (11) shows not only the theoretical considerations involved, but also how such a pattern might be seen, under standard analyses, as a simplification from the actually attested *ABB* and *ABC* patterns). The explanation

that appears to hold robustly across languages, but which in many languages at least, cannot be inferred from the data, a slight twist on the classical logic of the poverty of the stimulus, and thus, an argument for (a property of) UG.

It is worth noting, in addition, that the relevant property regards comparative and superlative degrees of adjectives, something that is not manifest in all, or even a large percentage, of the world's languages. Instead, it takes the form of an implicational universal. If a language has a synthetic comparative and superlative degree of adjectives, then the superlative is derived from the comparative. Yet a great many languages lack adjectives, and/or comparative degrees thereof, finding alternative means to express comparison (see Andersen 1983, Stassen 1995). As noted in the introduction, there is a geographic skew to the CSG, with its centre in Europe.

This observation raises the possibility of an alternative, historical explanation of the CSG, in place of the synchronic account offered here. Thus, in order to maintain the argument for a UG-based account, it is important to establish that an account in terms of inherited vocabulary items is insufficient, and it is to this point that I offer a few brief remarks here.

The first point against a historical account is that it is the pattern, but not the actual morphemes marking degree, that is shared across languages. This speaks against an account in terms of cognate morphology shared from a common ancestor or borrowed in periods of bilingualism. That the relevant morphology is not cognate is evident in the examples in (13). Even among languages in which the superlative is transparently derived from the comparative, the actual means used to derive the superlative differ substantially. In Indo-European, the suffix **-tos* that was used to form the superlative from the comparative was also used to form ordinals (Seiler 1950); the use of a common suffix for ordinals and superlatives is also found in Latin (Hühner and Holzweissig 1912:551, 572), but the relevant Latin suffix *-mus* is not a descendant of the Indo-European ordinal-forming suffix. The Slavic and Baltic languages with a morphological superlative also base the superlative on the comparative, but the superlative forming affix is a prefix unrelated to the ordinal-forming suffix. Hungarian, unrelated to the above languages, shows the same structural pattern (prefix *leg-* added to suffixal comparative *-bb* to form the superlative) but the pieces are not cognate. In Ubykh, the superlative-forming prefix is the definite article (Dumézil 1931:37). Other examples amplify this general point. Moreover, as noted above, the nesting pattern holds across distinct structural types of superlative formation (prefixing vs. suffixing), where the morphemes involved are also not cognate.

A second argument against a historical account mirrors the first, but with reference to the roots involved. Again, it is the pattern that is common among related and unrelated languages, yet there is wide variation in the individual roots (cf. Mel'čuk 2006:456). This is exemplified with a few select examples of the paradigm for 'small' among some Indo-European languages, as given in (15). The examples in (15a) share an apparently cognate root in the comparative and superlative, yet the positive roots are unrelated. Whatever the ancestral situation, at least two of these paradigms are thus innovative, but the innovation preserved the ABB structure of the paradigm. Likewise, in (15b), Danish shows an additional innovation, shared with some other Scandinavian languages. Namely, a further instance of suppletion has arisen, for number, in the positive degree of the adjective meaning 'small'. Yet this innovation too preserves the general pattern (ABB). The Anglo-Saxon example in (15c) shows the complementary situation. Anglo-Saxon underwent an innovation not in the positive form of the adjective, but rather in the formation of the comparative and superlative. Note that this innovation affected both the comparative and the superlative together, with the root *læss* used for both. Once again, sharing the suppletive root across the two degree forms preserves the ABB pattern.

sought here is not why an individual learner does not end up with an ABA pattern (the account of that lies in the input data available to the child), the explanation sought here is instead why the ABA pattern is never in the input in the first place.

(15) ‘small/little’

a.	Latin:	parv-us	min-or	min-imus
	OCS:	mal-ŭ	mĭn-jĭjĭ	
	Gothic:	leit-il-s	minn-iza	minn-ists
b.	Danish:	lille (sg) små (pl)	mind-re	mind-st
c.	Angl-Saxon:	lýt-el	læss-a	læss-t

In an even more telling example, Old Icelandic provides a clear case of the innovation of a suppletive paradigm from a previously regular adjective (an innovation that survives into the modern Scandinavian languages). As the Gothic and Anglo-Saxon examples show, the paradigm for ‘old’ was not suppletive, yet in Old Icelandic, the positive form was replaced with an unrelated root. In conformity with the CSG, this innovation respects the ABB pattern. Since this example illustrates the innovation of a suppletive paradigm where there had not been one before, there is simply no way to talk of the pattern being inherited in this case.

(16) ‘old’

Gothic:	alp-eis	alp-iza		(regular)
Ang-Sax:	eald	ield-ra	ield-est	(reg, +umlaut)
O.Ice.:	gamall	ell-re	ell-ztr	(suppletive)

What these examples show is that suppletion itself is not particularly stable. Neither roots nor morphemes are systematically cognate (or borrowed) among the languages displaying comparative suppletion, nor is the morphological structure (morphological comparative versus periphrasis, prefixes versus suffixes, source of superlative morpheme are allpoints of variation). Yet what is common is the ABB pattern and the absence of the ABA pattern.

I therefore suggest that a historical explanation alone is insufficient as an account of the absence of the ABA pattern.²¹ Every single one of the pieces involved in the pattern is subject to replacement (the positive root, the comparative root, the comparative and superlative morphemes), but the replacement of the individual pieces never yields the ABA pattern. The historical account must be supplemented by an additional constraint preventing the ABA pattern, that additional constraint appears to be a part of UG.²²

²¹ These considerations do not exclude the possibility that there was a single innovation of the morphological embedding of comparative within superlative in the remote past, and that the structure (but not the actual forms) underwent diffusion throughout the Greater European Sprachbund area. Even on such an account, I would contend that the stability of the shared pattern over what must be an extremely significant time depth calls for an explanation.

²² Attributing the embedding property to UG, of course, begs the question: why should UG have this property? It seems to me quite reasonable to think there may be a general cognitive basis for the embedding (after all, the meaning of the relative superlative is: “more than all others”). However, I am aware of no proposals that would bridge the gap between saying that a cognitive explanation is plausible and showing why that should be manifest in UG specifically as a morphosyntactic embedding, as claimed here. For example, works such as Heine (1997:124-126), discussing Ultan’s results, suggest a cognitive basis for the markedness relations that I am treating as structural nestedness, but the suggestion is based on the linguistic evidence, and not on any independent properties of the cognitive capacity of comparison.

3.4 Section summary: (im)possible morphemes?

I have argued in this section that the CSG is robust and not amenable to any obvious historical account. The absence of the *ABA pattern is only explained if some aspect of universal grammar ensures that the superlative is always built from the comparative. Since only a fraction of the world's languages have morphological comparative and superlative degrees of adjectives (if they have adjectives at all), the nature of the universal amounts to a proposed claim about an impossible morpheme. Specifically, it is possible for a language to have a comparative degree morpheme, with the meaning “>” (more), and it is possible for a morpheme to have a meaning such as “than all others”. By its nature, this latter morpheme (the superlative) will necessarily combine with a comparative (i.e., “tall than all others” should fail on semantic grounds). However, the claim here is that UG does not permit for a single morpheme with the meaning normally labelled superlative (*-est*) (up to the remark in fn. 18).

Before moving on, one further observation seems worth making on the topic of (im)possible morphemes. A striking fact that emerges from this study is that there is a fundamental asymmetry between comparison of superiority and comparison of inferiority. In periphrastic constructions, these two often stand in pairs (as in English *more/less*, *most/least*). However, I have come across no single reference to a morphological comparative of inferiority. One does find comparison of equality (“as X as”) expressed morphologically, as in Welsh and Ubykh, but no language has an affix meaning “less X”. This gap calls for an explanation. Given that the meaning is transparently expressible periphrastically, an appeal to general properties of cognition seems unlikely. Rather, the meaning “>” appears to simply be un-morphologizable. The meaning can only be expressed compositionally, for example through expressions such as *less* (which, of course, is the comparative of superiority of *little/few*). Thus, for a phrase *least high*, the etymologically justified analysis must also be the synchronic one: [little]-CMPR-SPRL [high], “more little high than anything else”. That is, there appears to be a fundamental asymmetry between periphrastic and morphological comparatives, with the former involving significantly more structure than the latter, and only the former permitting (derived) expressions of comparison of inferiority. See Bobaljik (In prep) for further remarks.

4. ADDITIONAL GENERALIZATIONS

Section 3 presented the account of the absence of the ABA pattern, and contrasted that explanation with possible alternatives. At this point, before turning to the CCSG, I wish to close some loose ends in the domain of comparatives and superlatives. In section 4.1, I consider the distinction between suppletion and irregular relations, offering an account of why the CSG holds only of suppletive forms. I then return to the AAC pattern, or more specifically, the absence thereof. As mentioned in note 8, this unattested pattern is not excluded by the account presented in section 3. In section 4.2, I offer some tentative remarks on how this might be excluded, and provide some reasons why I believe it is correct to keep the accounts of *ABA and *AAC distinct. In section 4.3, I turn to an asymmetry between morphological and periphrastic comparatives, and argue that the framework of DM captures another robust generalization in the data, which I term the *Synthetic-Suppletive Generalization*.

4.1 Suppletion versus irregularity

The CSG holds of suppletive relations, but apparent ABA patterns arise in irregular groupings. This is illustrated in (17). Classical Greek (17a) provides the clearest example, with surface *meg-* in both the positive and superlative, but *meiz-* in the comparative (the regular suffix is *-iōn*). Latin and German provide similar examples, where a root ends in a velar consonant in the

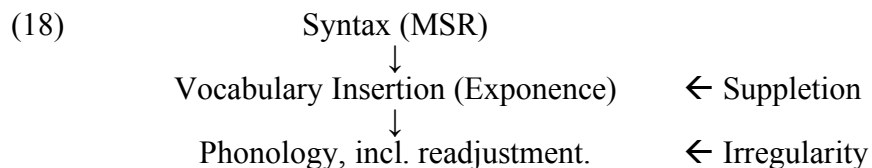
positive and superlative, but not in the comparative (abstracting away from surface allomorphy in German).

(17)		positive	comparative	superlative
a.	Cl. Greek ‘big’	meg-as/-al-	meiz-ōn	meg-istos
b.	Latin ‘big’	mag-n-us	mājor	maximus
c.	German ‘high’	hoch /hox/	höh-er /hœ.er/	(am) höch-sten /hœx-sten/

These are not examples of suppletion. As Osthoff (1899:26) notes, despite the surface variation in the form of the root for ‘big’ in the comparative and superlative in Greek and Latin, the root is one and the same through all three degrees of the adjective. What is at stake in the apparent *meg-*, *meiz-*, *meg-* sequence in Classical Greek, for example, is not suppletion, but rather the occurrence of an unproductive, phonological rule (palatalization) that occurs in the comparative of ‘big’ and perhaps a handful of other adjectives (e.g., *tach-us* ‘swift’, *thasson* ‘swifter’ *tach-istos* ‘swiftest’, Kinchin Smith and Melliush (1968:187) under the influence of the initial segment of the comparative. A comparable unproductive phonological rule applies in Latin *mājor* < *mag-ior*. In similar fashion, the alternations in the paradigm of German ‘high’ are attributable to a mix of productive and unproductive phonological rules, with a single underlying root in all cases.

The fact that the CSG holds of suppletion, but not of other phonological irregularities follows from general properties of the framework of DM, on the assumption that suppletion is contextual allomorphy. So far as I can tell, no such distinction is predicted under theories that fail to draw a categorical distinction between suppletion and irregularity, either treating the irregular-suppletion continuum as a cline (as in Natural Morphology, see Wurzel 1985) or treating all non-productive alternations as special cases of suppletion (as I understand Anderson 1992). The facts thus argue, in this case, in favour of the assumptions underlying DM.

As mentioned above, DM is a realizational theory of morphology, in which the morpho-phonological component of grammar is conceived of as interpreting the (logically prior) syntactic structure. Phonological rules, whether productive or unproductive, effect changes on an underlying representation (for example, the /g/ → /iz/ in Greek). In a realizational framework, such rules (readjustment rules) must apply after the rules of exponence that introduce the underlying representations of the morphemes into the derivation (in DM, these are called vocabulary insertion rules). The necessary ordering is sketched in (18).



Now, the rules of exponence take as their input a (morpho)-syntactic representation. The subset-superset relations identified above characterize this level of representation, and thus the elsewhere logic that derives the CSG (see section 3) will apply to rules of exponence, of which the suppletive alternations are, by hypothesis, a special case. On the other hand, there is no a priori reason why the readjustment rules, applying (necessarily) after vocabulary insertion, should be constrained by morpho-syntactic subset relations. The Greek (and Latin) palatalization rules are conditioned, it seems, by morpho-phonological context, the pre-vocalic *-i* < **j* of the comparative triggers the palatalization. While the superlative is a special case of the comparative in terms of its syntactic feature structure, the superlative, in these languages is not a special case

of the comparative in phonological terms (the initial *-i* of the superlative is the nucleus of the following syllable and cannot be rendered as a glide, thus fails to fuse with the preceding consonant). The conditions necessary for elsewhere ordering fail to be met where the conditions are phonological, rather than morphosyntactic. The comparative is simply different, phonologically, from the superlative. All else being equal, the logic underlying the CSG should hold over readjustment rules whenever the conditions for their application are stated in terms of morphosyntactic, rather than morphophonological features. Indeed, this is apparently correct, as discussed for the distribution of ablaut in section 4.2.2.

4.2 *AAC

As noted in the introduction, the ABA pattern is not the only pattern that is unattested, although it is the only pattern excluded by the account given above. Specifically, the pattern AAC (hypothetical **good-gooder-best*) is also unattested. However, this pattern seems to be expressible within the framework of assumptions put forward here. Consider again the rule schema from (9), repeated here.

- (19) Rule 3 $\sqrt{\text{ADJ}} \rightarrow C / [[_ \text{CMPR}] \text{SPRL}]$
 Rule 2 $\sqrt{\text{ADJ}} \rightarrow B / [_ \text{CMPR}]$
 Rule 1 $\sqrt{\text{ADJ}} \rightarrow A /$ <elsewhere>

Recall that a rule 3 (i.e., a rule targeting the superlative exclusively) is needed for languages like Latin and Welsh in order to capture the ABC pattern. Recall in addition that regular adjectives are characterized by rule 1 alone. The combination of a rule 1 and a rule 3, without a rule 2, for a given adjective, would yield the unattested AAC pattern. What is needed in order to exclude the AAC pattern is thus a means of ensuring that if there is a rule 3 applying to a given adjective, then there must be a distinct rule 2 applying to that adjective as well. I suggest that there is such a means available within morphological theory, and turn to this now.

4.2.1 Markedness

I suggest that the solution to the problem just outlined lies in the logic of markedness, and that a reasonable extension of a common idea will yield the chain of implication in (20a) for any adjective. This plays out such that only the combinations in (20b) are admissible, yielding the attested patterns (see (10), above), while the rule inventory in (20c), the one that defines the unattested AAC, is inadmissible.

- (20) a. Rule 3 \rightarrow Rule 2 \rightarrow Rule 1
- b. Rule 1 alone: AAA (regular)
Rules 1&2: ABB (suppletive)
Rules 1,2&3: ABC (doubly-suppletive)
- c. Rules 1&3: *AAC (inadmissible)

Let us begin by focusing on the implication Rule 2 \rightarrow Rule 1. Since Rule 1 is the default rule, the content of this implication is recast in (21). It says that for any given abstract morpheme or feature α , if there is a context-sensitive rule of exponence applying to that morpheme, then there is also a context-free rule of exponence for that morpheme. This can be distilled even further. What it says is that no root has only a context-sensitive form, and that for any root, there is always a default form.

