Obliteration vs. Impoverishment in the Basque g-/z- Constraint

A Distributed Morphology Analysis of Present Tense Auxiliaries in Zamudio*

Karlos Arregi and Andrew Nevins

University of Illinois at Urbana-Champaign and Harvard University
karlos@uiuc.edu, nevins@fas.harvard.edu

Laburpena

We provide here a full analysis of the morphology of present indicative auxiliary verbs in Zamudio Basque.

Abstract

We provide an analysis of the morphology of present indicative auxiliary verbs in Zamudio Basque. In doing so we present an illustration of the theory of Distributed Morphology and the rules of phonology that obscure a fairly regular and well-structured syntactically-generated auxiliary complex. We provide the inventory of agreement morphemes for ergative, dative, and absolutive arguments and the auxiliary root, and propose a set of morphological operations that interact in a derivation to yield the surface forms of the auxiliary complex. The phenomena under discussion include root allomorphy based on transitivity, co-occurrence restrictions on identical person features, and post-syntactic rules of feature-deletion. The resulting model is one in which the intricate distribution of morphemes within the auxiliary complex is regulated by a number of orchestrated grammatical mechanisms.

Hitz gakoak: Zamudio, *g-/z-* constraint, Distributed Morphology, readjustment rules, impoverishment

1. Introduction

We provide here a full analysis of the morphology of present indicative auxiliary verbs in the variety of Bizkaian Basque spoken in the town of Zamudio.[2] The present paper is the continuation of a project we started with Arregi and Nevins 2006b, in which we undertake a systematic and detailed study of the auxiliary system in several Bizkaian varieties. Except otherwise noted, all the data analyzed here are from Zamudio, as reported in Gaminde 2000, a detailed descriptive grammar of this variety.[3] de Yrizar (1992) classifies Zamudio Basque as belonging to the southern subvariety of the Plencia variety of the dialect of Bizkaia.

Previous work on Basque verbal morphology addressing these issues in the generative framework typically does not concentrate on any local variety of the language.[4] However, we believe that significant progress can be made in understanding the interplay of various morphological procesees by looking at specific dialects thoroughly. The organization of this paper is as follows. In Section 2, we introduce the parts of the auxiliary and an overview of the component morphemes to be discussed. In Section 3 we provide a background on the theory of Distributed Morphology and the morphosyntactic features that are realized in the auxiliary. Our proposal regarding the realization of agreement morphemes is discussed in Section 4. In Section 5 we discuss the realization of the auxiliary root, including transitivity-dependent allomorphy (the "have/be" alternation) and the realization of agreement features copied onto the root itself. In Section 6 we discuss the operation of the *g-/z-* constraint, a morphological co-occurrence ban whose repairs yield syntax-morphology mismatches. Section 7 contains a set of phonological rules and readjustment rules and derivations that map the set of concatenated morphemes in a word onto their ultimate surface forms.

2. Auxiliary forms in Zamudio

In each tense, Basque auxiliaries are traditionally presented in four separate paradigms, each corresponding to auxiliaries containing different sets of agreement morphemes: (i) absolutive only (intransitive), (ii) absolutive and dative (psych-verb), (iii) absolutive and ergative (transitive), and (iv) absolutive, dative, and ergative (ditransitive). The paradigms for the present indicative in Zamudio are in tables 1–5.[5] These are the forms obtained after vocabulary insertion. Several readjustment and phonological rules modify them further, as discussed in section 7 below.

The underlined forms are subject to the g-/z- constraint, which is discussed in section 6. As shown in

* We thank Iñaki Gaminde and José Igancio Hualde for many helpful discussions.

[2] We undertake the analysis of other forms in Arregi and Nevins 2006a. Apart from the realization of tense in the auxiliary (which is ∅ in the present indicative), the main differences between the present indicative and other tenses have to do with tense-related allomorphy in the root and in third person absolutive agreement. Other tenses also have ergative displacement (Laka 1993, Albizu and Eguren 2000, Fernández and Albizu 2000, Rezac 2003), and taking this phenomenon into account would take us far beyond the scope of this paper.

[3] An online version of Gaminde's grammar can be found in http://bips.bi.ehu.es/manwe-bideoteka/zamudio/.

[4] Rezac 2006 is an exception, in that it takes into account many different varieties of Basque. However, Rezac's objective in this work is to analize several phenomena in verbal morphology found in some or all varieties, and does not provide a thorough analysis of all the morphological details of any particular variety.

[5] We use the follwoing abbreviations in the tables: A: absolutive; ALL: allocutive agreement; COLL: colloquial; D: dative; E: ergative; F: feminine; FOR: formal; INT: intransitive auiliary root; M: masculine; P: plural; S: singular; TR: transitive auxiliary root. 2S.M/F stands for second singular colloquial masculine/feminine.

tables 2 and 4–5, absolutive agreement must be third person if dative agreement is present, due to the **me-lui* constraint, which is operative throughout Basque.[6] The other gaps in the paradigms are signaled with the letter 'X', and are due to two different reasons. First, there are no reflexive forms (1st with 1st, 2nd with 2nd) in any paradigm in any Basque dialect. Second, many of the forms for 2nd person singular colloquial are missing in Gaminde (2000). As in many dialects, the colloquial-formal distinction is being lost in favor of the formal forms.[7]

The forms in these tables follow this template:

(1) *Slots in the auxiliary*

Abs—Root—2Pl.Abs—Dat—Erg—Pl.Abs

In the following sections, we account for the realization of all these slots except for the special plural absolutive morphemes 2Pl.Abs and Pl.Abs. 2Pl.Abs is realized as *-e*, and always appears right-adjacent to the root. Pl.Abs is realized as *-s*, and its distribution within the verb is somewhat idiosyncratic. In particular, it is absent in all the Pl.Abs forms in table 1, in the 1Pl.Abs-3Erg forms *g-aitu-(e)*, and in all the 2Pl.Abs forms (*s-aitu-e-*) in table 3, while it is present in the 2Sg.Form-3Sg.Erg form *s-aitu-∅-**s*** in the same table, even though the absolutive morpheme in this verb is not plural.[8] Furthermore, its position is also idiosyncratic in some forms. Specifically, it appears at the very end of the verb, except when there is an adjacent agreement morpheme specified as [+Colloquial]. This can be seen, for instance, in the forms 3Pl.Abs-2Sg.Coll.Msc.Dat *d-a-**s**-k* in table 2 and 3Pl.Abs-3Pl.Dat-2Sg.Coll.Fem.Erg *d-o-tze-**s**-na* in table 5. We assume that this Pl.Abs morpheme is generated in final position, and that a special *colloquial metathesis* rule applies when it is preceded by a colloquial agreement morpheme (see Hale 1973, Harbour 2005, Harris and Halle 2005 and Adger 2006 for other cases of morpheme metathesis.)

