

# Revisiting Basque (*xe-*)Comparatives

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## 1. Introduction

Locality of allomorphy is a central notion for those contemporary theories of morphology, which aim to derive existing patterns using complex internal structure for words in a restrictive fashion (Starke 2009; Embick 2010; Bobaljik 2012). While the cyclicity condition on allomorphy is almost universally accepted (Bobaljik 2000; Embick & Marantz 2008), additional restrictions can be more controversial. The main ones to be considered in this paper include the linear adjacency condition of Embick (2010), the structural adjacency condition of Bobaljik (2012), and a more lax in some respects and more strict in others structural adjacency condition found in the Nanosyntax literature (Starke 2009; Baunaz & Lander 2018).

Due to the central nature of locality for contemporary theories of morphology, one finds many reports of the so-called ‘non-local’ patterns of allomorphy, which cast doubt on the existing locality conditions for allomorphy. A prominent example comes from comparatives in Basque (Bobaljik 2012; Moskal & Smith 2016). In Basque, one finds not only regular comparatives but also comparative with an additional *-xe-* morpheme, with the result meaning ‘a little more of X’. As shown in the table in (1), such comparatives interact with allomorphy in a non-trivial way — not only does the presence of *-xe-* not block root suppletion in forms like *gehi-xe-ago* ‘a little more’, it also does block the allomorphy of the comparative affix, which is zero in the form *hobe* ‘better’ but non-zero in the form *hobe-xe-ago* ‘a little better’.

- (1) Allomorphy in Basque *xe-*comparatives (Bobaljik 2012: ex.70, ex.213)

	POS	CMPR	<i>xe-</i> CMPR
high	<i>gora</i>	<i>gor-ago</i>	<i>gora-xe-ago</i>
much	<i>asko</i>	<i>gehi-ago</i>	<i>gehi-xe-ago</i>
good	<i>on</i>	<i>hobe</i>	<i>hobe-xe-ago</i>

This paper presents a reanalysis of Basque data which is not problematic for any notion of locality, building on the split comparative hypothesis of Caha et al. 2019. The solution lies in distributing the properties of CMPR head into two heads, C1 and C2. For our purposes, the C1 is going to be the part of the structure triggering the adjectival root suppletion while the C2 will undergo *-ago/-∅* morphological alternation under adjacency with  $\sqrt{\text{GOOD}}$ -C1 complex. The diminutive affix *-xe-*, however, will be placed in between of C1 and C2, which derives the presence of both root suppletion and *-ago* in the form *hobe-xe-ago* ‘a little better’.

The paper is structured as follows. In section 2, I present the morphological analysis. Section 3 sketches the semantics for the proposed structure building on Zhang & Ling 2021. Section 4 concludes.

## 2. A reanalysis

This section’s goals are three-fold. Firstly, I introduce the split comparative hypothesis of Caha et al. (2019). Then, I show that accepting the split comparative hypothesis leads to a straightforward solution of the Basque puzzle. Finally, I suggest that accepting the split comparative hypothesis leads to a solution of another problem posed by Basque comparative, which makes use of either word-internal phrasal movement (Myler 2017) or post-Vocabulary Insertion movement (Embick & Noyer 2001).

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### 2.1. The split comparative hypothesis