- (21) if there is a context-sensitive rule for some root α : $\alpha \rightarrow X / ______ [F]$
 then there is corresponding context-free rule: $\alpha \rightarrow Y / ______ [F]$

This implication need not be stated as such as a part of UG, but may arise as a product of the nature of the acquisition process itself, inasmuch as learning Rule 1 is simply learning a root, while the acquisition of a context-sensitive rule involves the additional step of learning that a previously acquired root has two surface manifestations, one restricted to a particular context, and the other elsewhere. If this is plausible, (cf. Pinker 1984, especially the discussion on the acquisition of paradigm structure), then nothing further need be stated in the grammar to ensure the descriptive validity of (21).

The implication in (21) may be conceived of in terms of markedness. The feature [F] defining the context for the context-sensitive rule, in effect partitions the set of contexts in which *α* appears into those that contain [F] (marked) and those that lack [F] (unmarked) (cf. Noyer 1998 and especially Calabrese 2005). With reference to the examples under discussion, the comparative is a marked context for adjective roots, and a handful of adjectives have a special root allomorph (suppletion) that applies in the marked context.

We are now ready to return to the superlative context, introduced by Rule 3. Recall that the proposal of structural nestedness in (8) is one way of cashing out the markedness hierarchy proposed by Greenberg (1966:40-1), Canger (1966), and Ultan (1972) (positive < comparative < superlative).²³ That the comparative is marked with respect to the positive means that the comparative is a special case of the contexts in which the adjective root may appear. Likewise, that the superlative is marked with respect to the comparative means that the superlative is a special case of the comparative contexts. What (8b-c) express is that the comparative contexts are partitioned into a group marked superlative and a group lacking such a mark. Under this view, then, the logic of (21) should also characterize the relationship between the (rules introducing the) superlative and the comparative. Where [F] is [SPRL], rule 3 is a context-sensitive analogue to rule 2, lacking such a specification. The logic of (21) now applies. If, for a given adjectival root, there is a rule of exponence that is restricted to the superlative context, which is a special case of the comparative, then there must be a rule of exponence applying to the general case of the comparative, i.e., Rule 3 \rightarrow Rule 2. And this is precisely what is needed to correctly exclude *AAC.²⁴

The proposal of nested structure in (8) thus lies at the core of the accounts of the absence of *ABA and of the absence of *AAC patterns in the data. Nevertheless, the accounts invoke partly separate reasoning, and a critic might be tempted to ask if there were not some way to provide a truly unified account, that would simultaneously exclude ABA and AAC patterns. These patterns share the property that they can be covered by a single descriptive statement: if there is suppletion anywhere in the non-positive degree, then there is suppletion everywhere.²⁵ This is distinct from the CSG, as formulated above.

²³ It is also the case that if a language has a morphological superlative, then it also has a morphological comparative, with the possible exceptions of Modern Armenian and Classical Nahuatl, on which see the remarks in Appendix 2 and 4, respectively.

²⁴ This makes the further assumption that the rules (or the forces of acquisition underlying them) cannot make direct reference to superlative as a conditioning environment for the root exponence, but must make reference to the superlative only via the comparative. This largely preserves the general intuition that rules of contextual allomorphy are constrained to make reference to structurally adjacent contexts, with the twist that adjacency may be defined transitively. Perhaps a more perspicuous format for Rule 3 might be as in (i) (to be read as: in the context of the comparative, when the comparative is in the context of the superlative). Considerations of the broader ramifications of these questions here would take us too far afield.

(i) $\alpha \xrightarrow{1} C / __ [\text{CMPR} / [__ \text{SPRL}]]$

²⁵ My thanks to Duk-Ho An and Željko Bošković for raising this question.

As things currently stand, though, I suspect that it will prove important to keep the accounts partially distinct as I have done. This is because in other domains, we do find situations which may be characterized in a manner parallel to the CSG, with *ABA excluded, but where AAC is attested. One such domain, brought to my attention by Curt Rice and Klaus Abels (for English) and Gereon Müller (for German) concerns the distribution of ablaut in the German and English verbal paradigms, as discussed for German in Wiese (2004, 2005).²⁶ I provide a brief summary of this work in the next subsection.

4.2.2 Ablaut and *ABA

In German, the strong verbs are characterized by vowel alternations in characterizing the stems of the principal parts, i.e., the present (=infinitive), past and past participle (cf. English *sing-sang-sung*).²⁷ All told, Wiese notes that there are some 40 distinct patterns attested (Wiese 2005:2). Some verbs show a three-way distinction as just illustrated, while others show some degree of syncretism. Strikingly, the attested patterns of syncretism may be summarized as in (22), where identity refers to identity of the stem (vowel).

- (22)
- | | |
|----|--|
| a. | Distinct for all three principal parts. |
| b. | Past and past participle identical, present distinct. |
| c. | Present and past participle identical, simple past distinct. |
| d. | unattested: present and past identical, participle distinct. |

German examples (from Wiese) illustrating the attested patterns are given in (23); forms are listed in the conventional order: (1sg.) present, (3sg.) past, past participle.

- (23)
- | | | | | |
|----|---------|----------|----------|--------------|
| a. | 'speak' | sprech-e | sprach-Ø | ge-sproch-en |
| b. | 'water' | gieß-e | goss-Ø | ge-goss-en |
| c. | 'give' | geb-e | gab-Ø | ge-geb-en |

The examples in (24) show it may be possible to make the same point for English (C. Rice, K. Abels, p.c.), with a pair given for each pattern showing that the distribution is independent of whether the participle is marked with an additional suffix or not.²⁸

- (24)
- | | | | |
|----|-------|-------|-------------|
| a. | sing | sang | sung |
| | ride | rode | ridden (-n) |
| b. | shine | shone | shone |
| | tear | tore | torn (-n) |
| c. | come | came | come |
| | give | gave | given (-n) |

²⁶ Another context in which ABA is systematically excluded, but all other patterns, including AAC, are attested, is the relation among nominative-accusative-instrumental formatives in Czech nominal morphology, as discussed by Caha (2006). The nominative and instrumental may be syncretic, but only if the accusative is as well (AAA, *ABA). Other combinations of syncretism are possible (ABC, AAC).

²⁷ There are additional vowel alternations in the 2,3 sg present, as in 'sleep' 1sg: *schlafe*, 3sg: *schläft*) and in the subjunctive past (as in 'speak' past: *sprach-*, subjunctive past: *spräch-*), but these are predictable from the principal parts.

²⁸ A possible counter-example is *shear*, past *sheared*, participle, *sheared* or *shorn*. The OED gives a variant past *shore*, though Miriam Webster on-line, for example, does not. For the variety described by the OED at least, this counter-example, like those noted for the CSG in Basque and Welsh, involves a doublet, existing alongside the form consistent with the generalization.

Wiese's solution to the puzzle of why one of the possible syncretisms is unattested (namely (22d)) follows the same logic as I have proposed for the CSG. Specifically, he proposes that there is a markedness hierarchy characterizing the principal parts, namely that in (25a) (Wiese 2005:29). Reworking his features slightly, this corresponds to the feature sets in (25b), which shows the relationship of proper containment among the features.

- (25) a. present < participle < past
- b. i. [] "present"
 ii. [past] "non-finite past" = "participle"
 iii. [past, finite] "finite past tense"

Note that the order determined by the markedness hierarchy differs from the traditional textbook presentation of the principal parts (as in (23)) in that the participle occupies the middle position on the hierarchy, and in terms of features, is considered to be marked with respect to the present/infinitive stem, but unmarked among past forms, in contrast to the marked finite past form (the simple past).²⁹ Given these feature relations, the logic of underspecification now applies. In the absence of a designated form for any given category, the next most highly specified form is used. The possible patterns of syncretism, defined by (25b), are given in (26).

(26)	present	participle	past	contexts	examples
	A	A	A	(i)	(weak verb)
	A	B	C	(i, ii, iii)	(22a)
	A	B	B	(i, ii)	(22b)
	A	A	C	(i, iii)	(22c)
*	A	B	A	n/a	unattested

Just as with the CSG, the *ABA pattern is unstatable. It is not possible to single out the middle member of the hierarchy (in this case, the participle), to the exclusion of one of the other columns. To the extent that a particular ablaut form does in fact only surface in the participle, this can only arise when the use of this form in the simple past is bled by a more highly specified form for that context.

On the narrow point of the exclusion of *ABA patterns, Wiese's treatment of German ablaut (and its extension to English) seems to provide exciting confirmation of the validity of the approach sketched in section 3, and thus provides a new tool for the investigation of the fine details of feature structures. But note that the AAC pattern is attested in the German (and English) verbal ablaut paradigms, in striking contrast to the comparative-superlative domain. What does this tell us? On the one hand, I suggest that this justifies keeping the account of *ABA distinct from the account of *AAC. Their empirical distribution is simply different. On the other hand, we must now ask if the account I have offered for the absence of *AAC in the adjectival domain (section 4.2.1) is threatened by the existence of the AAC pattern in the ablaut paradigms.

²⁹ Wiese notes precedents for this treatment, motivated by the patterns of stem syncretism discussed here, in Adelung (1782) and Johnston (1997). It may also be relevant to note that the simple past is not used in all Germanic languages and dialects, for example, in Austrian German as in Yiddish, the simple past is replaced in all contexts by the compound past. This is consistent with the predictions of the markedness hierarchy just given, if the same notion of markedness regulates cross-linguistic distributional asymmetries (cf. Jakobson 1941).

Though quite speculative, I see at least two ways in which the broad picture may be kept internally consistent. The first direction to pursue would be to exploit the difference between nested structure and unstructured feature sets. I refrained from positing a nested structure in (25b) and left the most complex environment as a set of features [past, finite], of which [past] is a proper subset. If terminal nodes such as Infl (or “Tense”) may contain bundles of features (perhaps as a parametric option, see Bobaljik and Thráinsson 1998) then the considerations in section 4.2.1 and especially note 24 might not be relevant here, though the logic of underspecification will still apply. Note that the key evidence of nestedness, going beyond feature subsumption, in the CSG cases section 3.2, is not replicable in the ablaut domain, so far as I know.³⁰ This line of inquiry would provide a consistent picture, and would correctly yield the asymmetries and similarities between the two empirical domains. An alternative direction to pursue would be to appeal to the distinction between rules of exponence (vocabulary insertion) and readjustment rules. For the discussion of the CSG, it is important to draw this distinction (see §4.1 above), since the CSG regulates only the distribution of suppletion (unrelated roots/stems), and not the effects of phonological readjustment rules (unpredictable changes to a single root/stem). Ablaut is clearly a case of the latter. The logic of underspecification, yielding the *ABA result, should apply in the same manner in both types of rules, but it is not clear to me that the logic of markedness, and in particular the implication in (21), necessarily applies in readjustment rules. In rules of exponence, there must be a default rule associated with each root, and hence context-sensitive rules arise through the bifurcation of an environment that already has a default rule. In the case of the readjustment rules, the default is not the application of a rule, but rather the absence of any applicable rule (i.e., no change from the underlying representation, as introduced by a prior rule of exponence). For this reason, the considerations in the paragraph under (21) are less obviously applicable. If these considerations apply only to rules of exponence, and not to readjustment rules, then the ban on the AAC pattern will surface only in alternations of suppletion, regulated by rules of exponence, and not to ablaut. The logic of underspecification will apply in both environments. Having noted these possibilities to explore, I leave the resolution of the questions to future research.

4.3 Suppletion and blocking

One further generalization of apparent theoretical consequence that emerges from the investigation is what I will call the Synthetic-Suppletive Generalization (SSG), given in (27).³¹

(27) *The Synthetic-Suppletive Generalization*

(True) root suppletion never occurs in analytic comparatives/superlatives.

The SSG also serves as a point to distinguish among competing morphological theories. On some theories, including DM, the SSG may follow directly from general assumptions. Other theories, notably those in which synthetic and analytic forms compete directly in relations of morphological blocking (see Poser 1992, Vincent and Börjars 1996), appear to miss this generalization, at best treating it as an accident.³²

³⁰ There is one consideration, in English, that is potentially relevant and seems problematic for (25b). As noted in Halle and Marantz (1993), there are only some 58 verbs in English that have a participle form in *-n*. For all other verbs, the participle takes the same affix (although the stem may undergo readjustment) as the simple past, regardless of whether that affix is regular (*-ed*, with phonologically conditioned allomorphs), zero, or the phonologically unexpected *-t*, as in *%dwell-dwelt-dwelt*, and likewise *smell, spell*. This consideration suggests [past] is a subset of [past participle]. I leave reconciliation of these competing arguments for future research. Similarly, the participle in German (and Dutch) consists of a prefix and suffix as compared to just suffix for past tense, again apparently providing evidence of nesting at odds with the ablaut evidence.

³¹ The list of languages considered in formulating this observation is given in Appendix 2 and Appendix 4.

³² The works cited do not make their assumptions about morphology sufficiently clear to provide a thorough

4.3.1 Explaining the SSG

Consider first the content of the generalization. Recall from the discussion above that the overwhelming majority of suppletive comparative and superlative forms involve root suppletion (*bett-er*) and not word-suppletion (*worse*). That is, suppletion involves, for the most part, an unexpected root, but an otherwise transparent regular morphological/morphosyntactic comparative structure. German (28), illustrates.

(28)	gloss	positive	comparative (root+er)	German
a.	‘small’	klein	klein-er	
b.	‘good’	gut	bess-er	

When we turn to analytic comparatives, we strikingly find absolutely no instances of true root suppletion, that is, where there is an obligatory, regular degree marker, but replacement of the adjectival root. While many adjectives, in many languages, form their comparatives analytically, as in (29a), no adjective in any language that I have come across obligatorily forms a comparative as in (29b).

(29)	a.	regular	Adj_A	“more” Adj_A	
	b.	transparent:	Adj_A	“more” Adj_B	unattested

Note that the absence of (29b) is not because suppletion does not occur in languages that form regular comparatives analytically. While it is true that suppletion is characteristic of languages with synthetic comparatives (most languages with synthetic comparatives have at least some suppletion), and rare among languages that form all regular comparatives periphrastically, there are nevertheless languages of the latter type that show suppletion, namely, the modern Romance languages (except Romanian), and also Abaza (Tabulova 1976, O’Herin 1995).³³ French examples are given in (30), the (a) example is representative of regular comparatives which are always formed analytically, while the (b) example illustrates one of the few suppletive adjectives. Of central importance here is the absence of the comparative marker (adverb *plus*) from the suppletive form.³⁴

evaluation of how they fare relative to the SSG. The following discussion is accordingly brief, and framed in rather general terms. For a longer discussion of the general issue of blocking, with specific reference to comparatives, and the arguments in favour of DM in this domain, the reader is directed to Embick and Marantz (to appear), Embick (2007).

³³ Georgian displays a similar pattern in the superlatives. Regular superlatives are formed only periphrastically, but there are a handful of suppletive, non-periphrastic, superlatives. These are derived from suppletive comparatives.

