Chapter 2

Stress in Ondarroa Basque

2.1 Introduction

In this chapter, I provide an analysis of the basic facts of the accentual system of Ondarroa Basque within the framework of the metrical grid. Certain aspects of the data and analysis discussed in this chapter are crucial in order to understand the analysis of sentence stress and focus developed in later chapters.

The variety of Basque spoken in the western coastal town of Ondarroa belongs to the Biscayan dialect. As in many other varieties within this dialect, prosodic prominence is realized as pitch accent. The main features of the Ondarroa accentual system are described and analyzed in Hualde 1995, 1996, and in Hualde 1991a, 1997, 1999a, which also contain extensive descriptions of other Basque accentual systems. Other varieties related to Ondarroa Basque are described in Hualde 1991b, Hualde and Bilbao 1993, Hualde 2000, Hualde, Elordieta, and Elordieta 1994 and Elordieta 1997a. Of particular interest for our purposes are the latter two works, since they offer detailed description and analysis of the accentual system used in Lekeitio, which is a town neighboring Ondarroa. The data presented and analyzed below are taken from several of these works, and from my own field work.

As noted by Hualde (1991a), the accentual system used in Ondarroa and many other Vizcayan towns is very similar to the Japanese accentual system. First, there are two types of words: *accented* and *unaccented*. Second, prominence in accented words is realized as a fall in pitch starting on some specific syllable, the *accented*, or *stressed* syllable. On the other hand, unlike Japanese, unaccented words can contain

a pitch drop in certain syntactic positions to be specified below. These facts are analyzed in the following sections in terms of a metrical grid, i.e. the tonal contours appearing in the words and phrases in this dialect are the realization of metrical structure imposed on them. In this respect, I follow several of the works on the pitch accent dialects of Basque mentioned above[1] and other pitch accent languages (see, for instance, McCawley 1968, Prince 1983, Tenny 1986, Watanabe 1991, Idsardi and Purnell 1997, Purnell 1997 for Japanese).

This chapter is organized as follows. In §2.2, I present the basic facts of the accentual system in Ondarroa Basque, and show that there are two basic types of words accentually: accented and unaccented. In §2.3, I propose an analysis of these word level accentual facts based on the metrical grid. §2.4 presents data which show that the prosodic patterns created at the word level undergo certain changes at the phrase level, which justify certain additions to the analysis proposed in the previous section. Finally, the appendices to this chapter provide further extensions to the analysis, justified by data having to do with monosyllabic words and with words ending in vowel clusters.

2.2 The Basic Facts: Accented and Unaccented Words

As noted above, there are two types of words in the Ondarroa accentual system: accented and unaccented. The former are always stressed, i.e. they always contain a drop in pitch beginning on some specified syllable. On the other hand, unaccented words are stressed only in certain syntactic environments (see §2.4 below). Whether a given word is accented or not is a lexical property of its constituent morphemes, i.e. if a word contains a *marked* morpheme, then it is accented.[2] Furthermore, whether

[1] In particular, Hualde (1991b) is the first one to propose a metrical analysis for these dialects. Previously, Hualde (1991a) had offered a tonal analysis which did not involve a metrical grid. See Hualde and Bilbao 1993 for arguments in favor of the metrical analysis over the purely tonal one.

[2] Note that I have chosen the term *marked*, rather than *accented*, to refer to morphemes which determine that a given word is accented. The reason for this terminological point will become clear below, where it is shown that, even though a marked morpheme makes the word containing it accented, the accent does not necessarily fall on the marked morpheme itself. Thus, calling these morphemes *accented* would be somewhat misleading.

a given morpheme is marked or not is an idiosyncratic property of that morpheme.