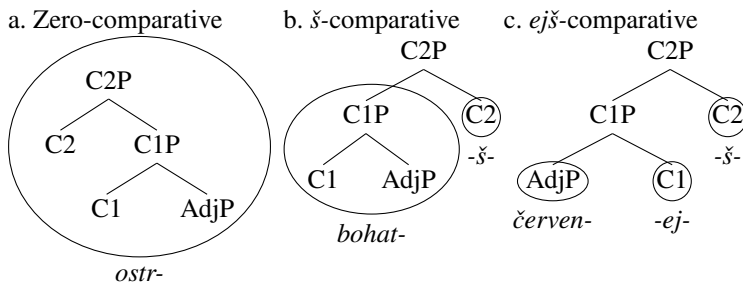
Examples of adjectival root suppletion with an overt comparative affix, like English *bett-er*, already pose a problem for vanilla Nanosyntax, assuming the simple [CMPR [AdjP]] structure (since Nanosyntax does not allow multiple exponence; see Caha 2024). It is clear, however, that positing a second comparative node in a structure like [C2 [C1 [AdjP]]] circumvents the problem: *bett-* spells out C1 and AdjP while *-er* spells out C2. The question is, then, does one find independent evidence for splitting the comparative node? For that, we ideally need a grammatical system with two independent affixes found in comparatives. Caha et al. (2019) provide such an example from Czech. To quickly recap their work (to which I cannot do full justice here), one finds three classes of adjectives in Czech. In literary Czech, there are adjectives that form the comparative with the affix *-ejš-* (like *červen-* ‘red’), adjectives that form the comparative with the affix *-š-* (like *bohat-* ‘rich’). Additionally, in North-Eastern Bohemia dialect of Czech, one finds adjectives with zero-formed comparatives (like *ostr-* ‘sharp’). Obviously, a linguist can be led to decompose *-ejš-* into *-ej-š-*. Given the absence of comparatives formed with *-ej-* only, the following picture emerges, see the table in (2), adapted from (Caha et al. 2019).

(2) The Czech comparative system

	STEM	C1	C2	AGR
red	<i>červen</i>	<i>ej</i>	<i>š</i>	<i>í</i>
rich	<i>bohat</i>	∅	<i>š</i>	<i>í</i>
NEB sharp	<i>ostr</i>	∅	∅	<i>í</i>
Unattested	<i>stem</i>	<i>ej</i>	∅	<i>í</i>

Not only does the positing of a split comparative node capture the seeming presence of two comparative affixes in Czech, *-ej-* and *-š-*, it also rules out the unattested type of the adjective, given the inner workings of Nanosyntax. Given that C1 and C2 appear to be spelled out independently, Nanosyntax derives the three out of four possible patterns with different ‘root sizes’ (how much structure the adjectival root is able to spell-out). Importantly, given that non-adjacent nodes cannot be spelled-out together, the system rules out the zero-exponence of C2 with non-zero-exponence of C1 (the unattested  $\sqrt{-ej-\emptyset}$  pattern)

(3) Possible ‘root sizes’ in Czech



Thus, Czech data presents a case study for the comparative structure: Czech has two independent comparative affixes whose allomorphy also reflects their structural configuration. Now, let us see how the split comparative structure can be utilized to account for the data of Basque *xe*-comparatives.

### 2.2. An analysis for all three locality conditions

Accepting the split comparative structure allows to put *-xe-* right in the middle of the two heads. This move allows a clear reanalysis of *xe*-comparatives, as shown below for all three approaches to locality (linear adjacency as in Embick 2010; structural adjacency as in Bobaljik 2012; span-based structural adjacency as in Nanosyntax).

(4) Proposed structure for *xe*-comparatives: C2 » Dim » C1 » Adj

First, let us deal with the linear adjacency approach, for which the Vocabulary Insertion rules in (5) work. However, they require a post-syntactic Fusion rule of C1 and suppletive adjectives ( $\sqrt{\text{GOOD}}$  and  $\sqrt{\text{MUCH}}$ ). According to the rules below, the suppletive adjectival bases are portmanteaux of the acategorial root, the adjectivizer *a* and the first comparative head. Aside from that, the other parts are rather straightforward: the lack of zero-exponence of C2 in *hobe-xe-ago* is analyzed as linear intervention of *-xe-*. The previous problems posed by Basque data for linear adjacency are circumvented by having one head trigger stem allomorphy and another head be exponed by the comparative affix *-ago*. An analysis assuming structural adjacency works exactly the same. Suppletive stems are portmanteaux and the *-xe-* affix intervenes for the purposes of comparative affix allomorphy in *hobe* and *hobe-xe-ago*.