³⁴ Note, that the form *plus meilleur* is used (though frowned upon prescriptively). As far as I can tell, analogous forms are used, and similarly proscribed, in other Romance languages (e.g., Italian *più migliore*) as well as in English (*more better*) though these are never the primary form of the comparative and always exist as doublets alongside the simple synthetic suppletive comparative. English is particularly telling in this regard, since it has a regular (non-suppletive) synthetic comparative, and the double comparatives (and superlatives) are attested for regulars and irregulars alike (e.g., *more quicker*, *most boldest*). Kytö and Romaine (1997) track the distribution of these double comparatives in English, noting that they were once used in the literary language, but in English, as in the Romance languages, they have been proscribed by grammarians. These secondary forms do not invalidate the SSG—no language requires a transparent suppletive periphrastic comparative, in contrast to transparent suppletive synthetic comparatives, which are the norm. Nevertheless, the fact that these redundant forms arise consistently across languages is surely significant. One possible analysis is that these forms are indicative of a lexicalization of the comparative form as a positive adjective, itself subject to comparison. Examples of this lexicalization abound. English *elder* is historically a comparative, and retains a comparative aspect to its meaning, but is no longer synchronically a comparative (**elder than me*). Likewise *optimal* is historically derived from a superlative, and

(30)	gloss	positive	comparative	French
a.	‘small’	petit	plus petit	
b.	‘good’	bon	meilleur	

Another line that does not pan out would be an appeal to “redundancy” (cf. the *No Vacuous Affixation Principle*, Marantz 1984). One could imagine the suggestion, for example, that (29b) is excluded because the suppletive root (Adj_B) already expresses the comparative degree, and thus the comparative adverb is at best redundant. The French facts just noted are suggestive of such an approach, especially inasmuch as the adverb *plus* is used colloquially with *meilleur* (see n. 34). But such an approach stumbles, it appears, with respect to synthetic comparatives, which, as noted above, are routinely characterized by such a redundancy. Thus, parity of reasoning would suggest that the root *bess-* in (28b) already expresses the comparative degree, and thus the comparative suffix is at best redundant, and similarly for Latin *mel-ior* ‘better’.³⁵

So what does explain the striking asymmetry between analytic comparatives (never transparent) and synthetic comparatives (mostly transparent)? A DM approach to synthetic-analytic alternations (see Embick and Marantz, to appear, Embick 2007) provides the tools to explain the asymmetry. As these works explicitly discuss comparative constructions (though not suppletion), I will provide only the briefest sketch of the relevant points here.

A consideration of synthetic-analytic alternations in comparative constructions beyond Romance shows that listedness cannot be the key element that decides the competition between forms (as it appears to be in French).³⁶ That is, the alternation cannot be reduced entirely to the basic blocking relation whereby a listed, irregular form (like French *meilleur*) blocks the regular form

retains a superlative meaning (the *OED* gives: *optimal* “best, most favourable...”), but is not grammatically the superlative degree of an adjective (it can itself be compared: *more optimal* receives 566,000 Google hits, Aug 10, 2006). Similarly, Italian adjectives such as *superiore* ‘superior, higher’, *maggiore* ‘bigger’, are transparent descendants of Latin comparatives (suffix *-ior*) but are now simple adjectives, and fail to participate in comparative constructions (**maggiore di* ‘bigger than’, A. Calabrese, personal communication 2006). Note also Turkish *beter* ‘worse’ (borrowed from Persian) alongside two adjectives for ‘bad’, *fena* and *kötü*. Here again, although the meaning of *beter* is comparative in some sense, the form *beter* is not grammatically the comparative form of *fena* or *kötü*: these both form regular comparatives. The form *beter*, like English *optimal*, is itself subject to further comparison, and moreover, in constructions of explicit comparison (X is bad, but Y is worse), it appears that an overt comparative form (not just *beter*) is needed. (For discussion of the Turkish examples, I thank: M. Erdal, M. Keleşir, N. Şener and S. Şener.) A source for lexicalization of the historical comparatives is readily imaginable, for example, in sentences such as “Jeffrey was sick but now he is better.”

³⁵ The facts constituting the SSC are not addressed in any of the treatments of comparative suppletion that I am aware of, hence one must make educated guesses about how (29b) might be excluded. Papers such as Vincent and Börjars (1996), which treats the historical development of the Romance comparatives from an LFG perspective, is silent about the workings of morphology. The rules of the system apply to words, such as *altior* ‘higher’ and *melior* ‘better’ (p.10) with no discussion of how these properties arise as a combination of their parts. The redundancy problem arises for them, as they recognize the internal complexity of *mel-ior*, and in particular, the regular nature of the comparative suffix in this form. The only way I see to avoid the redundancy problem would be to assume that suppletive forms, even if transparent, are listed without internal structure. Thus *better*, *melior* would be seen as synchronically unsegmentable, like French *meilleur*, with the transparent morphology a historical residue. I have argued against treating the suppletive forms as historical residue in section 3.3, on the grounds that this move would fail to provide an account of the CSG.

³⁶ Note that in Italian, and other languages, there is free variation between the synthetic and analytic comparatives. In English, even those adjectives that otherwise require an analytic comparative (*-er*) may take the synthetic comparative in a variety of environments, as is well documented in the literature. Note also that for French, the *bon~meilleur* alternation involves blocking, but for other adjectives (*petit* ‘small’, and *mauvais* ‘bad’, the analytic and synthetic comparatives are both used, with differences in meaning, see Dietiker (1983:104).

(which in the French case happens to be periphrastic). The insufficiency of such an account is shown by English, which has, in addition to suppletion, an alternation between synthetic and analytic forms where both forms are regular and productive. Some adjectives (especially monosyllabic adjectives) require a synthetic comparative (as *smarter*, **more smart*) while others require the analytic (*more intelligent*, **intelligenter*), with a well-known area of variability in between (*politer*, *more polite*). Focussing on the clear cases, it does not seem tenable to assert that forms, such as *smarter*, that (apparently) block periphrastic comparatives are all listed as synchronically unanalyzable wholes, to the extent that nonce forms with the right phonological shape pattern with *smart* - *smarter* (e.g. *yip* – *yipper*, see Dalalakis 1994, Clahsen and Temple 2003; see below for further discussion).

Looking at the larger picture then, there are two separate alternations that must be recognized: the choice between an analytic and synthetic form, and a second choice, between a regular and an irregular form. Under a DM approach, these are separate choices, effected by different operations. The structure of comparatives, generated by the syntax, is as in (31a), with separate comparative and adjectival heads. If nothing else happens, this will yield a periphrastic comparative, with each head spelled out individually (*more intelligent*). This is not the only option, of course. DM also countenances a post-syntactic operation, namely Morphological Merger, as in (31a). This operation maps two heads in the syntax that stand in a complementation relation, to a complex terminal node in the morphology. The rule of Merger thus derives synthetic comparatives (see Embick and Marantz, to appear, Embick 2007 for details).

- (31) a. [DegP CMPR [AdjP ADJ]]
 b. Merger: [BP B [AP A]] → [X° [A] B] (linear order not relevant)

Merger does not entail suppletion or even irregularity. In English, there are a host of regular synthetic comparatives (*smart-er*, etc.) as already noted. Suppletion, under this framework, is the result of a further rule, specifically, as argued above, a rule of contextual allomorphy such as those in (9). What is needed in order to derive the SSG is simply the assumption that the contexts for rules of contextual allomorphy are local, specifically, word-internal. In order for the CMPR head to trigger contextual allomorphy of the root (i.e., root suppletion), Merger must have applied. But if Merger has applied, we are no longer dealing with (the structure underlying) an analytic form. The unattested pattern (29b) simply cannot be derived.³⁷

What then of French? The English examples make the strong case that there are two distinct steps—the analytic-synthetic alternation and the regular-irregular alternation. The SSG makes the case for seeing these as entering a feeding relation, whereby the regular-irregular relation is parasitic on the prior application of Merger. As it happens, in French (and other Modern Romance languages, also Abaza) the few forms that undergo Merger all happen to also be subject to suppletion as well. From the point of view of UG, this property of French must be treated as an accident. That it cannot be universal is shown by the fact that it is not universal. In English (and most of the other languages in the survey), the irregular forms are only a small, proper subset of the forms that undergo Merger, leaving a residue of regular, analytic comparatives.

The two-step solution, deriving the SSG, is not available (it seems) to theories that propose to treat the Romance comparative formation as an instance of morphological blocking—i.e., where the listed form *meilleur* directly blocks the otherwise expected periphrastic comparative *plus bon*. Such theories must countenance root suppletion in otherwise morphosyntactically regular

³⁷ This reasoning does not exclude forms like %*more better*, *plus meilleur* if they have an analysis as sketched in fn. 34. Otherwise, more needs to be said. See also §3.4 for reservations about treating the synthetic and analytic comparatives as syntactically equivalent.

comparative constructions (as noted above), and thus there is no obvious means by which to exclude the unattested pattern (29b). If characterized correctly here, the theoretical choice before us amounts to determining which generalization is spurious, the generalization that periphrastic forms may be blocked by listed words (true of Romance) or the SSG (true universally, so it seems). I contend that the theory with broader generality is, in this case, DM.

4.3.2 *Loose ends*

Before moving on to the CCSG, there are two final points regarding the preceding discussion that stand to be addressed. The first concerns a careful point of ordering that arises under the DM treatment of synthetic-analytic alternations, when taken together with the treatment of suppletion as contextual allomorphy presented above. The second concerns an empirical puzzle from Russian, which I will note, but leave open with some speculative remarks.

In section 4.3.1, I showed how the SSG can be derived under the assumption that Merger feeds the contextual allomorphy rules that introduce suppletive roots. In the absence of Merger, the comparative head is not within the same complex terminal node (word) as the root, and thus cannot serve as a context for conditioning root allomorphy. This requires some delicacy in implementation, in order to avoid an ordering paradox (as noted by Andrew Nevins, personal communication, 2006). The paradox arises if the alternation between synthetic and analytic comparatives in English is governed by phonological characteristics of the root (for example, if Merger occurs when the root is mono-syllabic or di-syllabic ending in *-y*). This view creates an apparent paradox, since the phonological characteristics of the root would need to be known prior to the application of Merger. Since the root's phonological form is introduced by the rules of exponence, this would seem to require that these rules precede Merger, though I have just argued that they must follow Merger.

The paradox is avoided if the conditioning of the application of Merger does not make reference to surface phonological characteristics of roots, but is rather synchronically determined by a diacritic.³⁸ A review of the literature suggests that this is in fact correct. Specifically, while there are some trends and sub-regularities, there are counter-examples to a phonological account in both directions. Monosyllabic adjectives such as *ill* and *apt* resist *-er* suffixation, and near minimal pairs exist in disyllabic adjectives (*handsomer* vs. **irksomer*, Clahsen and Temple 2003). Particularly relevant is the experimental work of Graziano-King (1999) (see also Dalalakis 1994).³⁹

There is an over-arching limitation, such that adjectives greater than two syllables resist the comparative suffix (with well-known exceptions, including affixation of *-y* or *un-*, see below). However, among adjectives that are not excluded on these grounds, the results are far from neat. Thus, below the tri-syllabic threshold, Graziano-King shows that the major factor determining whether comparative formation is via suffixation or periphrasis is frequency, not phonological form. In one of her tasks (a relative acceptability judgment), for example, high-frequency, mono-syllabic adjectives like *old*, *long* took the suffixal, rather than periphrastic comparative in 99% of responses, while low-frequency items like *lax*, *gaunt* took the suffixal comparative in only 15% of responses. Strikingly, for nonce words on the same test, the suffixal comparative was preferred over the periphrastic at exactly 50%. Similar results obtained across a range of experimental designs. The conclusion to be drawn is that there is a phonological restriction (the tri-syllabic restriction) but that within adjectives that are phonologically amenable to suffixation, the distribution is diacritic-like, rather than phonological. For existing words, there is a fact-of-

³⁸ The paradox is also avoided if the phonological conditions on the attachment of the comparative suffix are treated as a surface filter, rather than applying at the point of the derivation at which affixation applies. My thanks to Mark Baker for discussion of this point.

³⁹ I thank Nilüfer Şener for drawing Graziano-King's work to my attention.

the matter as to whether the adjective is compatible with the suffix or not, a property we might indicate as the diacritic [+M]. For nonce words, there is (by definition) no information in the input as to whether the word does or does not bear the diacritic, and subjects perform at 50%. If there had been a phonological rule at work (monosyllabic adjectives take the affix by default), the expected performance should have been near ceiling, whereas if listedness (i.e. treating forms like *smarter* as rote-learned suppletion, and synchronically unsegmentable) were at issue, nonce words should substantially resist suffixation. The 50% performance, I suggest, is best understood only if there is a diacritic (or some notational variant thereof). At least superficially, the pattern appears to me to be reminiscent of other diacritics such as gender assignment, strong vs. weak verbs in Germanic, with partial regularities that may generalize (e.g., by redundancy rule) but no overarching phonological regularity. For example, in Russian, certain word-forms provide no phonological cue as to gender. In one study looking at nonce words ending in unstressed [a], which are ambiguous between feminine and neuter gender, subjects chose feminine over neuter at roughly a 3:1 ratio, closely tracking the relative frequency of these two genders in the language (Tarasenkova 2007). The conclusion to be drawn is that for gender, in Russian, when phonological or other cues (such as natural gender) are unavailable for particular items, speakers make an educated guess, with an appeal to the statistical probability for each gender (feminine:neuter = 3:1). I contend that this is the best interpretation of Graziano-King's results for English comparative formation as well, and conclude that, synchronically, whether or not an adjective takes a morphological comparative is a lexical property, encoded via a diacritic. Now, there is no compelling reason to suppose that the diacritic is inserted along with the phonological matrix, rather than being associated with the root throughout the syntax. If the diacritic is indeed part of the abstract root, then the pitfall noted by Nevins is neatly side-stepped.⁴⁰

A final loose end is a puzzle posed by Russian superlatives (called to my attention by G. Corbett). The puzzle centres around the adjective 'good', which shows suppletion in the comparative, but can also form an apparent analytic superlative on the basis of either the positive or comparative root, as in (32).

(32)	positive	comparative	superlative	Russian 'good'
a.	xoroš-ij	lučš-e	sam-yj xoroš-ij	
b.			sam-yj lučš-ij	

Depending on how one looks at this pattern, it appears to be another doublet that is potentially problematic for the SSG, the CSG, or both. Without being able to offer a full analysis of this construction, the Russian superlatives have a set of properties which, I believe, mitigate the apparent problem to some degree, though I ultimately leave the matter unresolved.

I suggest that a key observation here is that superlatives are built on the declinable form of the adjective. The form *sam-yj lučš-ij* is no exception in this regard. Note though that the adjective 'good' is one of only four adjectives that has a declinable synthetic comparative. Synthetic comparatives in Russian are normally indeclinable (ending in *-e*), but exactly four adjectives (including the three that show comparative suppletion) have declinable comparative alongside the regular, indeclinable form ('good': positive *xoroš-ij*, comparatives *lučš-e*, *lučš-ij*, 'bad': positive *plox-oj*, comparatives *xuž-e*, *xud-š-ij*, 'small': positive *malen'k-ij*, comparatives *men'sh-e*, *men'sh-ij*, 'big': positive *bol'sh-ój*, comparatives *bóljš-e*, *ból'sh-ij*). Now, it happens that exactly these four declinable comparatives are (or were) ambiguous between comparative and

⁴⁰ This view also eliminates the special bracketing paradox posed by *unhappier*, *unrulier* (Pesetsky 1985, among many others), reducing it to the general property that prefixes in English (and Germanic generally) are transparent for the percolation of features. The adjectival roots are marked for diacritics regulating combinatorial potential, and these diacritics percolate through the prefix *un-*, just as, in the normal case, diacritics regulating choice of tense morphology (strong/weak) on verbs survive prefixation.

superlative uses (cf. the *elative* in Arabic), with or without the prefix *nai-*. This is now only productive for *lučš-ij*, as in (33) (Garde 1998:238).