Some relevant examples of accented words are listed in (1). In each word, the morpheme which is marked (i.e. responsible for the word being accented) is annotated with an apostrophe (’). The examples in (1b-d) are given in their surface forms when uttered in isolation. The uninflected form in (1a) is given in phrase initial position, followed by the determiner *bat* ‘a’, since uninflected forms are not possible in isolation.[3]

(1) *Accented words*

a. *Uninflected marked root*

/leko’/ ‘place’ le ko bat

b. *Marked root + unmarked suffix*

/leko’+ra/ ‘place+ALL.SG’ le ku re

c. *Marked root + marked suffix*

/leko’+tik’/ place+ABL.SG’ le ku tik

d. *Unmarked root + marked suffix*

/esko+agas’/ ‘hand+COM.SG’ es ku as

As can be seen in these examples, either the root, such as /leko’/ ‘place’, or a suffix, such as /-tik’/ ‘ABL.SG’, can be marked. As can be seen in the surface forms, all words containing one or more marked morphemes are stressed on some syllable, that is, they contain a drop in pitch beginning on that syllable. Other relevant examples for all the cases in (1) are given in table 2.1 on page 40.[4,5]

[3]This is because all DPs and APs must contain some inflectional ending, a determiner, or both.

[4]In some of the words in (1) and table 2.1, there are rules of segmental phonology involved in the derivation of the surface forms. See Hualde 1991a (§2.5) for details of these rules in Ondarroa Basque. Another fact which has been ignored for ease of exposition is that many of the inflectional suffixes in the examples are decomposable into a determiner morpheme (which inflects for number), and a case morpheme. For instance, commitative plural /-akin’/ (see table 2.1) is in fact composed of the plural determiner /-a’/ and the commitative case morpheme /-kin’/. For details of the Basque number and case inflectional system, see Arregi 1999 and references cited there.

[5]Some of the examples contain diphthongs, a fact which is important in determining the placement of stress. Where relevant, the vowels forming the diphthongs are linked by an arch (‿).

Uninflected marked root		
/leko'/	'place'	leko bat
/txisto'/	'flute'	txisto bat
/lenguso'/	'cousin'	lenguso bat
/denpora'/	'time'	denpora bat
/alkondara'/	'shirt'	alkondara bat
/errosaxo'/	'rosary'	errosaxo bat

Marked root + unmarked suffix		
/leko'+ra/	'place+ALL.SG'	leku re
/txisto'+ari/	'flute+DAT.SG'	txistu ai
/lenguso'+antzako/	'cousin+BEN.SG'	lengusuntzako
/denpora'+an/	'time+IN.SG'	denporan
/alkondara'+ko/	'shirt+LGEN.SG'	alkondarako bat
/errosaxo'+ko/	'rosary+LGEN.SG'	errosaxuko bat

Marked root + marked suffix		
/leko'+tik'/	'place+ABL.SG'	leku tik
/txisto'+akin'/	'flute+COM.PL'	txistukin
/lenguso'+ari'/	'cousin+DAT.PL'	lengusu ai
/denpora'+tik'/	'time+ABL.SG'	denpora tik
/alkondara'+ak'/	'shirt+ABS.PL'	alkondarak
/errosaxo'+akin'/	'rosary+COM.PL'	errosaxukin

Unmarked root + marked suffix		
/esko+agas'/	'hand+COM.SG'	esku as
/txisto+akin'/	'saliva+COM.PL'	txistu kin
/armoso+ari'/	'breakfast+DAT.PL'	armosu ai
/gixon+antzako'/	'man+BEN.PL'	gixonantzako
/kartero+akin'/	'mailman+COM.PL'	kartekin
/laba+etan'/	'oven+IN.PL'	labetan

Table 2.1: Accented Words

In contrast to other Vizcayan varieties, the placement of stress In Ondarroa Basque is not determined by the marked morpheme(s) contained in the word. Rather, stress placement obeys the following generalization:

(2) An accented word is stressed on its penultimate syllable.[6]

Thus, all the accented words in (1) have penultimate stress. This is most clearly seen in paradigms like the one in (3), which contains the uninflected form and several inflected forms of the marked roots /belarri'/ 'ear' and /egi'/ 'truth'.

(3) *Accented words have penultimate stress*

	/belarri'/ 'ear'	/egi'/ 'truth'
Uninflected	be la rri	e gi
ABS	be larri xe	e gi xe
ERG	be larri xak	e gi xak
GEN	be larri xan	e gi xan
DAT	be larri xa͡i	e gi xa͡i
BEN	be larrixantza ko	e gixantza ko

As can be seen in the contrast between the uninflected forms and the longer ones below them, stress does not necessarily fall on any specific syllable in the marked root, and as can be seen in the even longer benefactive forms, stress does not even have to fall on the marked morpheme. In all cases, stress is penultimate in the word.