(5) VI rules for linear adjacency

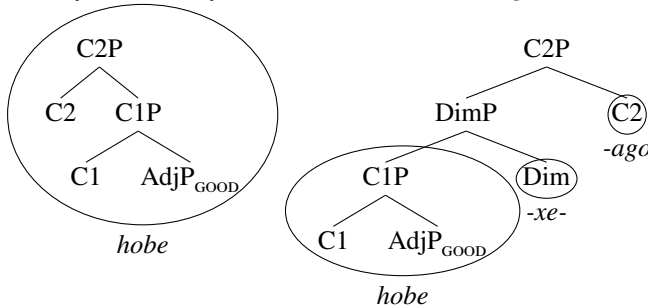
- a.  $C2 \leftrightarrow \emptyset / [\sqrt{\text{GOOD}}+a+C1] \sim \_$
- b.  $C2 \leftrightarrow -ago$
- c.  $[\sqrt{\text{GOOD}}+a+C1] \leftrightarrow hobe-$
- d.  $[\sqrt{\text{MUCH}}+a+C1] \leftrightarrow gehi-$
- e.  $\text{DIM} \leftrightarrow -xe-$

(6) VI rules for structural adjacency

- a.  $C2 \leftrightarrow \emptyset / [\sqrt{\text{GOOD}}+a+C1] \_ \_$
- b.  $C2 \leftrightarrow -ago$
- c.  $[\sqrt{\text{GOOD}}+a+C1] \leftrightarrow hobe-$
- d.  $[\sqrt{\text{MUCH}}+a+C1] \leftrightarrow gehi-$
- e.  $\text{DIM} \leftrightarrow -xe-$

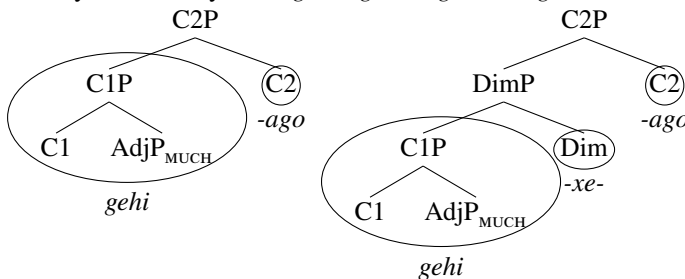
A nanosyntactic analysis, descriptively, works similarly.<sup>1</sup> The *-xe-* affix works as an intervener for exponing C2 together with C1, *a*, and  $\text{AdjP}_{\text{GOOD}}$ , causing *-ago* to arise in *hobe-xe-ago* but not *\*hobe-ago*.

(7) Nanosyntactic analysis for *hobe-* and *hobe-xe-ago*



The forms *gehi-ago* and *gehi-xe-ago* are also derived in a straightforward fashion: the only difference between *hobe-* and *gehi-* lies in the amount of structure they can realize.

(8) Nanosyntactic analysis for *gehi-ago* and *gehi-xe-ago*



I believe that this demonstration shows that assuming the structure in (4) leads to a simple solution of Basque *xe*-comparatives no matter which theory of adjacency one prefers. In the next subsection, I will

<sup>1</sup> Recently, it came to my attention that the basic logic of the presented analysis was independently developed (Pavel Caha, p.c.) by previous researchers as well. The relevant works are Holaj & Starke 2019 and Caha et al. 2023. I take it as an example of reproducibility of analyses.

look at Basque comparative adverbials, which also exhibit a problematic allomorphy pattern but in a different way.

### 2.3. A suggestion for adverbs

Regardless of whether the contents of the last subsection are correct, another problem arises once we consider the morphology of Basque comparative adverbials, shown below.