- (33) moj lučš-ij drug
 my better-m.sg. friend
 ‘my best friend’

In this way, then, Russian pattern may reduce to the Italian pattern, mentioned in n. 36, in which the periphrastic and suppletive-synthetic comparatives are in free variation. The true periphrastic superlative is only *sam-yj xoroš-ij* (32a), with the non-suppletive root, in conformity with the SSG. The form *lučš-ij* is an analytic formation, thus subject to suppletion. The latter is demonstrably a superlative on its own, but as in many languages, may optionally be reinforced by an intensifier, such as *sam-yj*, which literally means ‘very, same’ rather than ‘most’. If these suggestions are on the right track, then the Russian data are compatible with the picture presented here.

4.4 Section summary

In this section, I surveyed a variety of additional generalizations that emerge from the investigation of the CSG. Each generalization contributes one additional piece to the broader picture, and each one serves as a potential choice point among theories. DM remains as a theoretical framework that allows for an accurate characterization not only of the attested patterns, but also one that divides up the landscape of possibility correctly, excluding a variety of unattested patterns where other frameworks appear to over or under-generate.

5. THE COMPARATIVE-CHANGE-OF-STATE GENERALIZATION

At this point, we leave superlatives and move to the second generalization introduced in the introduction, namely, the CCSG, repeated here.

- (3) *The Comparative-Change-of-State Generalization (CCSG):*

If the comparative degree of an adjective is suppletive with respect to the positive form, then the (basic) corresponding change-of-state verb is also suppletive.

The change of state verbs corresponding to some adjective X are those verbs whose meanings can typically be paraphrased as “become X” (inchoative) or “make s.th. X” (causative), see Levin (1993:245). These are among the *degree achievements* of Dowty (1979). A sampling of examples consistent with the CCSG are given in (34) (for additional examples, see Appendix 3; the difference between these and other deadjectival verbs will be considered briefly below).

- | (34) | gloss | positive | comparative | verb | | |
|------|--------|----------|-----------------|-------------|-------------|----------|
| | ‘bad’ | bad | worse | worsen | *badden | English |
| | ‘bad’ | plox-oj | xuž-e (</xud-/) | u-xud-š-at’ | *u-plox-at’ | Russian |
| | ‘good’ | hyvä | pare-mpi | para-ntaa | | Finnish |
| | ‘bad’ | cud-i | u-ar-es-i | a-uares-ebs | | Georgian |

The pattern is analogous to the CSG: ABB is the norm, while *ABA is excluded. Parity of reasoning with the first section leads us to the same conclusion. Namely, deadjectival change-of-state verbs must properly include the comparative, as in (35a), where V_{Δ} represents the morpheme that forms verbs from gradable adjectives (for example, the BECOME operator of

Dowty 1979). The structure in (35b), as in Dowty (1979) (with antecedents as early as Lakoff 1965), must be unavailable (at least for gradable adjective roots).

- (35) a. [[[ADJ] CMPR] V_Δ]
 b. *[[ADJ] V_Δ]

Note that the claim made here is not (just) the rather obvious point that the word *worsen* contains the comparative. Rather, the claim must be that all deadjectival change-of-state verbs (from gradable adjectives) contain the comparative, even where the containment relation is not morphologically transparent. Thus the verb (*to*) *cool* in English must have the morphological structure in (35a) (loosely paraphrasable as [BECOME [COOL-ER]]) and cannot be simply [BECOME COOL], as commonly assumed since Dowty (1979). The reasoning here is strictly parallel to the argument against allowing the superlative to attach directly to the adjectival root, given in section 3.1. If it were possible for V_Δ to directly embed the positive adjective, there would be no reason why **to badden* should be excluded. Without the assumption that the comparative is always present, there is no way to systematically excluded the ABA pattern. Seen in this light, the claim is, in its strongest form, that no language may have a deadjectival change-of-state verb that means “become ADJ”, as opposed to meaning “become ADJ-er”.

In the next subsection, I will point briefly to confirming morphological evidence in favour of the proposed embedding. I turn then to a discussion of the semantic issues facing the proposal, and offer some remarks on a direction that appears to offer some measure of plausibility. I turn then to issues of a somewhat more mundane nature, namely, a methodological issue in determining which verbs count as being the “corresponding change-of-state verb” for some adjective, for the purposes of the CCSG, and finally, a consideration of some apparent counter-examples. Before proceeding, it is important to point out that the conclusions reached here depend on the factual accuracy of the CCSG. As Appendix 3 indicates, I have reliable information about verbs for only about half of the languages that have morphological comparatives. Within this group, the CCSG is notably robust, but it is not without exceptions. Some of these are only apparent and can be explained away (section 5.4). Others, though, seem difficult to re-analyze at this time, and are left as outstanding puzzles, with the acknowledgment that the analysis on offer here will falter if the CCSG represents a statistical trend rather than a true universal.

5.1 Nested Structure

As with the CSG, the proposed nesting in (35a) can be supported with examples of transparent embedding of the comparative in many languages, including German, Dutch, (late) Latin, Czech, Polish, and, outside of Indo-European, Georgian. German examples are given in (36), showing transparent derivations from regular (a), umlauting (b) and suppletive (c) comparatives.

(36)	gloss	adjective	comparative	verb (infinitive)
a.	beautiful	schön	schön-er	ver-schön-er-n
b.	big	groß	größ-er	ver-größ-er-n
c.	good	gut	bess-er	ver-bess-er-n

The evidence for the CCSG from transparent nesting is, however, somewhat slimmer than it was in the case of the CSG. This is because the transparent nesting is not systematic across the relevant class of verbs in any of the languages investigated to date. Thus in German, alongside the verbs in (36) one also finds, for example, *dick* ‘thick’, comparative: *dick-er*, verb: *ver-dick-en* and not **ver-dick-er-n*. I am aware of no systematic factors that determine whether a given deadjectival verb will contain the comparative morpheme or not.⁴¹ With this worry noted, and

⁴¹ Martin Krämer (personal communication, April 2006) observes one possible sub-regularity within the non-

pending evidence to the contrary, I will continue to maintain that all verbs contain the comparative, leaving the presence or deletion of the overt comparative morpheme as an idiosyncratic property of individual lexical items in some languages.⁴²

5.2 Semantics: From cooler to cool

The CCSG leads to the conclusion that deadjectival change-of-state verbs contain the comparative (35a), and are never built by adding verbal morphology directly to the positive root (35b), appearances notwithstanding. Morphology aside, this claim should be surprising from a semantic perspective. To whatever extent it may have been plausible to posit a general semantic reasoning behind the embedding of comparatives in superlatives (on the basis of the paraphrase: ‘more X than all others’), there is no obvious semantic reason why deadjectival degree achievements should necessarily include the comparative. Indeed, in periphrastic constructions, either the positive or comparative degree of the adjective may be used, with a corresponding difference in meaning. This is illustrated for inchoatives in English in (37); the reader can readily verify that such pairs may be constructed for causatives (make something X) in English, as well as for degree achievements in other languages.

- | | | |
|------|----------------------------|-----------------------------|
| (37) | become bad
become worse | become big
become bigger |
|------|----------------------------|-----------------------------|

The relevant restriction, then, is a restriction on morphological derivation, and not on the compositional construction of complex meanings. Assume, then, as in section 3, that these are the facts, and that the CCSG has thus revealed a property of the inventory of (im)possible morphemes in UG. Even if that is the case, a question remains as to how to reconcile this structure with the evidence that has led previous researchers, such as Dowty (1979) and Abusch

transparent degree achievement verbs in German (i.e., those that lack the *-er* morpheme). Namely, among those adjective roots that undergo umlaut in the formation of the comparative, some also undergo umlaut in the formation of the verb, while others do not. Those derived verbs in which the adjectival root is subject to umlaut are basically transitive, and form derived intransitives with the reflexive (medio-passive) pronoun *sich* (as in (i)). Deadjectival verbs from umlautable roots that do not undergo umlaut form simple (underived) intransitive verbs (as in (ii)).

- | | | |
|------|--|--|
| (i) | hart – härter – sich verhärten
jung – jünger – sich verjüngen | ‘hard – harder – to harden (intr.)’
‘young – younger – to become younger’ |
| (ii) | alt – älter – veralten
arm – ärmer – verarmen | ‘old – older – to age’
‘poor – poorer – to become poor’ |

Note that for the purposes of the generalizations considered in this paper, umlaut is classed as an irregular, rather than a suppletive, pattern, thus all of these examples are consistent with the CSG and CCSG. Nevertheless, this sub-regularity seems to be significant, though I have no insights to offer.

⁴² As Edwin Williams observes (p.c., 2006), the proposal advocated here might lead one to expect that the idiosyncratic morphological restrictions on comparative (*-er*) affixation are inherited by the verb, just as they are by the superlative (see n. 14). This appears to be correct, at least for contemporary English *-en* suffixation (*shorten*) and zero derivation (*cool*). All the deadjectival change of state verbs from gradable adjectives listed in Levin (1993:245) embed adjectives that are compatible with *-er* suffixation for comparatives. However, as Mark Baker points out (p.c., 2006), verbs such as *modernize* behave like degree achievements, but **modernier*. The *-ize* class may force the conclusion that phonological selectional restrictions on affix combination are encoded as filters, since the structural analysis must be *modern-ER-ize* (with subsequent deletion of *-er*).

Note that English, curiously, has exactly one non-suppletive adjective for which the corresponding verb apparently contains the comparative, namely *to lower*. Huddleston and Pullum (2001) also consider this verb as being exceptional in that it contains an apparent inflectional morpheme (the comparative) inside a change of category (the zero-derivation from adjective to verb). Under the analysis presented here, all deadjectival verbs have at some level of abstraction the structure that is apparently overt in *lower*. The transparent examples just mentioned show that UG must permit this; see also Kahnemuyipour (2000) on nominalization of comparatives in Persian.

(1986), to reach the conclusion that the deadjectival verbs are either never built on the comparative,⁴³ or are ambiguous between comparative and non-comparative derivations.

Recently, Hay, et al. (1999) and Kennedy and Levin (to appear) have made proposals that suggest a promising direction. What these authors contend, in essence, is that the appearance of a meaning like ‘become X’ can be generated from a semantics that properly gives only ‘become more X’, along with various pragmatic inferences. I illustrate in a rather superficial manner here.

One of Dowty’s important observations regarding degree achievements, a class of predicates including deadjectival change-of-state verbs, was that many of these verbs behave ambivalently with respect to standard telicity diagnostics. Thus, the verb *to cool* combines freely with telic (‘in X time’) and atelic (‘for X time’) modifiers, as illustrated in (38).

- (38) a. The soup cooled in an hour.
b. The soup cooled for an hour.

Roughly speaking, the telic sentence invites a paraphrase with the positive adjective (‘The soup became cool’) where the sentence with the atelic modifier invites rather a paraphrase with the comparative (‘The soup became cooler’), cf. Abusch (1986). As is well known, the comparative does not entail the positive: the tomato soup can be cooler than the potato soup, even if neither one is cool. The sentence (38b) seems to display the same failure of entailment—the soup may cool for an hour, but still not be cool.

Another telicity diagnostic is illustrated in (39). For an atelic predicate such as *sing*, the progressive entails the perfect. If Kim is singing, then she has completed some amount of singing. For a telic predicate such as *sing a song*, however, there is no such entailment, since the perfect indicates the completion of the song, which the progressive does not (Vendler 1967, Dowty 1979).

- (39) a. Kim is singing. \Rightarrow King has sung.
b. Kim is singing a song. \nRightarrow King has sung a song.

With regards to degree achievements, we find that some verbs do license the entailment (and hence are atelic) while others do not (see (40)). Apparently, it is lexical properties of the different adjectives that controls this behaviour.

- (40) a. Kim is widening the path. \Rightarrow Kim has widened the path.
b. Kim is straightening the rope. \nRightarrow Kim has straightened the rope.

To capture these variable telicity effects, Dowty (1979:90ff) appealed to the vagueness of the contextual standard for the gradable adjective. In effect, his proposal for the atelic cases is that the threshold for counting as ‘cool’ in (38b) shifts over time, with the soup being evaluated as undergoing successive transitions from ‘not cool’ to ‘cool’ over a span of time. Under Abusch’s (1986) extension of Dowty’s ideas, the pair in (38) reflects instead an ambiguity between [BECOME [COOL]] and [BECOME [COOLER]].⁴⁴

What Kennedy and Levin (2007) suggest, in essence, is that the variable telicity effects can be captured without semantic/syntactic ambiguity, from a comparative-like derivation. ‘To cool’ always means, for them, ‘to make/become more cool’. What derives the telicity effects is an

⁴³ “This ... avoids having to derive The soup cooled from the morphologically unmotivated BECOME [The soup is cooler] rather than simply BECOME [the soup is cool].” (Dowty 1979:90).

⁴⁴ But see Abusch (2005) for a different view.

extent variable that measures out the degree to which the change has taken place. The extent variable is often implicit, but can be explicit, as in (41).

- (41) a. The soup cooled **by 5 degrees** in 2 minutes.
b. The soup cooled **from 100° to 95°** in 2 minutes.

As they note, when the extent phrase is explicit, this phrase plays the role of incremental theme in determining the telicity of the VP; when the extent is bounded as it is in (41), then atelic modifiers are infelicitous (see (42a)), but when the extent is unbounded, the atelic modifiers are felicitous (42b).

- (42) a. #The soup cooled **by 5 degrees** for 2 minutes.
b. The soup cooled **somewhat** for 2 minutes.

Thus, the extent expression plays the same role as the direct object in examples such as (43), yielding a telic VP when bounded, and an atelic VP otherwise.

- (43) a. Leo ate **5 apples** in/#for 10 minutes.
b. Leo ate **apples** #in/for 10 minutes.

What HKL suggest is that in the absence of an overt expression of the extent phrase, the context must determine what the relevant extent is (and whether or not it is bounded). For cooling soup, the extent may reasonably be expected to be something like ‘to a relevant extent’. Thus, a question like (44a), when asked of a guest, may reasonably be understood as ‘to an extent requiring the host’s attention’. Real-world knowledge suggests that that extent is when the temperature has fallen below the palatable threshold, and may elicit an answer like (44b). On the other hand, in the kitchen, asked of a sous-chef, the same question in (44a) may be felicitously understood as ‘to an extent that permits serving it’, and the answer (44b’) may be appropriate, that is, a ‘yes’ answer even though the soup has not become cool.

- (44) a. Has the soup cooled?
b. Yes, we should reheat it.
b’. Yes, it’s ready to serve.

What is crucial here is that both involve the same semantics—(44a) merely asks whether the temperature of the soup has decreased (BECOME COOLER). It happens that the contextually relevant threshold identified in (44b) converges with a situation where the soup has become cooler to a point we may describe as ‘cool’, but this component of meaning (the absolute, rather than the comparative) is, by hypothesis, a matter of pragmatics and real-world knowledge.⁴⁵

Another example, showing that *to cool* means only ‘to become cooler’ (i.e. to decrease in temperature) and not ‘to become cool’ was suggested to me by Klaus Abels personal communication, 2006). Given that ‘cool’ represents an intermediate point on the temperature scale (between cold and warm), it is certainly possible to take something that is a cold state and raise its temperature until it satisfies the relevant conditions for being ‘cool’. For example, one can take a frozen substance and apply heat to make a cool drink. While is at worst awkward to

⁴⁵ Consider in this light the following passage found on a Google search (10/2006): “FDA recommends the product [packaged fresh soup] should be cooled from 140°F (60°C) to 70°F (21°C) or below within two hours and to 40°F (4.4°C) or below within another four hours.” Note the consecutive telic modifiers in the two conjuncts. If telic ‘cool’ meant ‘become cool’, this would require shifting standards of ‘coolness’, and for the second conjunct, would require an evaluation where the change from 70° to 40° be described as a change from [not cool] to [cool]. On the approach sketched here, all that changes from conjunct to conjunct is the (explicit) extent variable.

describe this situation by saying that the drink “became cool,” it is out of the question to describe this by saying the substance *cooled*. *To cool* can only describe a decrease in temperature, exactly as expected if its meaning is comparative, as opposed to being an inchoative of the positive adjective.