Other pieces of the auxiliary often referred to as exponents of plural absolutive agreement are *it* and *ra*/*re*. As can be seen in tables 1 and 3–5, we take these strings to be actually part of the root. For instance, *eitu* and *aitu* in table 3 are different realizations of the root, with no internal morphological structure. In section 5, we argue that the realization of the root is (partly) dependent on both person and number features of absolutive agreement. Parsing the strings *it*/*ra*/*re* as separate exponents of plural agreement morphemes would complicate the analysis by introducing several ad hoc rules.

[6] Although forms violating **me-lui* are not possible in any transitive sentence throughout Basque, this constraint seems not to be active in intransitive sentences in some dialects. In Zamudio, older speakers have some intransitive forms that violate the constraint, although limited to first singular absolutive (see Gaminde 2000.) We have omitted these forms from table 2, since younger speakers do not use them.

[7] In the tables, we have completely omitted columns for 2nd person singular colloquial, since all the relevant forms are missing.

[8] See section 5 for discussion of other ways in which second singular formal forms behave as if they were plural. We provide a formal implementation of this fact in that section.

Absolutive	
1S	n-as
1P	g-ara
2S.COLL	g-as
2S.FOR	s-ara
2P	s-ara-e
3S	d-a
3P	d-ire

Table 1: Absolutive auxiliary

	Absolutive	
Dative	3S	3P
1S	d-a-t	d-a-t-s
1P	d-a-ku	d-a-ku-s
2S.M	d-a-k	d-a-s-k
2S.F	d-a-na	d-a-s-na
2S.FOR	d-a-tzu	d-a-tzu-s
2P	d-a-tzu-e	d-a-tzu-e-s
3S	d-a-ko	d-a-ko-s
3P	d-a-ko-e	d-a-ko-e-s

Table 2: Absolutive-dative auxiliary

	Absolutive			
Erg	1S	1P	2S.FOR	2P
1S	X	X	s-aitu-t	s-aitu-e-t
1P	X	X	s-ara	s-ara-e
2S.M	X	X	X	X
2S.F	X	X	X	X
2S.FOR	n-o-su	g-o-su-s	X	X
2P	n-o-su-e	g-o-su-e-s	X	X
3S	n-eu-∅	g-aitu-∅	s-aitu-∅-s	s-aitu-e-∅
3P	n-eu-∅-e	g-aitu-∅-e	s-aitu-∅-e	s-aitu-e-∅-e

	Absolutive	
Erg	3S	3P
1S	d-o-t	d-o-t-s
1P	d-o-u	d-o-u-s
2S.M	d-o-k	d-o-s-k
2S.F	d-o-na	d-o-s-na
2S.FOR	d-o-su	d-o-su-s
2P	d-o-su-e	d-o-su-e-s
3S	d-eu-∅	d-eitu-∅-s
3P	d-eu-∅-e	d-eitu-∅-e-s

Table 3: Absolutive-ergative auxiliary

	Dative			
Erg	1S	1P	2S.FOR	2P
1S	X	X	d-o-tzu-t	d-o-tzu-e-t
1P	X	X	d-a-tzu	d-a-tzu-e
2S.M	d-o-st-k	d-o-k	X	X
2S.F	d-o-st-na	d-o-na	X	X
2S.FOR	d-o-st-su	d-o-su	X	X
2P	d-o-st-su-e	d-o-su-e	X	X
3S	d-o-st-∅	d-o-sku-∅	d-o-tzu-∅	d-o-tzu-e-∅
3P	d-o-st-∅-e	d-o-sku-∅-e	d-o-tzu-∅-e	d-o-tzu-e-∅-e

	Dative	
Erg	3S	3P
1S	d-o-tze-t	d-o-tze-e-t
1P	d-o-tze-u	d-o-tze-e-u
2S.M	d-o-tze-k	d-o-tze-e-k
2S.F	d-o-tze-na	d-o-tze-e-na
2S.FOR	d-o-tze-su	d-o-tze-e-su
2P	d-o-tze-su-e	d-o-tze-e-su-e
3S	d-o-tze-o	d-o-tze-e-∅
3P	d-o-tze-o-e	d-o-tze-e-∅-e

Table 4: Absolutive-dative-ergative auxiliary (3Sg absolutive)

	Dative			
Erg	1S	1P	2S.FOR	2P
1S	X	X	d-o-tzu-t-s	d-o-tzu-e-t-s
1P	X	X	d-a-tzu-s	d-a-tzu-e-s
2S.M	d-o-st-s-k	d-o-s-k	X	X
2S.F	d-o-st-s-na	d-o-s-na	X	X
2S.FOR	d-o-st-su-s	d-o-su-s	X	X
2P	d-o-st-su-e-s	d-o-su-e-s	X	X
3S	d-o-st-∅-s	d-o-sku-∅-s	d-o-tzu-∅-s	d-o-tzu-e-∅-s
3P	d-o-st-∅-e-s	d-o-sku-∅-e-s	d-o-tzu-∅-e-s	d-o-tzu-e-∅-e-s

	Dative	
Erg	3S	3P
1S	d-o-tze-a-s	d-o-tze-e-t-s
1P	d-o-tze-u-s	d-o-tze-e-u-s
2S.M	d-o-tze-s-k	d-o-tze-e-s-k
2S.F	d-o-tze-s-na	d-o-tze-e-s-na
2S.FOR	d-o-tze-su-s	d-o-tze-e-su-s
2P	d-o-tze-su-e-s	d-o-tze-e-su-e-s
3S	d-o-tze-o-s	d-o-tze-e-∅-s
3P	d-o-tze-o-e-s	d-o-tze-e-∅-e-s

Table 5: Absolutive-dative-ergative auxiliary (3Pl absolutive)

3. Formal Foundations

The general model of grammatical computation assumed here is one in which syntactic operations put together phrases and heads, and in which agreement involves copying of abstract morphosyntactic features with no phonological content. After syntactic operations are complete, terminal-by-terminal, phonological content is inserted for morphosyntactic features at PF (the component of language responsible for ultimately yielding phonetic form through a sequential derivation).