Two more aspects of the pronunciation of accented words need to be taken into account. First, in words longer than two syllables, there is a rise in pitch beginning on the first syllable. Second, in longer words, there is a high pitch plateau beginning on the second syllable and ending in the stressed syllable. Thus, accented words have the following tonal pattern:[7]

[6] A similar pattern can be found in the Kagoshima dialect of Japanese (see Haraguchi 1977). Unlike other dialects of Japanese, the accent introduced by a marked morpheme does not necessarily fall on any syllable in that morpheme. Rather, some of them trigger penultimate stress in the *word*, and others trigger final stress in the word.

[7] This generalization says nothing about monosyllabic accented words. In fact, as shown in appendix A, these do not exist.

(4) *The tonal pattern of accented words*

$\overline{\sigma}\,\underline{\sigma}$ $\underline{\sigma}\,\overline{\sigma\ldots}\,\underline{\sigma}$

Unaccented words may also contain a pitch drop, but in most environments, they do not. As I show in §2.4 below, in phrase final position, they do contain a pitch drop. Thus, in this environment, and by extension, in isolation, the distinction between accented and unaccented words is neutralized. The following unaccented words are given in phrase initial position, where the contrast with accented words can be seen more clearly:

(5) *Unaccented words in phrase initial position*

/jai+a dakar/	'holiday+ABS.SG has'	ja xe rakar
/gixon+a dator/	'man+ABS.SG comes'	gi xona rator
/mendi+an dabil/	'mountain+IN.SG walks'	men dixan dabil
/arreba+an ixena/	'sister+GEN.SG name	a rrebin ixena
/mutriku+ko gixona/	'Mutriku+LGEN man'	mu trikuko gixona
/barbero+antzako da/	'barber+BEN.SG is'	bar beruntzako ra
/osasuntzo+a da/	'healthy+ABS.SG is'	o sasuntzu re

As can be seen in the contrast between the accented words in (1, 3) and the unaccented words in (5), the latter are characterized by the absence of a pitch drop at the end of the word. Otherwise, their tonal pattern is the same as in accented words. In particular, they also have a rise in pitch at the beginning of the word, and there is also a high pitch plateau beginning on the second syllable and extending to the end of the word. Thus, unaccented words (in non-pitch drop environments) have the following tonal pattern:

(6) *The tonal pattern of unaccented words*

$\underline{\sigma}\,\overline{\sigma\ldots}$

In what follows, I take (4) and (6) to be the basic tonal patterns of accented and unaccented words, respectively. Since the only difference between the two types of words is in the presence versus absence of a stressed syllable (i.e. drop in pitch), it is

useful to represent the surface forms of accented words with the acute accent mark (´) on the stressed (i.e. penultimate) syllable, and unaccented words without this mark. Thus, an accented word such as la be tan can be represented as *labétan*, and an unaccented word such as gi xona can be represented as *gixona*. From now on, I will use this convention, unless more detail is needed, in which case I will use the more detailed representations I have been using so far.

In the following section (§2.3) I provide an analysis of these facts in terms of the metrical grid. As we will see in §2.4, these patterns can be modified at the phrasal level, which will motivate certain extensions and modifications to the analysis introduced in §2.3.

2.3 Word Level Stress

As in the rest of this chapter, the theory I adopt in the computation of stress is that of the metrical grid (see, among others, Liberman and Prince 1977, Prince 1983, Halle and Vergnaud 1987, Idsardi 1992, Halle and Idsardi 1995). In particular, I adopt Idsardi's (1992) version of the metrical grid, whose main features were described in §1.3. One of the central ideas of this theory is that many aspects of prosody are the reflection of the metrical grid. In particular, tonal facts such as the ones described in the previous section are analyzed in terms of rules which make explicit reference to the metrical grid. In adopting this hypothesis, I follow Purnell (1997), who succesfully applies it to tonal facts in several languages.

There are two main facts that need to be accounted for. First, all words have an initial rise in pitch. Second, accented words contain a final drop in pitch:

(7) a. *The tonal pattern of accented words*

$\underline{\sigma}\,\overline{\sigma\ldots}\,\underline{\sigma}$

b. *The tonal pattern of unaccented words*

$\underline{\sigma}\,\overline{\sigma\ldots}$

In order to account for these facts, I propose that Ondarroa Basque has the stress rules in (8):

(8) *Stress rules for line 0*

a. Project a grid element for each syllable head.

b. Edge-marking: LRL.