(9) Basque comparative adverbs

	ADJ	ADV	CMPR.ADV
new	<i>berri</i>	<i>berri-ki</i>	<i>berri-ki-ago</i>
good	<i>on</i>	<i>on-gi</i>	<i>hobe-ki</i>

Assuming that what we see with the adjective *berri* ‘new’ is what we get, the structure for Basque comparative adjectives is similar to the structure for Basque *xe*-comparatives: the adverbial head sits in between of C1 and C2, which predicts a form \**hobe-ki-ago* (in parallel to *hobe-xe-ago*) and not the observed *hobe-ki*. An important observation, in my opinion, is that the behavior of *xe*-comparatives is semi-transparent (it is transparent for stem allomorphy while opaque for comparative affix allomorphy) while the behavior of adverbial comparatives is fully transparent: the patterns are as if there isn’t an adverb in between of comparative and adjective for the purposes of contextual allomorphy.

This is exactly what I propose for the adverbial data — the pattern is derived via movement, either post-syntactic (Embick & Noyer 2001) or word-internal phrasal movement in the spirit of Myler 2017. With post-syntactic, post-Vocabulary Insertion movement operation such as Local Dislocation (Embick & Noyer 2001), the analysis is straightforward. The initial order is ADJ-C1-C2-ADV, which then is transformed according to a rule that swaps places of ADV and C2.

(10) Linear order before and after Local Dislocation / word-internal phrasal movement

- a. ADJ-C1-C2-ADV
- b. ADJ-C1-ADV-C2

Of course, the question is, how does one describe the penetrability of the adverbial affix *-ki* for the zero-allomorphy of C2? That is the place where the post-VI nature of Local Dislocation (as in Embick & Noyer 2001 and *contra* Adger 2006) comes in. Although Local Dislocation results in the order in (10b), the allomorphy rules apply at (10a) — resulting in zero-exponence of C2 in the form *hobe-ki* ‘better’. The result is a subtle one and crucially depends on the existence of not only post-syntactic dislocation operations but also those which are sensitive to the overtiness of the C2 node, which may be seen as problematic for modularity reasons.

However, the result can be restated in a theory of word-internal phrasal movement approach put expored by Myler 2017. His main idea is that the order of Vocabulary Insertion is determined by the following relation: X undergoes VI before Y (X}Y) if Y is the head of a maximal projection M categorially distinct from X and M dominates X (Myler 2017: 102). The order of Vocabulary Insertion determined ‘visibility’ for the purposes of morphological and morphonological phenomena. Although the ‘default’ case is a total ordering of Vocabulary Insertion, movement results in a partial order: given the movement of C1P into specifier of AdvP, we get the ordering relation Adj}C1}Adv, C2}Adv. and, hence, a stage of Vocabulary Insertion where Adj, C1 and C2 are adjacent.

To sum up this section, I have provided putative solutions to two puzzles posed by Basque comparatives. The diminutive *xe*-comparatives presented a ‘semi-transparent’ non-local allomorphy: although the root suppletion caused by the CMPR is found in *xe*-comparatives, the zero-exponence of CMPR caused by the adjectival root isn’t found. To capture that, I have proposed that there are two CMPR nodes (as in Caha et al. 2019) with the first node triggering root allomorphy and the second node undergoing the  $-\emptyset$ /*-ago* alternation. Placing the diminutive affix *-xe* in between them captures the semi-transparent nature of the pattern. The comparative adverbials, however, presented a ‘fully transparent’ example of non-local allomorphy: it is as if the adverbial head isn’t there for morphological processes. However, such patterns

are captured either by assuming post-Vocabulary Insertion movement (Embick & Noyer 2001) or by word-internal phrasal movement with an alternative theory of Vocabulary Insertion order (Myler 2017).

### 3. Semantics for split comparatives

The split comparative structure, however, goes against contemporary approaches to semantic composition of comparatives, which usually posit a single CMPR operator (see an overview in Schwarzschild 2008). Given that I posit a semantically contentful piece in between two comparative nodes (namely, the diminutive), some semantics considerations are necessary. In this section, I build on a recent analysis of comparatives by Zhang & Ling 2021 and propose that their system can be adapted for the split comparative structure of Caha et al. 2019.