Turning to the lexical differences, Kennedy and Levin suggest a role for pragmatic inference here too. Building on work such as Rotstein and Winter (2004), Kearns (2007), and others, the idea they start from is that scalar predicates may be broadly classified into two groups, namely those with a natural maximal bound (closed range adjectives), and those lacking such a bound (open range adjectives), as illustrated in (45). The scale defined by closed-range adjectives has a fixed endpoint – there is a maximal degree of straightness, such that nothing can be straighter than that degree. By contrast, the scale of length is for all intents unbounded, length is infinite. The classification can be partly confirmed through the use of modifiers that target this natural endpoint, compare ‘completely straight/closed/dry’ to the oddity of #‘completely long/wide/short.’

- (45) a. closed-range adjectives (natural maximal bound): *straight, closed, dry*
 b. open-range adjectives (no natural maximal bound): *long, wide, short*

To be sure, I am not doing justice here to the intricacies of this literature, but the basic point suffices to indicate the intended direction. In the absence of any other contextual information, the natural endpoint for a closed-range adjective readily serves as the extent measure—verbs such as ‘straighten’ and ‘dry’ most naturally show telic behaviour. The inference in (40b) fails, since the perfect ‘Kim straightened the rope’ invites the implication that the rope has been made straighter to the natural maximal bound (up to issues of granularity of measurement). By contrast, *wide* has no natural endpoint, and thus *widen* is freely interpreted as simply made wider, to some unspecified degree. As the extent is unbounded, *widen* is expected to be compatible with tests for atelicity, as (40a) confirms. Note, importantly, that the relevant considerations are implicatures, not entailments, and are thus readily cancellable. Although *Kim has straightened the rope* naturally invites the conclusion that the rope is straight, the sentence *Kim has straightened the rope (a bit), but it could be straighter*, is not contradictory.

At this point, the facts discussed in section 5.1 bear recalling. In arguing for the universality of the embedding of the comparative, I pointed to languages, such as German, in which the proposed structure is morphologically transparent, at least for some verbs. Now, if I am correct that such structure is always present, and (Hay,) Kennedy and Levin are correct that the telicity effects arise via the pragmatics, then we should expect to find the same kind of ambivalent telicity even in verbs that transparently contain the comparative morpheme. Although I have not tested this systematically, pairs such as (46) from German suggest that this is correct.

- (46) a. Das Geschwür hat sich 1 Jahr lang vergröß-er-t
 the abscess has SE 1 year long CAUS-big-ER-PRTCPL
 ‘The abscess grew for a year.’
 b. Das Geschwür hat sich in einem Jahr (um 1 cm) vergröß-er-t
 the abscess has SE in 1 year at 1 cm CAUS-big-ER-PRTCPL
 ‘The abscess grew (1 cm) in a year.’

Note in particular that (46b) shows the possibility of a telic modifier even when the verb transparently embeds the comparative. Whether the Hay, Kennedy and Levin proposal turns out to be correct in the details or not, examples of this sort show clearly that it is possible to have a telic predicate derived from the comparative, not just the positive, adjective.

Degree achievements can be formed by embedding the comparative, rather than the positive adjective. Indeed, this is transparent in some cases. It seems moreover that it is possible to provide an appropriate semantics for degree achievements—even for the telic cases—based on a structure that embeds the comparative. This is good, since the evidence from suppletion (the CCSG) underlies an argument that all change-of-state verbs derived from gradable adjectives (in languages with comparatives, at least) must be derived from the comparative, even where that derivation is not morphologically transparent. At this point, we might ask to what degree this embedding must be stipulated, or if it might be derivable in part. As with the superlative-forming element in the CSG, the logic of the argument considered here would attribute this selectional restriction to V_{Δ} , and we might pause briefly to reflect on how that might be encoded.

At this point, we come back to consideration of the alternative view, that postulated an ambiguity. In analyses deriving from Dowty's original proposal, the operator BECOME is a sentential operator, embedding a proposition: [BECOME [the soup cool]]. As Roger Schwarzschild points out (personal communication, 2006), simply combining this operator with the comparative is insufficient to characterize the meaning of sentences like *The soup cooled*. The comparative 'cooler' is a transitive predicate and requires as one of its arguments the standard of comparison. This is normally expressed with *than*, and can be some other entity (47a) or the same soup, but at a different point in time (47b).⁴⁶ The comparative predicate may be used in a syntactically intransitive context, as in (47c), and in that case the standard must be understood from context. Of course, (47c) is still ambiguous and can correspond to either (47a) or (47b) in context (*Which is cooler—the soup or the gravy?*, or *How is the soup now?*).

- (47) a. The soup is cooler than the gravy.
 b. The soup is cooler than it was.
 c. The soup is cooler.

Now, if the verb 'cool' could be derived (at least on some interpretations) simply by embedding the sentence underlying (47c) under the sentential operator BECOME, one must ask what happens to the second argument of the comparative, namely, the standard. The first thing to note is that overt expression of the standard is completely impossible (48b). The second thing to note is that context the ambiguity in (47c) is absent. The verbal construction (48a) can only be understood as referring to a previous point in time (in fact, the time immediately before the change of state).

- (48) a. The soup cooled.
 b. *The soup cooled than the gravy.

In order to capture this fact, the component "than it was just before" must be contributed by V_{Δ} and is not simply implied by context. If that were not a part of the meaning of V_{Δ} , (48a) would be expected to be ambiguous, as just described. Of course, a morpheme with the meaning "than it was just before" requires a comparative, and cannot combine with a positive adjective.⁴⁷ It seems that an analysis invoking ambiguity along the lines in (35) would in fact need two distinct operators in any event, one like Dowty's BECOME (embedding only positive adjectives – or more accurately propositions derived from them), and the other like V_{Δ} , which embeds comparatives. The conclusion of this paper is that only one of these operators, in fact, is made available by UG.

Before moving to further empirical considerations, there is one further concern I would like to address. In presenting this material, it has occasionally been observed that some languages have

⁴⁶ The latter may reduce to the former on semantic treatments invoking time-slices of individuals, for example. They are kept apart here for expository reasons.

⁴⁷ Compare the discussion of the superlative forming –T "than all others" in sections 3.2 and 3.4.

a morphological difference apparently signalling the difference between “become X” and “become more X”. Typically, (e.g., for the Slavic languages), the difference is not as regards the inclusion or absence of comparative morphology, but is rather manifest in differences in the choice of (aspectual) prefix.⁴⁸ I suspect that, like English, the appearance of a meaning “become X” (rather than X-er) is nevertheless secondary, a result of the interaction of a basically comparative meaning for the verb on the one hand, and the aspectual (in the sense of Aktionsart/telicity, not perfectivity) contribution of the prefix. If it is at all plausible to think of prefixes as able to contribute meanings like “to the maximal extent” or “a little bit / somewhat”, then the source of the apparent meaning difference can be located in the boundedness of the degree/extent, without threatening the account given here. Indeed, something like this is independently needed, I would contend, for English particle constructions, for example in the difference between *to dry* and *to dry up/out*. The theoretical discussion above commits me to the view that *to dry* is [BECOME DRY-ER], with the implication of a maximal, and thus bounded, extent being contributed by the particle *up/out*. An analysis of the complex system of Slavic aspectual prefixes is well beyond the scope of this paper, and thus I leave this as an open challenge, with the hope that further investigation will reveal nothing more sinister in the aspectual prefixes than what is independently needed to describe their properties outside of the realm of deadjectival change-of-state verbs.⁴⁹

In sum, it seems to me that the most pressing question facing the analysis of the CCSG that I have offered was to reconcile the claim that deadjectival change-of-state verbs always embed comparatives with the predominant view in the aspectual semantic literature, whereby such verbs are (or at least can be) derived directly from the positive adjective. That view would be incompatible with the analysis of the CCSG—in order to exclude the (arguably unattested) ABA pattern on principled, rather than accidental grounds, it must be that the inventory of functional morphemes in UG admits of no element with change-of-state semantics that attaches directly to a positive adjective.⁵⁰ Co-opting ideas from Hay, Kennedy and Levin, I have argued that there is a plausible alternative, which appears successful in accounting for the variable telicity effects via independently motivated implicatures, all the while maintaining a semantics that embeds the comparative within the change-of-state verb.

It remains to be shown that the sketchy proposal above can be fleshed out in detail. This is not trivial, and the formalism that Kennedy and Levin 2007 propose does not translate in obvious ways into the structures I argue to be motivated by the morphology. Although they invoke a comparative semantics, they do not have a comparative morpheme in the structure they assume. I leave this, along with a number of other interesting questions, for future research. At this point, I leave discussion of the implications of the CCSG, and return to some issues in establishing its empirical validity and scope, issues that were postponed earlier in this section.

⁴⁸ I thank Mirjam Fried for first raising this point, in connection with Czech, and Patrycja Jablonska for a similar point about Polish. [Get data.](#)

⁴⁹ Note also in this regard the deadjectival verbs of Karo Batak as presented in Woollams (1996:62), some of which are given in (i)-(ii). The glosses suggest a morphological distinction between ‘make X’ and ‘make more X’, but the textual discussion seems to make clear that the sense of ‘more’ here is one of intensification of the verb. The affixes *pe-* and *-ken* are both causative forming affixes, and the combination of the two yields an intensification. A similar process happens with comparatives, which can be doubly marked (prefix *ter-* and suffix *-en* yielding an “intensive comparative degree ‘even more (adjective)’” (p.55).

(i)	ganjang	pe-ganjang	pe-ganjang-ken
	high	to put up high	to put up even higher
(ii)	uli	pe-huli	pe-huli-ken
	good	to make good, repair	to make better, improve

⁵⁰ This is inaccurate, as stated. There could be a single, internally complex, affix meaning [BECOME MORE] (cf. Hay, Kennedy and Levin’s 1999 *INCREASE*) however, what must be ensured is that the MORE component is exactly the right element to trigger comparative root suppletion on the adjective. See also note 18, above.

5.3 Identifying the corresponding verbs

The two qualifications to be mentioned here constitute somewhat of an aside, but they turn out to be important in delimiting the scope of the postulated generalizations. Both revolve around the question of identifying the “corresponding verb” for the purposes of the CCSG.

5.3.1 *Embiggen*: the productivity problem

In the first place, the reader will have noted that the preceding section omitted discussion of the ABC and AAC patterns, that is, patterns in which the verb was built on a root distinct from the either the positive or comparative. Such examples were important in the discussion of the superlative, and a complete study would ask about their status for the CCSG. As it happens, this presents a methodological hurdle I have been unable to surmount. The problem is that the formation of deadjectival, change-of-state verbs is simply not productive in the languages for which I have sufficient information. There is no guarantee for any given (gradable) adjective that there will be a morphologically related degree achievement verb. We might illustrate with English *big*, which appears to lack a corresponding degree achievement (see (49a)).⁵¹ Of course, there are a number of close paraphrases, as in (49b). The issue that arises is whether one (or more) of the items in (49b) should be counted as the corresponding change of state verb for *big*, which would then constitute an instance of the AAC pattern of suppletion.

- (49) a. *big* – *bigger* – Ø * to *big*(gen)
 b. *enlarge*, *increase*, *grow*...

My hunch is that there is no suppletion here. Deadjectival derivation is simply unproductive in English (for discussion, and some sub-regularities such as the near absence of inchoative and causative derivatives from human propensity adjectives, see Dixon 1982:21-24), and there is simply no deadjectival verb corresponding to *big*. Others, notably Apresjan (1992) on Russian, have argued for widespread suppletion in this domain. I currently see no way to resolve this issue and thus set aside the irresolvable cases, focussing on the ABB vs. *ABA asymmetry.⁵²

5.3.2 *The various natures of deadjectival verbs*

Another problem that arises in considering deadjectival verbs lies in the variety of meanings such verbs may have, both cross-linguistically and within a given language. In the text above, I suggested what amounted to the following rough and ready means of identifying the relevant verbs.

- (50) For some adjective A, the *corresponding change-of-state verb* is the verb that means “to become (more) A” (inchoative) or “to make something (more) A” (causative).

Under (50), certain types of deadjectival derivation are excluded. Thus, stative deadjectival verbs with the meaning ‘to be A’ are not counted, since they do not involve a change of state. Russian, for example, has deadjectival verbs which are ambiguous between stative and change-of-state readings, such as that in (51). Only the change-of-state verbs are expected to conform to the CCSG.

⁵¹ Pace Jebediah Springfield’s “A noble spirit embiggens the smallest man” (*The Simpsons*, Episode 3F13 “*Lisa the Iconoclast*” (1996), called to my attention by Mona Anderson).

⁵² For the superlatives, the issue of gaps seems less worrying as superlative formation is productive for languages that have superlatives. This dimension of productivity (the idea that for any given adjective there will be a corresponding superlative) seems to be one of the factors that led Osthoff (1888, 1899) to propose the term and notion of suppletion, in place of the previous conception of the conflation of *defective* paradigms.

- (51) bel-e-t' Russian
white-THEME-INFIN
'to whiten' change of state
also 'to gleam white' stative

Another verb type that is excluded from consideration is what might be called “ascriptive” verbs, such as *belittle* and *exaggerate*, with meanings that again do not denote a change of state (such as coming to have a property). For example, in current usage at least, *to belittle someone* is not to cause them to become little, but rather to (attempt to) cause them to appear little, or to decry their stature. Russian provides a nice minimal pair in this regards. The adjective meaning ‘small’ shows suppletion in the comparative (52), and has two deadjectival verbs, one from each of the roots. The verb with the basic change-of-state meaning is, as predicted by the CCSG, formed on the comparative root (52b). On the other hand, the verb from the positive root is an ascriptive, rather than a change-of-state verb.

- (52) a. ‘small’ mal-yj ‘smaller’ menⁱ-še
small-M.SG.NOM small-ER
- b. u-menⁱ-š-at ‘to shrink’ (i.e., to make smaller)
- c. u-mal-jat ‘to belittle’ (i.e., to suggest smallness)

A further qualification concerns verbs that show an apparent morphological relation to an adjective, but which lack the semantic connection, or have a rather tenuous connection, for example, corresponding only to a highly restricted subset of the possible meanings of the base adjective. Once again Russian provides an example. Corresponding to the adjective *xoroš-ij* 'good' in (53), which takes a suppletive comparative, is a basic verb meaning 'make better', derived, as expected, from the suppletive comparative root. There is a change-of-state verb which shares its phonological form with the positive adjectival root, but here the meaning component is not present: *xoroš-et'* does not mean 'to make *xoroš-ij*' but instead means 'to become more pretty'. That is, the meaning here corresponds to the positive adjectival *krasiv-ij*.⁵³ There is presumably a historical connection between the roots, but this does not appear to be a matter of synchronic morphological derivation.

- (53) a. 'good' xoroš-ij 'better' luč-še
good-INFL good-ER
- b. u-luč-š-at' 'to improve' (i.e., to make good/better)
- c. xoroš-et' 'to become prettier'

The root for 'good' in a range of languages appears to be particularly susceptible to semantic drift in deadjectival verb formation. For example, Old English, Basque and Russian have verbs built on basic (non-comparative) the root for 'good' which mean 'to fertilize' (presumably from 'to make the land good for farming'), while Czech and Bulgarian have verbs from the 'good' root meaning 'to conciliate' (cf. the English fixed expression 'to make good').⁵⁴ Some of these

⁵³ *Slovar' russkogo jazyka [Dictionary of the Russian Language]*, Academy of Sciences of the USSR, Institute of Russian Language, 3rd Edition, 1988, volume 4, p. 620.