We assume that complex words, such as the Basque auxiliary, are formed by syntactic operations, e.g., Merge, Agree, Move (see Adger (2003) for a thorough overview of these). The principles of morphology are therefore to a large extent the principles of syntax, because in the default case, the morphological structure at PF is simply the syntactic structure. Nevertheless, in more complex cases additional PF processes may modify and elaborate syntactic structure in limited ways. Thus in the syntactic approach to morphology adopted here some aspects of word formation arise from syntactic operations such as head movement, which occur in the syntax proper, while other aspects of word formation are accounted for by operations that occur on the PF branch. It is this fact that has given rise to the term Distributed Morphology, a theory of the interface between the syntactic construction of words and their phonological realization. General overviews of Distributed Morphology may be found in Halle and Marantz (1993), Harley and Noyer (1999), and Embick and Noyer (to appear).

The basic currency of agreement relations and of their morphological realization are abstract morphosyntactic features, often called φ-features for the categories of person, number, gender, and case. We provide the inventory of features and their definitions that are relevant for this paper below.[9] Note that [+F] = ¬[−F].

(2) *Person* (Noyer (1992), Halle (1997), Nevins (2005))

a. [+Author] true iff the reference set contains the speaker.

b. [+Participant] true iff the reference set contains one of the discourse participants.

c. Marked value = + for both [±Author] and [±Participant]

d. [+Colloquial] true iff the reference set contains only individuals with whom the speaker feels socially comfortable

e. Abbreviated as [±Auth], [± Part], [±Coll]

[9] In addition to ergative, dative, and absolutive, Basque includes a number of oblique Cases that are marked on arguments, such as inessive, allative, and so forth. The auxiliary does not include any cross-referencing of arguments with these Cases and we do not discuss them in this paper.

(3) a. [+Auth, +Part] = 1st person

b. [−Auth, +Part] = 2nd person

c. [−Auth, −Part] = 3rd person

d. [+Auth, −Part] = logically impossible

(4) *Case* (Calabrese (2006))

a. [+Motion, −Peripheral] = ergative

b. [+Motion, +Peripheral] = dative

c. [−Motion, −Peripheral] = absolutive

d. Abbreviated as [±Mot], [± Peri]

(5) *Number* (Harbour (2003))

a. [+Singular] true iff |N| = 1

b. Marked value = + for [±Singular]

c. Abbreviated henceforth as [±Sg]

Vocabulary Insertion is a process of inserting phonological material (i.e. an exponent) that realizes a set of syntactic features present at a particular syntactic node. One of the most canonically adopted principles governing the selection of an exponent to realize a particular set of φ-features at a node is the Subset Principle, based on the formulation in Halle 1997:

(6) a. The Subset Clause A phonological exponent realizes a feature bundle (syntactic node) if the item matches all or a subset of the grammatical features specified in the syntactic node. Insertion does not take place if the Vocabulary item contains features not present in the syntactic node.

b. The Maximal Subset Clause Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the syntactic node must be chosen.

Importantly, in between the conclusion of syntactic operations and the commencement of Vocabulary Insertion, certain rules may delete structure, triggered in either a context-free or context-sensitive structural description. Given a syntactic terminal S, *impoverishment deletes a feature on S*, and *obliteration deletes the terminal S entirely*. Both of these operations play a central role in our analysis of root allomorphy and of the g-/z- constraint in section 6.

4. Realization of Agreement Morphemes

A cursory look at tables 1–5 quickly reveal that Dat and Erg agreement morphemes have several shared properties that separate them from Abs agreement. The former are always realized as suffixes, while latter always as prefixes. Furthermore, several forms of Dat and Erg are identical, such as the suffix *-t* for 1Sg.

The following are the vocabulary entries relevant for tables 1–3:[10]

(7) *Vocabulary entries for 1st person*

/g-/ ↔ [−Mot, −Peri, +Part, +Auth, −Sg]

/-u/ ↔ [+Mot, −Peri, +Part, +Auth, −Sg]

/-ku/ ↔ [+Mot, +Peri, +Part, +Auth, −Sg]

/n-/ ↔ [−Mot, −Peri, +Part, +Auth, +Sg]

/-t/ ↔ [+Mot, +Part, +Auth, +Sg]

(8) *Vocabulary entries for 2nd person*

/g-/ ↔ [−Mot,−Peri,+Part,−Auth,+Sg,+Coll]

/-k/ ↔ [+Mot,+Part,−Auth,+Sg,+Coll,−Fem]

/-na/ ↔ [+Mot,+Part,−Auth,+Sg,+Coll,+Fem]

/s-/ ↔ [−Mot, −Peri, +Part, −Auth]

/-su/ ↔ [+Mot, −Peri, +Part, −Auth]

/-tzu/ ↔ [+Mot, +Peri, +Part, −Auth]

(9) *Vocabulary entries for 3rd person*

/d-/ ↔ [−Mot, −Peri][11]

/∅/ ↔ [+Mot, −Peri]

/-ko/ ↔ [+Mot, −Peri]

(10) *Vocabulary entry for plural*

/-e/ ↔ [−Sg]

Consider, for instance, the realization of first person. All the vocabulary entries in (7) except *-t* are self-explanatory, given the features defined in the previous section. The first singular *-t* suffix merits special attention due to the fact that it is underspecified for case features: it is only specified for [+Motion], which makes it compatible with both 1Sg ergative and dative agreement. What makes this possible is the Subset Principle (6). which simply requires that vocabulary entries match a subset of the features in a morpheme. This allows us to account for the syncretism we find in this corner of the auxiliary paradigm.

Another case of underspecification is found in the prefix *s-* in (8), which matches all second person absolutive agreement morphemes. Note that this is a subset of the features that *g-* in (8) is specified for (second singular colloquial absolutive.) Given the Subset Clause of the Subset Principle, both exponents compete for insertion in a second singular colloquial absolutive morpheme. However, the Maximal Subset Clause determines that the more richly specified *g-* is inserted in this case. On the other hand, this exponent is not compatible with all other instances of second person absolutive agreement

[10] Tables 4–5 are essentially the result of the simple combination of the morphemes found in tables 1–3, with some adjustments we discuss below.