#### 3.1. Analysis of comparatives in Zhang & Ling 2021

Building on Schwarzschild & Wilkinson 2002, Zhang & Ling (2021) propose an analysis of comparatives based on the interval semantics for gradable adjectives. Unlike the classic degree-based approaches (see Beck 2011 for an overview), the measure function in the interval-based system returns not a single degree, but rather a singleton set of degrees (denoted by the interval  $[a, a]$ ). The lexical semantics of the adjective is as follows: it takes an interval argument (contextually determined in the positive degree) and returns true iff the measure of its entity argument is a subinterval of its interval argument.

- (11) a. HEIGHT:  $\lambda x. [\text{PRECISE-HEIGHT}(x), \text{PRECISE-HEIGHT}(x)]$  (same for other measure functions)  
 b.  $\llbracket \text{tall} \rrbracket = \lambda I_{dt}. \lambda x_e. \text{HEIGHT}(x) \subseteq I$

The standard of comparison clause denotes a definite interval  $[\mu(\text{standard-of-comparison}), \mu(\text{standard-of-comparison})]$ , which is taken by the comparative operator as its argument. Let us provide the semantics for a sample standard of comparison “than that tree is tall”.

- (12)  $\llbracket \text{than } [\lambda I. \text{HEIGHT}(\text{THAT-TREE}) \subseteq I] \rrbracket = \iota I. \text{HEIGHT}(\text{THAT-TREE}) \subseteq I = [\text{PRECISE-HEIGHT}(\text{THAT-TREE}), \text{PRECISE-HEIGHT}(\text{THAT-TREE})]$  where  $\iota$  is the informativeness-based maximality operator (cf. Beck 2010)

The comparative operator is split into two parts. The first part is the interval subtraction operator MINUS, which takes two interval arguments, the interval being subtracted and the intended difference, and returns the interval such that it satisfies the equation. For the rigorous definition of interval subtraction, see Zhang & Ling 2021, the core idea is that it is an interval between the least difference between members of two intervals and the biggest difference between members of two intervals.

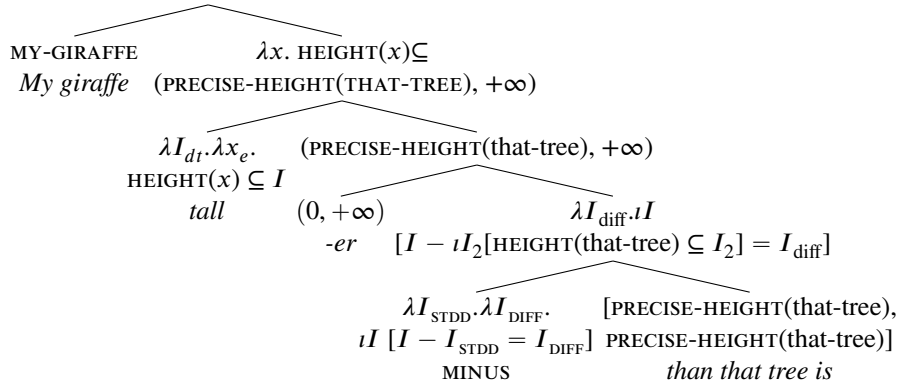
- (13)  $\llbracket \text{MINUS} \rrbracket = \lambda I_{\text{STDD}}. \lambda I_{\text{DIFF}}. \iota I [I - I_{\text{STDD}} = I_{\text{DIFF}}]$

The second part of the comparative operator denotes the intended difference, thought by Zhang & Ling 2021 to be the  $(0, +\infty)$  interval (given that any degree bigger than the standard of comparison’s measure satisfies the comparative). The main point is that the interval such that its difference with  $[a, a]$  is  $(0, +\infty)$  is the  $(a, +\infty)$  interval, which is the interval suitable for comparative semantics (a set of all degrees bigger than the height/weight/other measure of the standard of comparison).