54 The Russian verb *udobrjaj* 'to fertilize' is built on the root *dobr-*, which in Russian (as compared to other Slavic languages) has narrowed in meaning considerably, now meaning 'good' only in the senses of 'kind' and 'honourable', as well as in the noun in the juxtaposition of good and evil. That the adjectival/nominal root *dobr-* and the root in the verb have undergone separate semantic narrowings has left them in a position where they have no overlap in meaning whatsoever, despite a historically transparent morphological relatedness.

verbs have additional meanings, but with the exception of Old English, these verbs have a drastically limited range of meaning when compared to the basic adjectives.

While there are thus some fairly clear cases where the relation between the verb and the adjective is diachronic and not synchronic, there remains a rather sizeable grey area. Thus English *worsen* and especially *better* do not have the full range of meanings available to the corresponding adjectives, yet seem (to me) nevertheless to correspond to the adjectives in the sense needed for (50). I acknowledge, though, that this opens up something of a slippery slope, and thus that the accuracy of the CCSG will depend on a more precise resolution of some of these considerations, something I leave to future research, turning now rather to the discussion of some apparent counter-examples.

5.4 Some apparent counter-examples:

Before leaving the CCSG, I offer here a few remarks on some *prima facie* counter-examples to the CCSG. I contend that many are merely apparent, and can be more or less readily explained away. However, a residue remains.

5.4.1 Adjective polysemy: *to badden*

A first set of apparent counter-examples has a fairly straightforward explanation, namely those in which there are multiple, homophonous adjectives with related meanings, but distinct distribution. By way of illustration, we may consider *bad* in English: a Google search in 2006 yielded sporadic examples of ‘to badden’ as a verb in English, apparently in violation of the CCSG. Two examples are given in (54).

- (54) a. “I’m trying to **badden** up my image, like that Sabrina the Teenage Witch is trying to do.” (attributed to Ray Romano, speaking to Regis Philbin, April 2000)
<http://www.melissajoanhart.net/sightings.shtml>
- b. Or is it, as we suspect, part of a new programme to **badden** up the image of the perennial good guy?
<http://www.thefridayproject.co.uk/hi/tft/people/001223.php>

The context in which these examples appear makes clear that the intended meaning of ‘bad’ here is precisely the sense noted as slang in the *OED*, i.e., in which being ‘bad’ is an image enhancement—it is cool to be bad. In exactly this sense, the comparative of the adjective is not ‘worse’ but ‘badder’, cf. the *OED* usage illustration from 1968: “I was shouting to myself. ‘You’re the baddest motherfucker I’ve ever seen.’”. There are thus at least two sense of *bad* to contend with, the standard sense, with comparative *worse* and verb *worsen*, and the ‘slang’ sense, with comparative *badder* and verb *badden (up)*.⁵⁵ Both obey the CSG and the CCSG.

5.4.2 More than one way to create a verb

Just as adjective polysemy presents one source of noise in the data that must be controlled for in evaluating the CCSG, another source of noise is presented by languages that present more than one strategy for relating verbs (ultimately) to adjectival roots. The general point is the following: the theory of the CCSG presented above, is, at its core a stipulated universal selectional restriction on a particular functional morpheme: V_{Δ} —the morpheme that derives change-of-state verbs from (comparative) adjectives. The claim is that this morpheme cannot be attached directly to a gradable adjective root, and that the derivation must proceed through the comparative. To

⁵⁵ See also J. Croce’s *Bad, Bad, Leroy Brown*: “And he’s **bad, bad** Leroy Brown // The **baddest** man in the whole damned town // **Badder** than a-old King Kong // And meaner than a junkyard dog.”

(tr.)'. However, colloquially, one finds the verb *po-ploxe-t'*, apparently derived from the positive root. This verb occurs in impersonal experiencer constructions, as illustrated in (57).

- (57) a. mne ploxo-o
 me.DAT bad-ADV
 'I'm sick' / 'I don't feel good.'
- b. mne po-ploxe-l-o
 me.DAT PREF-bad-PAST-NEUT
 'I suddenly didn't feel good.'

I believe the 'suddenly' in the paraphrase, suggested by native speakers of Russian, may provide an important clue to the derivation of this verb, and how it exploits a particular loophole to escape the CCSG. As noted in section 5.3.2, Russian permits deadjectival verbs with stative (rather than change-of-state) meanings. Russian also has a rich array of aspectual prefixes, among which one finds 'inceptive' prefixes that indicate the start of an event. The prefix *po-* includes the inceptive among its many other uses, thus: *beža-t'* 'to run', *po-beža-t'* 'to start to run'. Taken together, the lexical resources of Russian thus seem to provide at least two routes to verb-hood. Alongside the derivation of a (true) change-of-state verb from a deadjectival predicate (necessarily embedding the comparative, (58b)), there may also be inceptives of stative deadjectival verbs (58b).

- (58) a. [V_Δ [[ADJ] -ER]] deadjectival change-of-state
- b. [START [[ADJ] V-BE]] inceptive of stative

The meaning derived by the two embeddings is extremely close ('become X' vs. 'start to be X'), but the word-internal syntax is different, in a crucial way: I noted already in section 5.3.2 that stative deadjectival verbs do not fall under the scope of the CCSG, and do not embed the comparative. If a stative verb is further embedded under an inceptive, rather than the change-of-state verb, there is no expectation that the comparative root be used. In the same way, morphological causatives of stative predicates (as opposed to causatives of inchoatives) are not expected to conform to the CCSG.

There remain various lacunae in these tentative remarks.⁵⁸ Nevertheless, they reinforce the point made with respect to Hungarian, namely, that in the realm of deadjectival verbs, there may be alternative routes towards surface forms that constitute an important potential source of noise in testing the CCSG. Specifically, the proposal here rests, ultimately, on a stipulated universal selectional restriction on a particular functional morpheme: V_Δ—the morpheme that derives change-of-state verbs from (comparative) adjectives. Inasmuch as that morpheme is the only means for such a meaning, the CCSG is predicted to hold. What Russian reminds us, though, is that there may be alternative derivational routes for a meaning that is, in practice, quite close to the deadjectival change-of-state meaning. As far as I can see, this presents difficulties in practice, but not in principle, regarding the analysis of apparent counter-examples.⁵⁹

⁵⁸ Note that at least some speakers also accept *sploxe-t'* in this meaning, with a different prefix, less readily amenable to the account sketched here. Note also that at least one speaker felt that the construction describes a change from bad to worse, and not from good to bad/worse, cf. the English expression 'take a turn for the worse'. I thank Oksana Tarasenkova, Nina Radkevich, Natasha Fitzgibbons and Natalia Kariaeva for discussion of this example.

⁵⁹ Note also that Modern Romance languages have verbs such as Italian *bonificare*, French: *bonifier* 'improve' alongside *migliorare*, *ameliorer*. The historical sources for both are clearly compatible with the generalizations as presented here: the latter verbs involve(d) morphological derivation from the adjective and transparently embed the comparative (as required the CCSG). On the other hand, the verbs containing *-ifi-* ultimately derive from

5.4.3 Outstanding counter-examples

Finally, I note that not all prima-facie counter-examples to the CCSG fall readily to analyses along the lines sketched above. The following cases resist analysis with the tools at my disposal. Unless further investigation yields reasonable analyses, they remain as outstanding hurdles to acceptance of the CCSG.

Although Modern English is consistent with the CCSG, English did have a verb *to good* from ca. 1000 through the 17th century (*OED*). Some of the examples given are plausibly denominal, such as the Old English ‘to enrich’ (cf. Dutch *vergoeden* ‘pay back for s.th. in money or goods’), however the *OED* provides some examples that do appear to be from the adjectival sense. Particularly telling is the juxtaposition of *good* and *wurse* in (59), from the 13th century.

- (59) 3e muwen muchel þuruh ham beon **i-goded**, and **i-wursed** on oðer halue.
 (1225 Ancr. R. 428, given in *OED*)

Another apparent counter-example is from Old Church Slavonic, in which the adjective *velikŭ* ‘big’ undergoes suppletion in the comparative (with two distinct roots: *bol-ijŭ* and *vešt-ijŭ*), but where the change-of-state verb is built on the positive root: *vŭz-velič-iti*. It is perhaps worthy of note that in the modern Slavic languages, the situation has resolved itself to some degree. Thus in Russian, the basic adjective for ‘big’ has become *bol’sh-ój* (comparative: *ból’sh-e*) with *velik-ij* taking on the narrowed meaning ‘great’. The verb *u-velič-iva-t’* retains the general meaning ‘increase, magnify’ but the replacement of the positive root means this is no longer an ABA pattern, but if anything, an AAC pattern (on which see §5.3.1). On the other hand, Ukrainian retains the suppletive pattern from OCS (*velykyj-bil’shyj*) but has undergone changes in the verbal domain, with *vozvelychty* taking on the specialized meaning of ‘to glorify’ and the general verb meaning to increase built on the comparative: *zbil’shyty*. Serbo-Croatian retains the suppletive adjectives, and a doublet in the verbs (with the problematic *uveličati* limited to the causative/transitive usage).⁶⁰

Serbo-Croatian presents additional potentially problematic doublets. Four adjectives in this language undergo suppletion in the comparative, and all four have regular corresponding change-of-state verbs derived from the comparative roots (see Appendix 3). In addition to these verbs, some speakers also allow verbs from the positive root, for example, alongside *poboljšati* (*se*) ‘improve’ from the root of the comparative *bolji* ‘better’, the forms *%podobriti* (*se*) or *%prodobriti* (*se*), and similarly *prozliti* ‘to worsen’. Not all speakers accept these latter forms (indeed ten of eleven speakers consulted directly or by proxy rejected *podobriti*), and speakers that do accept these forms do so primarily with restricted senses and or in limited contexts (e.g., for sarcastic effect). The intuitions appear to quite clearly support the claim that the “basic” verbs conform to the generalization, though a complete explanation will have to take account of the more peripheral attested forms, a task I must regrettably put aside here.⁶¹

periphrastic / compound constructions in Latin *bònu(m) ficare* ‘good make/do’. As noted in section 5.2, periphrastic constructions are not subject to the CCSG. What remains to be shown is how the synchronic analysis of Italian and French relates to the Latin periphrasis. Two options seem available: either the modern verbs are descended independently of the adjectival roots they contain or the modern verbs in *-ificare/-ifier* lexicalise a syntactic compounding structure in the modern languages just as they did in Latin. I leave this unresolved here.

⁶⁰ Data and discussion reported in this paragraph from Ljuba Veselinova, Ronald Feldstein, Natalia Kariaeva, Marijana Marelj, and Željko Bošković.

⁶¹ For extended discussion of the Serbo-Croatian examples and for exploring intuitions with a number of other speakers, I am grateful to Marijana Marelj.

Finally, I note the curious status of Classical Greek. The adjective *agathós* ‘good’ is presented as having as many as five or six corresponding suppletive roots in the comparative and superlative (Seiler 1950, Chantraine 1967, Kinchin Smith and Melliush 1968). There is a verb *agathýnō* ‘to make good’. This appears to violate the CCSG, being derived from the positive adjective. I suspect that this may fall to an analysis along the lines of the adjectival polysyemy and/or narrowing of meaning as discussed above, as it has been suggested to me that *agathýnō* means ‘to make good’ only in the moral sense of ‘good’, and not for the general sense of ‘improve’. As a perusal of the appendix shows, the one-to-many mappings that characterize comparative suppletion in Classical Greek (and the accompanying problems for the CCSG) are primarily restricted to dead languages, and I suspect that this observation is indicative of subtle nuances in meaning that are not indicated in the sources consulted. Moving beyond speculation and establishing this is left for future research.

5.5 Section summary - CCSG

6. CONCLUSION

In this paper, I have noted the following generalizations:

(1) *The Comparative-Superlative Generalization (CSG):*

If the comparative degree of an adjective is suppletive with respect to the basic (positive) form, then the superlative is also suppletive.

(3) *The Comparative-Change-of-State Generalization (CCSG):*

If the comparative degree of an adjective is suppletive with respect to the positive form, then the (basic) corresponding change-of-state verb is also suppletive.

(27) *The Synthetic-Suppletive Generalization (SSG)*

(Transparent) root suppletion never occurs in analytic comparatives/superlatives.

I contended that these generalizations reveal properties of the functional vocabulary, and structure, of UG. That is, UG makes available a functional morpheme CMPR meaning “>” (but not one meaning “<”, see §3.4). In addition, the CSG reveals that UG makes available a morpheme, which may be called SRPL, but whose meaning is “than all others”, rather than the familiar “more than all others”. This SPRL cannot attach to a positive gradable adjective directly, and must embed the comparative. This is morphologically transparent in some languages, but even where it is not transparent, this embedding is revealed by the role it plays in deriving (1). The account requires a realizational theory of morphology, such as DM, in which the morphosyntactic representation is established prior to the determination of the exponents of the features. It also requires that suppletion be handled as a form of contextual allomorphy, that is, as a special case of the rules of exponence that provide vocabulary items (roots) with phonological content. Elsewhere ordering for these rules is crucial to the account: it is in virtue of the logic of underspecification that the superlative will necessarily share a root with the comparative unless identity is bled by a form introduced by a more specific rule. The SSG in (27) follows as a corollary if the contexts for special allomorphs are limited to the word-internal domain, an implicit tenet within DM. Data that established the CCSG is somewhat more tenuous, but if the generalization is correct, it will imply that V_{Δ} —the affix that UG makes available for deriving change-of-state verbs from gradable adjectives—is, like SPRL, restricted to combining only with comparatives. Within limitations of space and resources, I have endeavoured to draw out the implications of the proposals contained here for debates in morphological and semantic theory.

To be sure, quite a few questions have been left unresolved, but I have sketched what appear, to me, to be promising directions to pursue for some of these.

7. APPENDIX 1 – THE STASSEN (1985) SAMPLE

The following is a list of the 110 languages in the Stassen (1985) sample, in three groups. The first group (A) is those with (at least some) synthetic comparatives, i.e., marked morphologically on the adjective. The second group (B) consists of languages with only analytic comparatives, that is, in which there is some word-external modifier of the adjective (such as English “more intelligent”). Languages (like English) that have both analytic and synthetic comparatives are thus listed in (A). The last, and by far the largest, group (C), is those languages which do not form comparatives by means of any overt modification of adjectives. It should be noted that this is a heterogeneous class, including three major types, namely, languages which express comparison by marking of the standard only (fixed-case comparatives: “John-FROM, Bill is tall”), languages which express comparison by means of a verbal paraphrase (exceed comparatives: “Bill is tall, exceeding John”), and languages which express comparison by means of antonymous juxtapositions (conjoined comparatives: “Bill is tall and John is short/not” or “John is tall, but Bill is very tall”). The initial grouping was refined by examining primary sources for every language that had any morphology that could count as comparative, whether bound (A) or free (B). The results of this exercise are reported in (60). (Note that the higher-order classifications are for expository purposes only, nothing is intended here about the genetic unity of Altaic, or Amerindian, for example).