[11] 3rd person absolutive is realized as *d-* only in the present indicative. In other tenses, other prefixes are used (*s-*, ∅, *y-* and *l-*.) See Gaminde 2000.

(singular formal and plural), due to feature mismatch. In that case, underspecified *s-* is inserted. Again, underspecification of vocabulary entries is crucial in accounting for the distribution of syncretic forms.

An important feature of ergative and dative agreement morphemes is that they are both subject to fission (see Noyer 1992, Halle 1997.) After insertion of the entry whose feature specification matches the most features in the morpheme, fission splits off the remaining features into a separate morpheme. Vocabulary insertion then proceeds onto this morpheme as usual. In particular, fission accounts for the fact that all 2Pl and 3Pl morphemes contain the vowel *-e*. For instance, 3Pl.Dat *-ko-e* in table 2 is a sequence of two suffixes: *-ko* in (9), which matches the features [+Mot, −Peri, −Part, −Auth], and *-e* in (10), which matches [−Sg]. Note that the plural suffix *-e* never appears in 1Pl agreement. This is due to the fact that the more specific suffixes *-u/ku* in (7) already match [−Sg].

Basque is not unique in having a clitic dedicated to realizing number features; Noyer (2001) provides an extensive analysis of the Nunggubuyu nonsingular clitic *wa*. In Basque, the discontinuous appearance of the clitic *-e* along with other clitics is the result of fission. We propose that vocabulary insertion into clitics in Basque is subject to fission (Noyer, 1992, Halle, 1997). After insertion of the entry whose feature specification matches the most features in the morpheme (in accordance with the Subset Principle (6)), fission splits off the remaining (i.e. unrealized) features into a separate terminal-of-exponence. Vocabulary insertion then proceeds onto this morpheme as usual. In particular, fission accounts for the fact that all second and third plural clitics contain the vowel *e*, as discussed above. For instance, in the second plural ergative enclitic *su-e*, *su* matches the features [+Participant, −Author], and *-e* matches [−Singular]:

(11) *Fission in second plural ergative*

$$[+\text{Participant}, -\text{Author}, -\text{Singular}] \xrightarrow{(8)} \textit{su}\ [-\text{Singular}] \xrightarrow{(10)} \textit{su-e}$$

Note that the plural suffix *-e* never appears in first plural clitics. This is due to the fact that the more specific exponents *g/u* already match [−Singular]:

(12) *No fission in first plural ergative*

$$[+\text{Participant}, +\text{Author}, -\text{Singular}] \xrightarrow{(7)} \textit{u}$$

The following examples illustrate the workings of vocabulary insertion in agreement morphemes:[12]

(13) *d-a-s-na: 3Pl.Abs-2Sg.Coll.Fem* (see Table 2)

Abs-	Root-	Dat-	Pl.Abs
−Mot, −Peri, −Part, −Auth, −Sg	−Have	+Mot, +Peri, +Part, −Auth, +Sg, +Coll, +Fem	−Mot, −Peri, −Sg
↕	↕	↕	↕
d	**a**	**na**	**s**

(14) *d-o-u-s: 3Pl.Abs-1Pl.Erg* (see Table 3)

Abs-	Root-	Erg-	Pl.Abs
−Mot, −Peri, −Part, −Auth, −Sg	+Have	+Mot, −Peri, +Part, −Auth, −Sg	−Mot, −Peri, −Sg
↕	↕	↕	↕
d	**o**	**u**	**s**

In these examples, the root is realized as specified below in section 5. Furthermore, Pl.Abs is realized as *-s*, and as discussed in section 1, colloquial metathesis applies to (13) to yield *d-a-s-na*.

The preceding entries are also relevant for tables 4–5, in addition to the following:

(15) *Vocabulary entries for dative and ergative*

/-sku/ ↔

[+Mot,+Peri,+Part,+Auth,−Sg] / ___ [+Mot]

/-st/ ↔

[+Mot, +Peri, +Part, +Auth, +Sg] ___ [+Mot]

/-a/ ↔

[+Mot, −Peri, +Part, +Auth, +Sg] / *tze* ___ *s*

/-tze/ ↔ [+Mot, +Peri] / ___ [+Mot]

/-o/ ↔ [+Mot, −Peri] / *tze* ___

All these affixes spell out dative or ergative agreement in contexts which limit them to forms in tables 4–5. For instance, *-tze* spells out 3rd dative in the context of ergative agreement, and *-o* is the realization of 3rd ergative in the context of *-tze*.

5. Root Allomorphy

The form of the root depends on two main factors: (i) the presence or absence of ergative agreement, and (ii) the feature specification of absolutive agreement.[13] We implement this with the following rules, which apply prior to vocabulary insertion:[14]

[12] The feature [±Have] appearing in the root in these examples is discussed in section 5.

[13] To a limited extent, the value of the feature [±Part] in ergative agreement also determines the form of the root. We implement this below with impoverishment rules (25)–(27).

[14] Root allomorphy also depends on tense. The analysis in this section is only valid for present indicative auxiliaries.

(16) Insert the feature [+Have] in the root in the context of ergative Agr. Insert [−Have] otherwise.

(17) Copy person/number features from absolutive agreement onto the root.

In the following subsection, we provide evidence for rule (16), and subsection 5.2 discusses the realization of the root in detail.

5.1. *Have* and *Be*

In this subsection, we examine the allomorphy conditions determining the form of the auxiliary root, where *have* is "transitive" and *be* is "intransitive". Arregi (2004) presents thorough argumentation that the *have/be* alternation in Basque is based on *the presence/absence of ergative agreement*, and not on the ergative DP argument. That this is the case can be best detected when ergative agreement and ergative arguments part ways.

One demonstration comes from *allocutive* auxiliary forms in Zamudio. Allocutive finite forms in Basque are unique in that they contain a second person morpheme that agrees with the adressee when the latter is someone who would be addressed using colloquial forms (see Oyharçabal 1993.) Importantly, *this morpheme does not cross-reference any argument in the clause*, hence the name 'allocutive'.