- (14)  $\llbracket \text{-er} \rrbracket = (0, +\infty)$

Let me provide a sample derivation (taken from Zhang & Ling 2021). The sentence is “My giraffe is taller than that tree is”, and the composition of it is provided in (15). The MINUS operator first takes the standard of comparison as its argument and then takes  $\llbracket \text{-er} \rrbracket$  as its argument. Then, the resulting  $(\text{PRECISE-HEIGHT}(\text{THAT-TREE}), +\infty)$  interval is taken as argument by the adjective, which results in the intended predicate which returns true iff its entity argument’s height is bigger than the speaker’s giraffe’s height.

- (15) Composition for the sample sentence *My giraffe is higher than that tree*:  
 $\text{HEIGHT}(\text{MY-GIRAFFE}) \subseteq (\text{PRECISE-HEIGHT}(\text{THAT-TREE}), +\infty)$



This quick recap shows how the account given in Zhang & Ling 2021 works. I cannot provide arguments nor evidence for this approach here and refer the reader to the cited paper for details. My main reason for building on this analysis is the fact that the comparative meaning already comes decomposed into two parts, which can be mapped onto the C1 and C2 head of Caha et al. 2019, as shown in the next subsection.

### 3.2. Sketch of split comparative semantics

To recap, the analysis in Zhang & Ling 2021 has two core parts: the interval subtraction operator *MINUS* and the pro-form for the difference interval (which they associate with English *-er*). Given that these two parts are somewhat independent, I believe they can be mapped onto the split comparative structure of Caha et al. 2019. I suggest that the C1 head is the *MINUS* operator (with the only difference being that it now takes the adjective as its argument, which does not require substantive changes to semantics), while the C2 head is the interval pro-form, as given in (16).

- (16) Semantics for C1 and C2, adapting Zhang & Ling 2021

- a.  $\llbracket \text{C1} \rrbracket = \lambda P_{\langle dt, et \rangle} \cdot \lambda I_{\text{STDD}} \cdot \lambda I_{\text{DIFF}} \cdot \lambda x. P(x, \iota I [I - I_{\text{STDD}} = I_{\text{DIFF}}])$   
 b.  $\llbracket \text{C2} \rrbracket = \text{pro}_{dt}$  defaults to  $(0, +\infty)$

Importantly, this account allows to give plausible semantics for the diminutive *-xe-*. To capture the diminutive’s categorial promiscuity, I suggest that it is polymorphic: it takes as its argument a term of type  $\langle dt, \tau \rangle$  (any term that has an interval first argument) and returns a function of type  $\langle dt, \tau \rangle$  with the specification that the interval to be taken as an argument is ‘small’ (whatever that might be in the given context). I suggest that a  $\text{SMALL}_c$  difference interval always has the form  $(0, r)$  where  $0 < r < \theta_c$ ,  $\theta_c$  being the threshold for ‘smallness’.

- (17)  $\llbracket \text{DIM}(-xe-) \rrbracket^c = \lambda P_{dt, \tau} \cdot \lambda I_{dt} : \text{SMALL}_c(I). P(I)$

A certain prediction of this proposal is that the standard of comparison is introduced below C2 and diminutive. This remains to be shown (although I do not have an idea on how to check this kind of a prediction — in any case, it isn’t hard to swap the order of arguments in the proposed semantics for C1). To sum up, I have adapted a recent analysis of comparative semantics to make my morphological analysis more of a competitor to Bobaljik’s account of Basque *xe*-comparatives and in doing so have provided a formal semantic proposal for the split comparative hypothesis of Caha et al. 2019.

## 4. Conclusion

This paper has discussed the allomorphy patterns in Basque comparatives and has presented a re-analysis of Basque diminutive *xe*-comparatives that is not problematic for any locality condition on allomorphy building on the Nanosyntactic hypothesis of split comparative structure. Additionally, I have

argued that Basque comparative adverbs are best understood via post-Vocabulary Insertion reordering (Embick & Noyer 2001) or word-internal phrasal movement (Myler 2017). Finally, I have sketched a semantic proposal for the split comparative structure that is compatible with the proposed structure for *xe*-comparatives, which have diminutive semantics, building on the novel analysis of comparatives given in Zhang & Ling 2021.

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