(60) Stassen’s Survey (110 languages)⁶²

A. Languages with morphological marking of comparative degree (19)

Indo-European: Breton, Dutch, English, (Scots) Gaelic, (Classical) Greek, Latin, Latvian, Ossetic, Tajik, Russian.
North-West Caucasian: Ubykh
Uralic: Finnish, Hungarian
Isolate (Europe): Basque
Semitic: Classical Arabic
Austronesian: Toba Batak, Ilocano
Pama-Nyungan (Australia): Aranda
Tupi-Guaraní (South America): Guaraní

⁶² Although Stassen’s glosses suggest morphological comparative elements for Chukchi, Gumbaynggir, and Salinan, my reading of the grammatical descriptions of these languages suggests that the particular morphemes are predicate intensifiers (not specifically comparative morphemes). Nothing hinges on this, though, as suppletion is not indicated in any of these languages. For the first two, I also checked grammars of related languages for any evidence of comparative morphemes, namely Chukotko-Kamchatkan: Itelmen (Volodin 1976, and my own field notes); Pama-Nyungan: Marthuthunira (Dench 1995), Warlpiri (Nash 1980, Simpson 1983, and David Nash, personal communication 2007). Other languages not included in List A are languages which use particular morphemes in the formation of predicates that enter into comparative constructions, but where the morphemes themselves have a function other than comparative. For example, the “disjunctive” verbal suffix *-ku* in Tarascan (Foster 1969) gives deadjectival verbs a comparative sense, but has a range of other functions.

B. Languages with (only) analytic marking of comparative degree (19)

Indo-European: Hindi,⁶³ Albanian, French

Altaic: Turkish

The Americas: Salinan (Hokan) Miwok (Penutian), Goajiro (?) (Arawakan), Aymara (Andean), Jacalteco (Mayan), Mapuche (Araukan), Menomini (Algonquian), Miskito (Misumalpan), Classical Nahuatl (Uto-Aztecan),

Nilo-Saharan: Bari

Pama-Nyungan (Australia): Gumbaynggir

Austronesian: Motu, Maori, Samoan

Isolates: Burushaski

Creole: Sranan

C. Languages with no marking of comparative degree indicated (n=72).⁶⁴

Indo-European: Kashmiri

Kartvelian: Laz

Uralic: Jurak

Altaic: Even, Manchu (Tungusic); Khalka Mongolian, Japanese, Korean

Paleo-Siberian: Chukchi

Sino-Tibetan: Tibetan, Burmese, Naga, Vayu, Mandarin

Other East Asian: Thai; Cambodian, Vietnamese

South Asian: Telugu, Tamil (Dravidian); Mundari

Afro-Asiatic: Tamazight (Berber); Hausa, Margi (Chadic), Bilin, Bedaaye (Cushitic), (Biblical) Hebrew, Amharic (Semitic)

Niger-Congo: Fulani, Wolof,⁶⁵ Igbo, Yoruba, Dagomba, Mandinka, Banda, Gbeya, Duala, Kirundi, Swahili

Nilo-Saharan: Kanuri, Tubu, Nuer, Masai

Khosian: Nama

The Americas: W. Greenlandic (Eskimo-Aleut); Navajo (Athapaskan); Dakota (Siouan), Couer d'Alene (Salishan), Yavapai (Hokan), Mixtec (Oto-Manguean), Shipibo (Pano), Cayapo (Ge), Tarascan (isolate), Siuslawan (Penutian), Carib, Hixkaryana, Andoke (Macro-Carib), Tupi, (Tupi), Abipon (Guaycuru), Quechua, Yagan (Andean)

Austronesian: Malagasy, Javanese, Sika, Cebuano, Jabem, Nguna, Pala, Ekagi, Kobon, Monumbo

Australian: Mangarayi

This listing, based on Stassen's sample, gives a rough idea of the distribution of comparative formation, and in particular, of the geographical skew towards the Greater European Sprachbund. Only four of the nineteen languages in A are spoken outside this area.

⁶³ Hindi has a limited inventory of morphological comparatives and superlatives borrowed from Sanskrit and Persian (McGregor 1972:93). No suppletion is indicated for this class.

⁶⁴ For some of these languages, e.g. Modern Hebrew, the comparative marker is described as optional.

⁶⁵ Interestingly some languages without adjectives do show apparent comparative suppletion in the verbal domain. In Wolof and Fulani, comparison is normally expressed by means of what Stassen (1985) termed an 'exceed' comparative, loosely: 'John surpasses Bill, being tall', however, in these languages there are a handful of verbs with inherently comparative meanings, such as 'be taller than'. See Mc Laughlin (2004) and Labouret (1952). I thank Fiona Mc Laughlin for drawing these facts to my attention.

8. APPENDIX 2 – MORPHOLOGICAL COMPARATIVES

Appendix 2

The following is a list of the languages investigated for the current study.⁶⁶ As in Appendix 1, classifications are primarily for ease of reference. For each language, the following information is indicated:

- M-CMPR: Language has (Y) or lacks (N) a morphological comparative.
 “S” indicates that there are some suppletive forms, but otherwise, comparatives are formed periphrastically (as in French).
 M-SPRL: As above, for superlative.
 SUPL: Language has some suppletion in comparative formation
 SOURCE: Source for data.

In addition to the sources listed in the table, I have made use of a variety of on-line dictionaries, including in particular the multi-language suite of dictionaries at <http://www.lingvosoft.com>.

Family Language	M-CMPR	M-SPRL	SUPL	Sources
Eurasia				
Basque (isolate)				
Basque	Y	Y	Y	Trask 2003, I. Iaka, G. Rebuschi p.c.
Indo-European				
Albanian				
Albanian	N	N	N	Kacori 1979
Armenian				
Classical	Y			Karst 1901, Mann 1968, B. Vaux p.c.
Middle/Modern	N	Y ⁶⁷	N	Riggs 1856, Bardakjian & Vaux 2001, B. Vaux p.c.
Baltic				
Latvian	Y	Y	N	Latvia 1999
Lithuanian	Y	Y	N	Ambrasas 1997
Celtic				
Breton	Y	Y	Y	Ternes 1970, E. Pyatt pc
Welsh	Y	Y	Y	Rhys Jones 1977, E. Pyatt, J.

⁶⁶ An additional nineteen languages are identified in Ultan (1972) as having some marking of comparison, which may be either morphological or periphrastic. Information is not yet available for these languages, but will be included, if available, in a future version of this work.

⁶⁷ Modern (Western) Armenian is the only language in the sample which may have a morphological (relative) superlative, but no morphological comparative. There are a variety of ways of forming superlatives in Modern Armenian, including periphrastic constructions. It is also possible to form a comparative by prefixing an element meaning ‘all’ to the adjective. Finally, the Classical Armenian comparative suffix *-gojn* can be found in Modern Armenian forming superlatives: *bare-goyn*, *lave-gojn* (both: ‘best’, from *bari*, *lavi* ‘good’; Bert Vaux, p.c. 2007), although Riggs (1856:19) gives these as comparatives.

Irish (Old)	Y	Y	Y	Phillips, p.c.
Irish	Y	N	Y	Thurneysen 1946
Gaelic (Scot)	Y		Y	A. Carnie, E. Pyatt, pc.
Germanic				E. Pyatt, p.c.
Gothic	Y	Y	Y	Osthoff 1899
Old Icelandic (Old Norse)	Y	Y	Y	Osthoff 1899, Cleasby & Vigfusson 1874, Noreen 1923
Danish	Y	Y	Y	Krymova, Emsina & Moltke 1960, http://danish.nigilist.ru/
Icelandic	Y	Y	Y	Einarsson 1945, Hólmarsson, Sanders & Tucker 1989, J. G. Jónsson, p.c.
Swedish	Y	Y	Y	Holmes & Hinchcliffe 2003, Prisma 1995
Norwegian	Y	Y	Y	Kirkeby 1989, Strandskogen & Strandskogen 1986
Anglo-Saxon	Y	Y	Y	Osthoff 1899
O. High German	Y	Y	Y	Osthoff 1899
Afrikaans	Y	Y	Y	Donaldson 1993
English	Y	Y	Y	OED online, Muthmann 1999
Dutch	Y	Y	Y	Broekhuis 1999, H. Borekhuis, p.c.
Frisian (W)	Y	Y	Y	S. Dyk, p.c.
German	Y	Y	Y	Muthmann 1991, Fleischer 1969, http://dict.leo.org , S. Wurmbrand, p.c.
Yiddish				
Greek				
Classical	Y	Y	Y	Seiler 1950, Chantraine 1967, A. Calabrese, W. Dressler p.c.
Modern	Y	Y	Y	Sofroniou 1962
Romance				
Latin	Y	Y	Y	Hühner & Holzweissig 1912, A. Calabrese, W. Dressler p.c
Catalan	S	N	Y	I. Oltra, pc
French	S	N	Y	Dietiker 1983, Cassell 1962
Italian	S	N	Y	A. Calabrese, p.c
Portuguese	S	N	Y	
Romanian	N	N	N	S. Herdan, p.c.
Spanish	S	N	Y	House & Mapes 1941,, I. Oltra, M. Rodríguez-Mondoñedo
Haitian Creole	S	N	Y	M. DeGraff, p.c.
Slavic				
OCS	Y	Y	Y	Bopp 1856, L. Veselinova, R. Feldstein, p.c.
Russian	Y	N	Y	Garde 1998, Katzner 1994, Kuznecova & Efremova 1986, O. Tarasenkova p.c.
Ukrainian	Y	Y	Y	N. Kariaeva, p.c.
Bulgarian	Y	Y	N	Bontcheva 1999, Mel'čuk 1994

Serbo-Croatian	Y	Y	Y	Vukadinović & Jovanović 1979, M. Marelj, Ž. Bošković, p.c.
Slovenian	Y	Y	Y	A. Harrison, p.c.
Czech	Y	Y	Y	H. Skoumalová
Polish	Y	Y	Y	Canger 1966, S. Dyla, P. Jablonska,
Indo-Iranian				
Indo-Aryan				
Sanskrit	Y	Y	Y	Bopp 1856, Debrunner & Wackernagel 1930
Hindi	N ⁶⁸	N	N	McGregor 1972
Iranian				
Persian	Y	Y	Y	Mace 2003, I. Cagri, A. Kahnemuyipour, p.c.
Ossetic	Y	N	N	Abaev 1964
Tajik	Y	Y	N	Rastorgueva 1963
Kartvelian				
Georgian	Y	S	Y	Brown et al. 2004, Chukobava 1967, Hewitt 1995, L. Nash, p.c.
Svan	Y	Y	Y	Topuria 1967, Gudjedjani & Palmaitis 1986,
Mingrelian	Y	N	Y	Kipshidze 1914, Kiziria 1967;
Chan / Laz	N ⁶⁹	N	N	Marr 1910, Dirr 1928
N.W. Caucasian				
Abaza	S	N	Y	Lomtatidze 1967a, Tabulova 1976, O'Herin 1995
Abkhaz	S	N	Y	Hewitt & Khiba 1979, Lomtatidze 1967b, Chirikba 2003
Adyghe	Y ⁷⁰	N	N	Jakovlev & Ashxamaf 1941, Rogava & Kerasheva 1966, Kumaxov 1967
Kabardian	Y	N	N	Colarusso 1992, Shagirov 1967
Ubykh	Y	Y	N	Dumézil 1931
Uralic⁷¹				
Finnic				
Estonian	Y	Y	Y	Tauli 1973, Tauli 1983, http://dict.ibs.ee

⁶⁸ Hindi has morphological comparatives and superlatives borrowed, with the degree morphology, from Sanskrit and Persian (McGregor 1972:93).

⁶⁹ According to Marr (1910:17), Chan has exactly one morphological comparative form, borrowed, along with the comparative morphology, from Mingrelian.

⁷⁰ In Adyghe and Kabardian, the comparative marker *nax* sometimes occurs as a separate word and sometimes as a prefix (and sometimes both). It is not clear whether this should be considered a morphological comparative, though the decision turns out to have no import for present purposes.

⁷¹ No information available for Mari, Mansi, the Permian languages (Komi, Udmurt), or the Samoyedic languages. Note that Collinder (1960:261) suggests reflexes of the morphological comparative **-mp* in Samoyed, but does not indicate if this is a productive suffix.

Finnish	Y	Y	Y	Aaltio 1984, Wuolle 1978, Wuolle 1979
Karelian	Y	Y	Y	Zajkov 1999
Veps	Y	N	Y	Zajtseva 1981
Vod (Votic)	Y	N	Y	Ariste 1968
Khanty (Ostyak)				
Vah	N/A	N/A		Gulya 1966
Northern	N/A	N/A		Redei 1965
Mordvin				
Erzya	N/A	N/A		Ermushkin 2004
Sámi				
Kildin	Y	Y	Y	Kert 1971
North Sámi	Y	Y	N	Nickel 1990
South Sámi	Y	Y	N	Bergsland 1982
Ugric				
Hungarian	Y	Y	Y	Tompa 1968, Országh 1988, K. Szendrői (p.c.)
Semitic				
Arabic	Y	Y ⁷²	N	Schulz, Krahel & Reuschel 2000
Hebrew	N	N	N	Glinert 1989
Australia and Indonesia				
Australian				
Pama-Nyungan				
Arrente	Y	N	N	Strehlow 1942
Gumbayngir	N			Eades 1979
Warlpiri	N		N	Nash 1980, Simpson 1983, D. Nash p.c.
Austronesian				
Sumatran				
Karo Batak	Y	(Yes)	N	Wooliams 1996
Toba Batak	Y		N	Percival 1964, Naraban 1966
Philippine				
Ilocano ⁷³	Y	Y	N	Rubino 1997

⁷² Arabic does not have distinct comparative and superlative morphology; the two functions are subsumed under a single morphological form known as the 'elative'. The elative is also used to express a particularly high degree. Hence, it might be more correct to treat this as an intensifier, rather than a comparative morpheme.

⁷³ Although Rubino (1997) describes these as comparative and superlative forms, López (1928) considers these to be forms of intensification: If compared to European languages, it is to be noted that both [Tagalog] and [Ilokano] have no real comparison of the *nomen qualitatis* as we usually understand that grammatical category in the European sense; hence the appellation 'intensification'" (p.82).

South America

Tupi⁷⁴

Tupi-Guarani

Guaraní	Y?	Pederson 1977
Tapiete	N	González 2005
Sirionó	N	Dench 1995, Firestone 1963

9. APPENDIX 3 – SUPPLETION

Appendix 3 – Data

The following table lists all examples of suppletive comparative formation collected for this study, along with the corresponding superlative and, if available, verb. The first row for each language gives the comparative morphology for regular adjectives. I have indicated productivity. For example, not all adjectives in English take comparative morphology—some take only the periphrastic form with *more*. Segmentation is given where provided in the sources, with the result that this is not consistently indicated in the table. For the most part, citation forms are given, which means that some forms contain inflectional morphology that is not systematically segmented off. However, root identity (or the lack thereof) should be readily apparent nevertheless. For verbs, the following symbols are used:

^I = intransitive/inchoative only;

^C = transitive/causative only;

-- = no verb attested in sources;

blank cell = no information available

gloss	Adjective	Comparative	Superlative	Verb
INDO-EUROPEAN				
GERMANIC				
English		<i>-er</i>	<i>-est</i>	
good, well	good, well	better	best	better
bad, badly	bad	worse	worst	worsen
much, many	much, many	more	most	--
few, (a) little	few, (a) little	less	least	lessen
Danish		<i>-(e)re</i>	<i>-st</i>	
good, well	god	bed-re	bed-st	bedre (sig)
bad, evil, ill	ond, slem, ilde	vær-re	vær-st	forværre(s)
old	gammel	æld-re	æld-st	^I (for)ældes
much	megen, meget	me-re	me-st	formere (sig)
many	mange	fle-re	fle-st	--
small	lille (SG), små (PL)	mind-re	mind-st	(for)mindske(s)
few	lidt	mind-re	mind-st	(for)mindske(s)
Icelandic		<i>-(a)ri</i>	<i>-(a)stur</i>	
good, well	góður	betri	bestur	^C bæta
bad, evil, ill	vondur, illur	verri	verstur	^I versna
old	gamall	eldri	elztur	eldast
great	mikill	meiri	mestur	--
little	lítill	minni	minnstur	minnka
many	margur	fleiri	flestur	--

⁷⁴ Grammars of three additional Tupi languages were consulted—Mekens (Galucio 2001), Karo (Gabas 1999), Gavião (Moore 1984). None of these indicated comparative formation.