What is of interest to us is the particular form that allocutive morphemes have. In an intransitive auxiliary with only absolutive agreement, the allocutive morpheme is realized as ergative agreement. This is illustrated in the following forms, where (19) is the allocutive counterpart of (18):[15]

(18) Lau astean egon n- as geixorik.
four week.in been 1S.A- INTR sick
"I've been sick for four weeks." (Gaminde 2000, p. 367)

(19) Lau astean egon n- o- k
four week-in been 1S.A TR- 2S.COLL.M.ALL
geixorik.
sick
"I've been sick for four weeks."

It is important to note that both sentences have the same syntax and meaning. Both are syntactically intransitive, in the sense that they contain a single absolutive argument. The only difference is that (19) is used whenever addressing a single male friend, and (18) otherwise. The auxiliary in both examples contains, as expected, the prefix *n*, which cross-references the first singular absolutive argument. However, the allocutive auxiliary in (19) also contains the allocutive morpheme *k*, which does not crossreference any argument in the sentence.[16] Furthermore, this allocutive morpheme has the same form and occupies the same position as an ergative suffix.

What is relevant to us is the fact that the root takes a different form in both examples. In the nonallocutive auxiliary (18), the root is intransitive *as*, as expected, but in the allocutive auxiliary (19), it is transitive *o* (see below for the relevant vocabulary entries.) Even though the sentence lacks transitive syntax and an ergative argument, the syntactically unmotivated presence of a morpheme with the form and position of ergative agreement triggers the insertion of a transitive root. Thus, (19) shows that ergative agreement, and *not* an ergative argument, triggers the presence of the transitive root.

To conclude so far, transitivity alternation in the root in Basque is determined by the presence of *ergative agreement* in the auxiliary, and is thus is a postsyntactic determination of allomorphy. For ease of exposition, we refer to a root specified as [+Have] as *transitive*, and to a root specified as [−Have] as *intransitive*. As a result of rules (16)–(17), the vocabulary entries to be inserted in the root are sensitive to both the person/number features copied from the absolutive argument, and on the value of the feature [±Have].

5.2. Impoverishment rules and vocabulary insertion

Both the feature [Have] and the features copied from the absolutive node are relevant for the vocabulary entries for the root.

The following impoverishment rules and vocabulary entries account for the exponence of intranstive roots (see tables 1–2:)

(20) *2nd formal impoverishment*

$[+\text{Sg}] \rightarrow \emptyset$ / [_, −Colloquial]

(21) *Dative root impoverishment*

$[-\text{Sg}] \rightarrow \emptyset$ / ___ [+Peri]

(22) *Vocaulary entries for intransitive root*

a. /ire/ ↔ [−Have,−Part, −Auth, −Sg]

b. /as/ ↔ [−Have, +Part, +Sg]

c. /ara/ ↔ [−Have, +Part]

d. /a/ ↔ [−Have]

With the exception of the second singular formal root, these vocabulary entries account for the forms of the root in table 1. The root in this table is *as* in the first singular and second singular colloquial, *ara* in the first/second

[15] Unfortunately, Gaminde 2000 does not have any relevant sentence containing allocutive forms, which reflects the fact that these forms are not in much use any more. Gaminde lists the allocutive form *n-o-k* in (19) on page 382.

[16] Oyharçabal 1993 provides several arguments that the presence of an allocutive morpheme in the auxiliary does not signal the presence of an additional argument in the sentence. For instance, this alleged argument cannot bind anaphors. Oyharçabal interprets these arguments as showing that the allocutive cross-references a *pro* in a high A′-position.

plural, *ire* in the third plural, and *a* in the third singular. Dative root impoverishment is needed to account for the fact that the root in table 2 is always *a*, regardless of the feature content of absolutive agreement.

The second singular formal is *ara* due to the 2nd formal impoverishment rule. This rule is a formal implementation of the important traditional observation in the Basque literature that second singular formal behaves, in some sense, as if it were morphologically plural. Strictly speaking, the effect of the rule is not to change the number in a second singular formal morpheme, but to remove the number specification. Given the right vocabulary entries, this has the desired result that a second singular formal morpheme is realized in the same way as plural morphemes. In the case at hand, the exponent *as* in (22) is specified as participant singular, and *ara* as participant, with no number specification. Given the subset principle, the result is that a participant singular root is realized as *as*, and a participant plural root is specified as *ara*. The 2nd formal impoverishment rule removes the number specification from second singular formal, which results in the insertion of numberless *ara* instead of singular *as*.

Note that this rule is not restricted to apply only in intransitive roots. It applies to all morphemes in the language that are specified as second person singular formal. Indeed, the traditional observation is that second singular formal behaves as plural throughout the system. In the forms discussed in this paper, the effect of this rule can only be seen in intransitive auxiliaries. Another illustration of the rule comes from the realization of pronouns in Zamudio. As in all other dialects, pronouns have a vowel which reflects number:

(23) *Ergative participant pronouns*

1S	2S.COLL	2S.FOR	1P	2P
n-**i**-k	**∅**-**i**-k	s-**u**-k	g-**u**-k	s-**u**-e-k

In this paradigm, the initial exponent realizes both person and number. The suffix *k* in all pronouns realizes ergative case. However, the distribution of the vowels *i/u* is parallel to the distribution of *as/ara* in intransitive roots: with the only exception of second singular formal, *i* is for singular and *u* for plural. This can be implemented in a way similar to the intransitive root: *i* is specified as participant singular, and *u* as simply participant. The second singular formal has *u* due to the 2nd formal impoverishment rule.

The main advantage of this analysis is that it does not predict that second singular formal behaves strictly as if it were plural. In particular, the prediction is that vocabulary entries that explicitly realize plural number cannot be used to realize a second singular formal morpheme. This can be seen in the fact that the second plural pronoun *s-u-e-k* has the plural exponent *-e*, but the second singular formal pronoun *s-u-k* does not. Unlike *u*, which has no number specification, *-e* is specfied as plural number. This is true throughout the auxiliary paradigm as well. As we saw in section 4, the suffix *-e* realizes plural number in both dative and ergative agreement. As expected, this exponent is used in realizing second plural, but not second singular formal.

Turning to transitive roots the the following are the relevant vocabulary entries (see tables 3–5:)[17]

(24) *Vocabulary entries for transitive root*

a. /o/ ↔ [+Have, −Part, −Auth]

b. /aitu/ ↔ [+Have, +Part]

c. /eitu/ ↔ [+Have, −Sg][18]

d. /eu/ ↔ [+Have]

As it stands, the analysis assigns the correct exponents to transitive roots specified for second person (*aitu*; table 3), and to all those in auxiliaries containing dative agreement (*o*; tables 4–5). However, three additional impoverishment rules are needed to account for other transitive roots. Thay all apply after (16)–(17) and before vocabulary insertion.