$\emptyset \rightarrow (\ / \ \#*\underline{\quad}$

c. Edge-marking: RLR (only in words containing a marked morpheme).[8]

$\emptyset \rightarrow) \ / \ *\underline{\quad}*\#$

d. Heads: rightmost.

These rules derive the following metrical grids for both types of words:

(9) a. *Accented words* b. *Unaccented words*

```
        *      line 1          *      line 1
*(*...*)*      line 0   *(*...**     line 0
σ σ...σ σ               σ σ...σσ
```

In both types of words, LRL creates a foot on line 0 beginning on the second syllable. The only difference between accented and unaccented words is that, due to RLR, which only applies in the former, this foot ends on the penultimate syllable in accented words. RLR does not apply in unaccented words, so their foot ends on the last syllable.

Given these metrical representations, the tonal patterns in (7) are derived as follows: a high tone is linked to all the elements inside the only foot created in line 0, and a low tone is linked to the ones outside the foot. The tones rules necessary for this result are those in (10). As schematized in (11), these rules derive the correct representations for both accented and unaccented words.

(10) *Tone Rules*

a. *H-insertion* b. *H-spread* c. *Default low tone*

```
            *   line 1
Ø → H /     *   line 0          ** → **          * → *   line 0
            |                    |   \|             |
            _                    H    H             L
```

[8]There are certain details in the structural description that are crucial. Specifically, the right parenthesis can only be inserted if the word contains two or more grid elements. Evidence for this aspect of this rule is given in appendix A.

(11) a. *Accented words* b. *Unaccented words*

```
        *      line 1          *      line 1
*(*...*)*      line 0      *(*...**      line 0
σ σ...σ σ                  σ σ...σσ
|   \\\|  |                |   \\\|
L     H L                  L     H
```

Some examples of accented and unaccented words are given in (12) and (13), respectively.

(12) *Accented words*

```
/lenguso'+antzako/        /denpora+tik'/        /laba+etan'/
'cousin+BEN.SG'           'time+ABL.SG'         'oven+IN.PL'

        *      line 1          *      line 1        *      line 1
* (* *   *)*   line 0      * (* *)*   line 0      *(*)*    line 0
lengusuntzako             denporatik              labetan
|   \\\|  |                |   \|  |               | | |
L     H L                  L   HL                  L H L
```

(13) *Unaccented words*

```
/barbero+antzako/         /gixon+a/             /jai+a/
'barber+BEN.SG'           'man+ABS.SG'          'holiday+ABS.SG'

          *    line 1          *    line 1          *    line 1
* (* *   * *   line 0      *(* *    line 0      *(*    line 0
barberuntzako             gixona                  jaxe
|   \\\|                   |   \|                  | |
L     H                    L   H                   L H
```

Finally, we need the following parenthesis deletion rule:

(14)) (→)

This rule is only relevant in bisyllabic accented words, where both edge-markings in (8), LRL and RLR, place a left and a right parenthesis between the only two grid marks on line 0. For instance, for the uninflected marked root /leko'/ 'place', the stress rules would derive the grid $\overset{*)(*}{\text{leko}}$. This grid would not derive the right tonal pattern for this word, which is $\overline{\text{le}}\underline{\text{ko}}$. (14) deletes the left parenthesis, giving the correct result:

(15)
```
 *      line 1
 *)*    line 0
leko
| |
H L
```

In the following section, I show that the metrical grid created at the word level is modified at the phrase level in certain positions.

2.4 Phrase Level Stress

At the phrase level, the grids created at the word level are modified in two different ways. First, the initial rise in pitch derived at the word level is only maintained in phrase initial position. Second, there is a drop in pitch at the end of the phrase, whether or not it coincides with an accented word. Consider the following example, in which two unaccented words are joined into a phrase. (16a) contains the predicted output given the rules introduced in the previous section, and (16b) the actual output.