Norwegian		-ere	-est	
good, well	bra, god	bed-re	be-st	(for)bedre (seg)
bad, badly	dårlig, ille, ond, vond	ver-re	ver-st	forverre(s) (seg)
old	gammel	eld-re	eld-st	eldes
small	liten (SG), små (PL)	mind-re	min-st	minke
much	mye	me-r	me-st	formere seg
many	mange	fle-re	fle-st	--
Swedish		-(a)re	-(a)st	
good, well	bra/god	bätt-re	bä-st	förbättra(s), bättra på
bad, badly	dålig/ond	vär-re	vär-st	förvärra(s)
bad	dålig	säm-re	säm-st	försämma(s)
old	gammel	äld-re	äld-st	--
small	liten	mind-re	min-st	minska(s)
much	mycket	me-r(a)	me-st	--
many	många	fle-r	fle-st	--
Afrikaans		-er	-st	
good	goed	beter	beste	verbeter
Dutch ⁷⁵		-er	-est	
good	goed	beter	best	verbeteren
much, many	veel	meer	meest	(zich) vermeederen
little, few	weinig	minder	minst	verminderen
Frisian (Mod. W.)				
good	goed	better	bêst	(fer)betterje; {oar-, oan-, op-} betterje
much, many	folle	mear	meast	(fer)mear(der)je
little, few	[en bytsje]	minder	minst	(fer)minderje
gladly	graach, jeerne	leaver	leafst	
German ⁷⁶		-er	-est	
good	gut	besser	am besten	verbessern
many	viel	mehr	am meisten	vermehrten
OLD GERMANIC				
Gothic		-iza	-ists	
good	gōps	batiza	batists	
bad	ubils	wairsiza		
big	mikils	maiza	maists	
little	leitils	minniza	minnists	
OHGer				
good	guot	bezziro	bezzisto	
bad	ubil	wirsiro	wirsisto	
big	mihhil	mêro	meisto	
little	luzzil	minniro	minnisto	
AngloSaxon				
good	Ʒód	bet(e)ra	bet(e)st	
	"	sélra	sélest	
bad	yfel	wiersa	wierrest	
big	mycel	mára	mást, mæst	
little	lýtel	læssa	læst	

⁷⁵ Hans Broekhuis notes (personal communication, 2006) that the *Algemene Nederlandse Spraakkunst* also gives: *kwaad* - *erger* – *ergst* (bad-worse-worst), but that *kwaad* in the sense of ‘bad’ is of limited distribution, and in its normal sense of ‘angry’ is regular (Harry van der Hulst, p.c., 2007). There is a verb *verergeren*, thus this lexeme is consistent with the CSG and CCSG if it is included in the dataset.

⁷⁶ The root *mind-* exists, as in *am mindesten* ‘least’, and some grammars give it as a suppletive superlative for *wenig/gering* ‘few/little’. Note that both adjectives have regular forms *weniger/(am) wenigsten* and *geringer/(am) geringsten* exist. There is a verb *(ver)mindern*, so including this triplet would be consistent with the CSG and CCSG.

Old Icelandic				
good	góðr	betri, betra	beztr, (ba(t)ztr)	
well	vel	betr	bezt, (baszt)	
bad	váðr, íllr	verre	verstr	
big	mikell	meire	mestr	
old	gamall	ellre	ellztr	
ROMANCE				
Latin⁷⁷		-ior (< -ios)	-issimus; -(ti)mus	
good	bon-us	mel-ior	op-timus	meliorare
bad	mal-us	pēj-or	pes-simus	pejorare
small, little	parv-us; paulum	min-or	min-imus	minorare
many; much	multi; multum	plūr-es	plūr-imi	
Catalan		<i>més X</i>	<i>DEF + COMP</i>	
good	bo	millor	el millor	millorar
bad	dolent	pitjor	el pitjor	empitjorar
little/small	petit	(menor)	(el menor)	empetitir ⁷⁸
large	gran	(major)	(el major)	engrandir
few	poc	menys		
much/many	molt	més		
French		<i>plus X</i>	<i>DEF + COMP</i>	
good	bon	meilleur	le meilleur	(s')ameliorer
well	bien	mieux	le mieux	
bad	mauvais	pire / pl. m.	le pire / le pl. m.	empirer
small	petit	moindre / plus p.	le moindre / le p.p.	amoindrire, diminuer
Italian		<i>più X</i>	<i>DEF + COMP</i>	
good	buono	migliore	il migliore	migliorare
bad, badly	cattivo, mal	peggiore	il peggiore	peggiore
Portuguese		<i>mais X</i>	<i>DEF + COMP</i>	
good	bom	melhor	o melhor	
Spanish		<i>más X</i>	<i>DEF + COMP</i>	
good	bueno	mejor	lo mejor	mejorar(se)
bad	malo	peor	lo peor	empeorar
SLAVIC				
Czech		-ší	<i>nej+COMP</i>	
good	dobrý	lepší	nejlepší	zlepšit (se)
bad	špatný; zlý	horší	nejhorší	zhoršit (se)
large	velký	větší	největší	zvětšit
small	malý	menší	nejmenší	zmenšit (se)
Polish		-ej/sz-y	<i>naj+COMP</i>	
good	dobry	lepszy	najlepszy	polepszyć
bad	zły	gorszy	najgorszy	pogorszyć
big, great	duży, wielki	wiekszy	największy	powiększyć
small	mały	mniejszy	najmniejszy	po-/z-mniejszyć
Russian		-ee, -(š)e	<periph>	
good	xoroš-ij	luč-š-e	(nai)-luč-š-ij	u-luč-š-at'
bad	plox-oj	xuž-e	(nai)-xud-š-ij	u-xud-š-at'
small	malen'k-ij	men'-š-e	(nai)-men'-š-ij	u-men'-š-at'

⁷⁷ In addition to the verbs derived from the suppletive comparatives, Latin also has verbs derived from the superlative: *optimare*, *pessimare*, *minimare*. It is not clear (to me) how these are to be brought under the general proposals in section XX.

⁷⁸ A form *minorar* is attested, but is not used in standard Catalan. Note that the suppletive comparative and superlative forms are used in only limited senses as compare to the basic adjectives. As in other modern Romance languages, the regular periphrastic expressions ((el) *més grand/petit*) exist alongside the suppletive forms and the periphrastic forms have a broader distribution than the suppletive forms (I. Oltra, personal communication 2006). Similar remarks apply to cognates in Italian (A. Calabrese, personal communication 2006).

Serbo-Croatian		<i>-(i)ji</i>	<i>naj+COMP</i>	
good	dobar	bolji	najbolji	poboljšati
bad	zao	gori	najgori	pogoršati
big	velik	veći	najveći	povećati
small	mali, malen	manji	najmanji	smanjiti, umanjiti
Slovene		<i>-((e)š)i / -(j)i</i>	<i>naj+COMP</i>	
good	dober	boljši	najboljši	boljšati (se)
small	majhen, mali	manjši	najmanjši	manjšati (se)
Ukranian		<i>-((e)š)i / -(j)i</i>	<i>naj+COMP</i>	
good	dobryj	krashchyj / lipshyj	najkrashchyj / najlipshyj	pokrashchyty
bad	pohanyj	hirshyj	najhirshyj	pohirshyty
big	velykyj	bil'shyj	najbil'shyj	zbil'shyty
small	malenkyj	men'shyj	najmen'shyj	zmenshyty
OCS (oldest attested)		<i>-(š)i i i</i>		
good	dobrŭ	lučijŭ		
	"	unjijŭ		
	"	suljijŭ / sulějŭ		
	"	bolijŭ		
bad	zŭlŭ	gorjijŭ		
big	velikŭ	bolijŭ		vŭz-velič-iti
	"	věštijŭ		
little	malŭ	mŭnjijŭ		
CELTIC				
Old Irish		<i>-(i)u / -a</i>	<i>-(i)em</i>	
good	maith, dag-	ferr	dech, deg	
bad	olc, droch-	messa	messam	
near	accus, ocus	nessa	nessam	
small, few	bec(c)	laigiu / lugu / laugu	lugam / lugimem	
Breton (i. Groix)		<i>-ox</i>	<i>-aŋ</i>	
good	ma:t	ǰwēl-ox	ǰwēl-aŋ	
bad	fal	gwax-ox	gwax-aŋ	
Irish			DEF + COMP	
good	maith	fearr		NO VERB
bad	olc	measa		NO VERB
small	beag	lú		
Scottish Gaelic		<i>-a</i>		
good	math	fheàrr		
bad	dona	nas miosa		
small	beag	lugh		
strong	làidir	treassa		
Welsh		<i>-ach</i>	<i>-a(f)</i>	
good	da	gwell	gorau	gwella
bad	drwg	gwaeth	gwaetha	gwaethygu
large / big	mawr	mwy	mwya	mwyhau / mawrhau
small	bach	llai	leia	lleihau
long	hir	hwy	hwyaf	
strong	cryf	cryfach / trech		
near (adv)	agos	nes	nesa / agosa	nésu / agosáu
GREEK				
Greek (Cl.)		<i>-teros / -iōn</i>	<i>-tatos / -istos</i>	
good	agathós	ameínōn		agathýnō
		areíōn	áristos	
		beltíōn	béltistos	beltiōō
		kreíttōn / kreíssōn	krátistos	kreissōō
		lōíōn	lōistos	
			féristos	

bad	kakós	kakiōn /kakóteros cheírōn héttōn	kakistos cheíristos hékista (hékistos) elénchistos	kakóō hēttaómai ⁷⁹
small	mikrós	álgiōn rhígiōn mikróteros meiōn	álgistos rhígistos mikrotatos meístos	
little, few	olígos	eláttōn (oleízōn eláttōn héttōn meiōn)	eláchistos olígistos eláchistos hékista (hékistos) meístos	
Greek (Modern)				
bad	kakós	-teros cheiróteros	-tatos cheíristos	cheirotereýo
INDO-IRANIAN				
Sanskrit				
		-yān < -(i)yās -tan	-iṣṭhas -tam	
good	pra-śásya-s	śré-yān jyā-yān	śré-ṣṭhas jyé-ṣṭhas	
Hindi⁸⁰				
Persian				
good	xub	-tær beh-tær (xub-tær)	-tær-in beh-tær-in (xub-tær-in)	
NON-INDO-EUROPEAN				
BASQUE				
Basque				
good, well	on	-ago hobe	-en hobe-ren[-a] on-en-a	hobe-tu
URALIC				
Estonian				
good	hea	-m pare-m	-im, or kõige + COMP parim / kõige parem	
Finnish				
good	hyvä	-mpi pare-mpi	-in paras (parhain)	parantaa
many	monet, usea	usea-mmat	useimmat	--
much	paljon	ene-mmän	eniten	enetä
Karelian				
good	hyvä	-mpi (mma, mpa) pare-mpi	-in (-imma, impi) parah-in	
many/much?	äijä	enä-mpi	äij-in	
Veps				
good	hüvä	-mb(a) pare-mb	ALL + COMP parahim	
many/much?	ei <äi	ena-mba-(d)		
Votic				
good	üvä	-p(i) parə-pi	ALL + COMP kəikkia parəpi	
Saami (Kildin)				
good	š'ig'	-mp per'amp	-mus per'mus	
Hungarian				
many/several	sok	-(e)bb tö-bb	leg-(...-bb) leg-tö-bb	sokszoros(ít); sokasodik

⁷⁹ agathós⁸⁰ Hindi has suppletion only in borrowings from Sanskrit and Persian.

Kartvelian				
Georgian				
good	k'argi-i	u-...-es-i u-k'et-es-i u-mJob-es-i	<PERIPH> sa-u-k'et-es-o sa-u-mJob-es-o	^C a-umJobes-ebs, ^I umJobes-d-eba
bad	cud-i	u-ar-es-i	<PERIPH>	^C a-uares-ebs, ^I uares-d-eba
few	cot'a	na-k'l-ebi	<PERIPH>	-k'l'- ⁸¹
many	bevr-i	met'-i	u-met'-es-i	^C a-met'-ebs (caus) 'to add'
Mingrelian				
big	met-i	u-...-aš-i u-met-aš-i, u- mosi	<PERIPH> <PERIPH>	
(Upper) Svan⁸²				
good	ezär	xo-...-a	ma-...-(ēn)e	
bad	leg	xo-č-a, xo-č-ēl	ma-č-ēne	
big	zyəd	xo-l-a, xo-dr-ēl		
small	qoṭōl	xo-š-a, xo-dr-ēl	ma-š-ēne	
		xo-xwr-a, xo-xwr-ēl		
N.W. Caucasian				
Abaza				
good	bzi	rəc'a/raha X	<PERIPH> ⁸³	
bad	g ^w əmxə	aɣ ^j ajč ^w a		
Abkhaz				
good	bzəja	ajha X		
bad	á-c ^w g'a	j-ájy ⁱ ə-w j-ajč ^w á-w		
CREOLES				
Haitian⁸⁴				
good	bon	pi X (% meyè)	= comp = comp	(amelyore)

10. APPENDIX 4 – THE SSG

In addition to the languages listed in Appendix 2, the following languages with analytic comparatives were considered in establishing the SSG (§4.3.1):

Eurasia: Turkish (I. Cagri, M. Kelepir, N. Şener, and S. Şener, p.c.).

Africa: Bari (Spagnolo 1933)

⁸¹ The suppletive comparative *na-k'l-ebi* 'less' is a participial form derived from the verb root *-k'l-* meaning roughly 'to take away'.

⁸² According to Gudjedjiani and Palmaitis (1986:52), the four suppletive forms with regular comparative morphology *xa-...-a* are used with positive, not comparative force, while comparative meaning for these four adjectives is indicated by the suffix *-ēl*.

⁸³ Sources differ in the descriptions provided of superlative formation in Abaza. Tabulova (1976:73) gives a morphological superlative in *-(dz)dza*, and provides the form *bzi-dzdza* 'best' formed from the positive root. However, this may be an absolute, rather than a relative superlative, as Tabulov notes that the *-dza* suffix is originally an intensifier. Compare the cognate affix in Abkhaz, which is described as an emphatic suffix and clearly forms absolute superlatives (i.e., intensified adjectives). O'Herin (1995) gives only a periphrastic superlative with *rəc'ag'əy* 'most', which Tabulov glosses as 'even more'.

⁸⁴ The suppletive *meyè* is not used by all speakers (M. DeGraff, p.c. 2006), and like the modern Romance languages, there is also a regular periphrastic comparative for 'good', *pi bon*. Haitian does not distinguish the superlative from the comparative.

The Americas: Aymara (de Torres Rubio 1616) Hixkaryana (Derbyshire 1985), Jacalteco (Craig 1977), Mapudungun (Augusta 1903), Miskito, Ulwa, Panamaka, Twahka (Conzemius 1929), Classical Nahuatl (Andrews 1975),⁸⁵ Salinan (Mason 1918), Tarascan (Foster 1969),

Austronesian: Motu (Lister-Turner and Clark 1930),

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⁸⁵ In Appendix 2, Modern Western Armenian is noted as the only language in the sample with a morphological superlative but not morphological comparative. In Classical Nahuatl, one of the modifiers that marks the superlative incorporates, but none of the comparative intensifiers do, see Andrews (1975:350-353).

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