The first such rule accounts for the exponence of 3rd person transitive roots in the context of 3rd person ergative agreement:

(25) *3rd Impoverishment*

[+Have, −Part] → [+Have] / ___ [−Peri, −Part]

This rule triggers the insertion of the underspecified entries *eu/eitu* in 3rd person transitive roots in the context of nonparticipant ergative agreement. In the context of participant ergative agreement, the impoverishment rule does not apply, and 3rd person roots are realized as the more richly specified *o*. Note that this rule requires ergative agreement to be adjacent to the root, which entails that it does not apply if dative agreement intervenes. Indeed, as shown in tables 4–5, 3rd person transitive roots are always realized as *o* in the context of dative agreement.

The other two impoverishment rules apply to roots specified as first person:[19]

(26) *1Sg impoverishment*

[+Have, +Part, +Auth, +Sg] →
[+Have, −Part, −Auth, +Sg]

[17] Note that some of the roots in the underlined forms in tables 3–5 do not have any of these transitive exponents. As a result of obliteration of ergative agreement, which applies prior to (16), the root is specified as [−Have] in these cases. This is due to the g-/z- constraint, and is discussed at length in section 6.

[18] The entries for *aitu* and *eitu* are ordered as shown. This extrinsic ordering is needed to account for the fact that 2Pl transitive roots are spelled out as *aitu*, not *eitu*.

[19] Both (25) and (27) can be seen as instances of dissimilation, since in both cases a [αPart] feature is impoverished in the context of [αPart]. They lend futher support to the general argument in Arregi and Nevins 2006b that impoverishment rules, rather than being random, are often the result of a constraint on syntagmatic identity of abstract features. Interestingly, (27) is reminiscent of the conditioning environment for the g-/z- constraint discussed in that paper: 1Pl features are impoverished in the context of participant agreement.

(27) *1Pl impoverishment*

[+Have, +Part, +Auth, −Sg] →
[+Have,−Part,−Auth,−Sg] / ___ [−Peri,+Part]

Due to (26), transitive roots specified for 1Sg are impoverished so that they are specified for 3Sg, which means that the root is spelled out as *o* or *eu*. (27) does the same for those specified for 1Pl in the context of participant ergative agreement, yielding *o* (in other contexts, 1Pl roots are realized as other participant roots, with *aitu*.)

6. The g-/z- Constraint in Zamudio Basque

In this section, we discuss the effects of the *g-/z- constraint* in Zamudio Basque. This is a constraint that we proposed in Arregi and Nevins 2006b to account for certain neutralizations found in auxiliaries with both first person plural and second person agreement. The basic idea is that it is a dissimilation rule triggered by adjacent [+Part] features. There is significant dialectal variation in the application of this rule, and Arregi and Nevins 2006b illustrates this with six different Bizkaian varieties. We concentrate here on Zamudio forms affected by the constraint (the ones that are underlined in tables 1–5) with reference to other varieties whenever necessary.

We provide a unified analysis for all varieties involved by separating the structural description (triggering context) of the dissimilation rule from the structural change (repair) it effects. Dialectal variation can be witnessed in both parts of the rule. We begin with the structural description, of which there are two types: (i) 2 ergative and 1Pl dative/absolutive (**you-us*), and (ii) 1Pl ergative and 2 dative/absolutive (**we-you*). In terms of the features involved, this can be schematized as follows:

(28) *Structural Description of the g-/z- constraint*

Erg	Dat/Abs
[+Part]	**[+Part]**
	and either
[−Auth]	[+Auth, −Sg]
	or
[+Auth, −Sg]	[−Auth]

What is common to all dialects is that the structural description contains two adjacent [+Part] features, which is what triggers dissimilatory repair.

The structural change triggered by this structural description is also of two different kinds. It can be either impoverishment or obliteration. That is, it can involve *deleting* either a [+Part] *feature* on one of these morphemes (impoverishment), one of these *morphemes* entirely (obliteration).

In Zamudio, we find obliteration of first plural in **we-you* contexts: the entire 1Pl ergative morpheme is deleted in the context of a second person absolutive or dative. Obliteration in the context of a second absolutive is illustrated in the following form (from table 3:)

(29) *Zamudio 1Pl obliteration*

s- **aitu- u** → s- **ara**.
2S.A- **TR-** **1P.E** → 2S.A- **INTR**

The form to the left of the arrow is the one expected if the g-/z- constraint were not active, and the form to the right is the one actually found due to the constraint.

In order to better understand the difference between obliteration and impoverishment, it is useful to compare this form with the corresponding one in Alboniga, where the ergative node is impoverished:

(30) *Alboniga 1pl impoverishment*

s- aitxu- sie- **gu** →
2P.A- TR- P.A- **1P.E**→

s- aitxu- sie- **∅**.
2P.A- TR- P.A- **3S.E**

(Alboniga, de Yrizar (1992, vol.1: 466)

In this case, the 1Pl Erg exponent *gu* is replaced by the default (3Sg) suffix ∅, due to the deletion of the marked features [+Participant, +Author, −Singular].

The crucial difference between the two varieties can be seen in the effect that the g-/z- constraint has in the root of the auxiliary. In Zamudio, the auxiliary root changes from the expected transitive *aitu* to intransitive *ara*. This shows that the ergative terminal is completely deleted, since a transitive form of the auxiliary is only possible if this terminal is present. In Alboniga, the auxiliary root retains the transitive form *aitxu*, which is an indication that the ergative node is still present, even though it is realized as ∅.

A 1Pl ergative morpheme is also obliterated in the context of 2nd person dative in Zamudio (tables 4–5:)

(31) *Zamudio 1pl obliteration in context of dative*

d- **o-** tzu- **u** → d- **a-** tzu.
3S.A- **TR-** 2S.D- **1P.E** → 3S.A- **INTR-** 2S.D

As in the previous case, the main cue that the ergative terminal is completely gone is the change in the auxiliary root, which takes the intransitive form *a* instead of the expected transitive form *o*. If the absence of an overt exponent for 1Pl Erg where analyzed as impoverishment followed by insertion of default ∅, we would not be able to explain the change in the form of the auxiliary.

It is important to note that this change in the root does not signal a change from transitive to intransitive syntax in the sentence. Forms like *datzu* in (31) are used in clearly transitive sentences, as witnessed by the presence of an ergative case-marked pronominal argument (Iñaki Gaminde, personal communication):

(32) Gu-k su-ri emon d- a- tzu.
we-E you-D.S given 3S.A- INTR- 2S.D
"We have given it to you."

Thus, the *g-/z-* constraint must be applying to the auxiliary in a postsyntactic level of representation, after the pronominal arguments have been licensed in the syntax proper.

Zamudio also exemplifies **you-us*, with obliteration of 1Pl dative in the context of a second person ergative (tables 4–5:)

(33) *Zamudio 1pl dative obliteration*

d- o- **sku**- na → d- o- na
3S.A- TR- 1P.D- 2S.F.E → 3S.A- TR- 2S.F.E

In this case, the expected 1Pl dative morpheme is absent from the auxiliary. This cannot be a case of impoverishment, which would lead to the insertion of the default (3Sg) dative exponent *tze*. Note, furthermore, that, unlike obliteration of ergative, obliteration of dative does not result in a change in the form of the auxiliary root, since the realization of the latter is not affected by the presence or absence of dative agreement.

Finally, we include here a case of the g-/z- constraint that affects the second person morpheme. It is from the variety of Alboniga, where a 2nd ergative is impoverished in the context of a 1Pl absolutive:

(34) *Zamudio 2nd person impoverishment*

g- aitxu- **sue**- s →
1P.A- TR- **2P.E**- P.A

g- aitxu- ∅- s →
1P.A- TR- **3S.E**- P.A

(Alboniga, de Yrizar (1992, vol.1: 466))

The second person ergative morpheme is impoverished in the context of a first person plural absolutive morpheme. This results in the deletion of the marked features [+Participant, +Author, −Singular], and the morpheme is realized with the default entry ∅.

7. Readjustment Rules

The surface forms of all auxiliaries are shown in tables 7–11. These surface forms diverge to some extent from the expected concatenation of the vocabulary items discussed here, due to the operation of certain readjustment rules and phonological rules discussed in this section. All readjustment rules introduced below are exemplified in table 6.

The following readjustment rules account for certain allomorphs of the agreement suffixes *-tze* in (15), *-k* in (8) and *-e* in (10):

(35) a. *e-elision*

$e \rightarrow \emptyset$ / ___ + C_0u

b. *a-epenthesis*

$\emptyset \rightarrow$ a / s + ___ k

Underlying form	3S.A-3S.D-1P.E d+o+tze+u	3P.A-2S.M.D d+a+s+k	1S.A-3P.E n+eu+∅+e	2P.A-3P.E s+aitu+e+∅+e
e-elision	d+o+tz+u	—	—	—
a-epenthesis	—	d+a+s+ak	—	—
r-epenthesis	—	—	n+eu+re	—
Nonhigh V elision	—	—	—	s+aitu+∅+∅+e
i-epenthesis	—	—	—	—
e-epenthesis	—	—	—	—
V dissimilation	—	—	—	—
Surface form	dotzu	dasak	neure	saitue

Underlying form	3S.A-1S.D-3P.E d+o+st+∅+e	3P.A-1S.D d+a+t+s	3P.A-2S.D-1S.E d+o+tzu+e+t+s	2P.A s+ara+e
e-elision	—	—	—	—
a-epenthesis	—	—	—	—
r-epenthesis	—	—	—	—
Nonhigh V elision	—	—	—	s+ar+e
i-epenthesis	d+o+st+∅+ie	—	—	s+ar+ie
e-epenthesis	—	d+a+t+es	d+o+tzu+e+t+es	—
V dissimilation	—	—	d+o+tzu+e+t+as	—
Surface form	dostie	dates	dotzuetas	sarie

Underlying form	3P.A-3P.D-1S.E d+o+tze+e+t+s	3S.A-3S.D-2S.E d+o+tze+su	3S.A-3P.D-2S.E d+o+tze+e+su
e-elision	—	d+o+tz+su	d+o+tze+∅+su
a-epenthesis	—	—	—
t-epenthesis	—	—	—
Nonhigh V elision	d+o+tz+e+t+s	—	—
i-epenthesis	d+o+tz+ie+t+s	—	—
e-epenthesis	d+o+tz+ie+t+es	d+o+tz+esu	—
V dissimilation	d+o+tz+ie+t+as	—	—
Surface form	dotzietas	dotzesu	dotzesu

Table 6: Derivations with readjustment rules

c. *r-epenthesis*

$\emptyset \rightarrow$ r / eu + ___ e

The following readjustment rules apply afterwards in the order shown:

(36) a. *Nonhigh vowel elision*

[V, −high] $\rightarrow \emptyset$ / ___ + [V, −low]

b. *i-epenthesis*

$\emptyset \rightarrow$ i / C + ___ e +

c. *e-epenthesis*

$\emptyset \rightarrow$ e / C + ___ C

d. *Vowel dissimilation*

e $\rightarrow$ a / e + C_0 ___ C_0#

Although these latter rules are of more general application than those in (35), they must be considered readjustment rules, since they only apply in verbs.

8. Conclusion

The Distributed Morphology analysis proposed here directly expresses the joint contributions of syntactic, morphological, and phonological well-formedness conditions and operations in producing the complex pattern of auxiliaries in Zamudio. The burden of realizing this rather complex system of morphemes is, thus, in the words of Noyer (2001, p.810), generated by mech-

Absolutive	
1S	nas
1P	gara
2S.COLL	gas
2S.FOR	sara
2P	sarie
3S	da
3P	dire

Table 7: Absolutive auxiliary, surface forms

	Absolutive	
Dative	3S	3P
1S	dast	dates
1P	daku	dakus
2S.M	dak	dasak
2S.F	dana	dasena
2S.FOR	datzu	datzus
2P	datzue	datzues
3S	dako	dakos
3P	dakie	dakies

Table 8: Absolutive-dative auxiliary, surface forms

	Ergative					
Erg	1S	1P	2S.FOR	2P	3S	3P
1S	X	X	saitut	saituet	dot	dotes
1P	X	X	sara	sarie	du	dus
2S.M	X	X	X	X	dok	dosak
2S.F.	X	X	X	X	dona	dosena
2S.FOR	nosu	gosus	X	X	dosu	dosus
2P	nosue	gosues	X	X	dosue	dosues
3S	neu	gaitu	saitus	saitue	deu	deitus
3P	neure	gaitue	saitue	saitue	deure	deitues

Table 9: Absolutive-ergative auxiliary, surface forms

	Dative					
Erg	1S	1P	2S.FOR	2P	3S	3P
1S	X	X	dotzut	dotzuet	dotzet	dotziet
1P	X	X	datzu	datzue	dotzu	dotzu
2S.M	dostek	dok	X	X	dotzek	dotziek
2S.F.	dostena	dona	X	X	dotzena	dotziena
2S.FOR	dostesu	dosu	X	X	dotzesu	dotzesu
2P	dostesue	dosue	X	X	dotzesue	dotzesue
3S	dost	dosku	dotzu	dotzue	dotzo	dotzie
3P	dostie	doskue	dotzue	dotzue	dotzie	dotzie

Table 10: Ditransitive auxiliary, surface forms (3Sg absolutive)

	Dative					
Erg	1S	1P	2S.FOR	2P	3S	3P
1S	X	X	dotzutes	dotzuetas	dotzeas	dotzietas
1P	X	X	datzus	datzues	dotzus	dotzus
2S.M	dostesak	dosak	X	X	dotzesak	dotziesak
2S.F.	dostesena	dosena	X	X	dotzesena	dotziesena
2S.FOR	dostesus	dosus	X	X	dotzesus	dotzesus
2P	dostesues	dosues	X	X	dotzesues	dotzesues
3S	dostes	doskus	dotzus	dotzues	dotzos	dotzies
3P	dosties	doskues	dotzues	dotzues	dotzies	dotzies

Table 11: Ditransitive auxiliary, surface forms (3Pl absolutive)

anisms that are properly distributed over several modules of grammar.

References

Adger, David. 2003. *Core Syntax*. Oxford University Press.

Adger, David. 2006. Post-Syntactic Movement and the Old Irish Verb. *Natural Language and Linguistic Theory* 24.3:605–654.

Albizu, Pablo, and Luis Eguren. 2000. An optimality theoretic account for "ergative displacement" in Basque. In *Morphological analysis in comparison*, ed. Wolfgang U. Dressler, Oskar E. Pfeiffer, Markus A. Pöchtrager, and John R. Rennison, 1–23. Amsterdam: John Benjamins.

Arregi, Karlos. 2004. The *have/be* Alternation in Basque. Ms., University of Illinois at Urbana-Champaign. Available at http://uiuc.edu/~karlos/have.pdf.

Arregi, Karlos, and Andrew Nevins. 2006a. Agreement restrictions and their realization in Basque morphology. Ms., University of Illinois at Urbana-Champaign and Harvard University.

Arregi, Karlos, and Andrew Nevins. 2006b. Obliteration vs. Impoverishment in the Basque g-/z- constraint. In *Penn Linguistics Colloquium Special Session on Distributed Morphology*, (also available at http://ling.auf.net/lingBuzz/000280). U. Penn Working Papers in Linguistics 13.1.

Calabrese, Andrea. 2006. On absolute and contextual syncretism: remarks on the structure of paradigms and how to derive it. Ms., University of Connecticut, Storrs.

Embick, David, and Rolf Noyer. to appear. Distributed morphology and the syntax/morphology interface. In *The Oxford Handbook of Linguistic Interfaces*, ed. Gillian Ramchand and Charles Reiss. Oxford University Press.

Fernández, Beatriz, and Pablo Albizu. 2000. Ergative displacement in Basque and the division of labor between morphology and syntax. In *The Proceed-*

ings from the Panels of the Chicago Linguistic Society's Thirty-Sixth Meeting, 103–117. Chicago Linguistic Society, University of Chicago, Chicago, Ill.

Gaminde, Iñaki. 2000. *Zamudio berbarik berba*. Bilbo: Labayru Ikastegi.

Hale, Kenneth. 1973. Person Marking in Warlbiri. In *A Festschrift for Morris Halle* , 308–344. Holt, Rinehart and Winston.

Halle, Morris. 1997. Impoverishment and Fission. *PF: Papers at the Interface, MITWPL* 425–450.

Halle, Morris, and Alec Marantz. 1993. Distributed Morphology and the Pieces of Inflection. In *The View from Building 20*, 111–176. Cambridge, MA: MIT Press.

Harbour, Daniel. 2003. Elements of Number Theory. Doctoral dissertation, MIT.

Harbour, Daniel. 2005. The morphosyntax of split agreement. Ms., Queen Mary, University of London.

Harley, Heidi, and Rolf Noyer. 1999. Distributed Morphology. *GLOT International* 4:4:3–9.

Harris, James, and Morris Halle. 2005. Unexpected Plural Inflections in Spanish: Reduplication and Metathesis. *Linguistic Inquiry* 36.2:192–222.

Laka, Itziar. 1993. The structure of inflection: A case study in X^0 syntax. In *Generative studies in Basque linguistics*, ed. José Ignacio Hualde and Jon Ortiz de Urbina, 21–70. Amsterdam: John Benjamins.

Nevins, Andrew. 2005. The Representation of Third Person and its Consequences for Person-Case Effects. *Harvard Working Papers in Linguistics* 11:103–144.

Noyer, Rolf. 1992. Features, Positions and Affixes in Autonomous Morphological Structure. Doctoral dissertation, MIT.

Noyer, Rolf. 2001. Clitic Sequences in Nunggubuyu and PF Convergence. *Natural Language and Linguistic Theory* 19:751–826.

Oyharçabal, Bernard. 1993. Verb agreement with non arguments: On allocutive agreement. In *Generative studies in Basque linguistics*, ed. José Ignacio Hualde and Jon Ortiz de Urbina, 89–114. Amsterdam: John Benjamins.

Rezac, Milan. 2003. The Fine Structure of Cyclic Agree. *Syntax* 6:156–182.

Rezac, Milan. 2006. Agreement displacement in Basque: Derivational principles and lexical parameters. Ms., University of the Basque Country. Available online at http://loargann.batcave.net/index.html.

de Yrizar, Pedro. 1992. *Morfología del verbo auxiliar vizcaino: estudio dialectológico*. Bilbao Bizkaia Kutxa: Euskaltzaindia.