(16) /gixon/ /andi+a/
'man' 'big+ABS.SG'

a. *Word level rules*

```
    *          *     line 1
  *(*    *  (* *     line 0
[gixon] [andixe]
 | |     |    \|
 L H     L     H
```

b. *Actual output*: gixon andixe

```
[gixon andixe]
 |    \\ \|  |
 L        H L
```

Thus, it is clear that, at the phrase level, there are some stress rules that modify the structure created at the word level.

First, the second word in (16), *andixe* does not have the expected initial low tone. The first word, *gixon*, however, does have the expected initial low tone. In terms of the metrical grid, this must mean that the left parenthesis in the second word is

deleted. This can be stated naturally as a rule which deletes a left parenthesis when preceded by another left parenthesis:[9]

(17) *Left parenthesis deletion at the phrase level*

$(\rightarrow \emptyset \ / \ (\ X \ \_\_$

where X contains no parenthesis.

The addition of this rule results in a surface representation for (16) which is closer to the actual one:

(18) a. /gixon/ /andi+a/
'man' 'big.ABS.SG'

Word level rules *Left parenthesis deletion*

```
   *          *   line 1                    *   line 1
 *(*    *  (* *   line 0   →   *(*  *   * *   line 0
[gixon] [andixe]               [gixon andixe]
                                |      \  \  |
                                L        \  H
```

b. *Actual output*: gixon andixe

```
[gixon andixe]
 |      \  \ |
 L        \ H L
```

The phrase contains two left parenthesis inserted at the word level, one in each word (cf. 16a). At the phrase level, (17) deletes the second one, resulting in (18a). The direct effect of the deletion rule is that the phrase contains only one line 0 foot, which is reflected in that only one vowel in the phrase projects to line 1. Given the tone rules introduced in the previous section (cf. 10), this correctly derives the fact that only the first word in the phrase contains a rise in pitch.

However, we still need to account for the fact that, as shown in (18b), a final drop in pitch ('accent') appears beginning on the penultimate syllable, even though it does

[9] As a result of this rule, most left parentheses created at the word level are deleted at the phrase level. The data presented so far could be analyzed in a simpler way by simply having a rule inserting a parenthesis phrase initially, rather than having both an insertion rule at the word level and a deletion rule at the phrase level. However, as I show below, there are other positions apart from phrase initially in which left parentheses are kept. Having a single parenthesis rule at the phrase level would thus not be sufficient. As will be shown below, the two rules proposed here capture all the relevant facts.

not belong to an accented word. Given the tone rules introduced in the previous section, this must mean that a right parenthesis is inserted to the left of the last grid element in the phrase:[10]

(19) Phrase level edge-marking: RLR.[11]

```
Ø→ ) / *__*]   line 0
         |
        CV
```

The addition of these two phrase level rules (17&19) results in the correct representation for (16):

(20) /gixon/ /andi+a/
'man' 'big.ABS.SG'

Word level rules *Phrase level rules*

```
   *        *    line 1                    *      line 1
 *(*    * ( * *  line 0   →   *(*  *  *)*   line 0
[gixon] [andixe]              [gixon andixe]
                               |   \\ \ |  |
                               L      H  L
```

In order to obtain the correct result, the tone rules (cf. 10) must apply only at the end of the phrase level, i.e. after both word and phrase level stress rules have applied. If the tone rules were also allowed to apply at the word level, we would not obtain the correct result. This is simply a consequence of the hypothesis that the metrical grid is the main element in explaining the tonal patterns of words and phrases in Ondarroa Basque. The surface distribution of tones is simply a reflection of the metrical grid, which means that tone rules apply after all rules constructing the metrical grid have applied.

To summarize so far, I have argued that the following stress rules are needed for the word and phrase levels:

[10]Note that there is an additional condition on this rule: the vowel corresponding to the last grid element must be preceded by a consonant. This condition is discussed in appendix B.

[11]The fact that the vowel linked to the last grid element must be preceded by a consonant is discussed in appendix B.

(21) *Word Level Stress* (line 0)

a. Project a grid element for each syllable head.

b. Edge-marking: LRL: Ø → (/ #∗__

c. Edge-marking: RLR (only in accented words): Ø →) / ∗__∗#

d. Heads: rightmost.

(22) *Phrase Level Stress* (line 0)

a. Project a grid element for each syllable head.

b. Left parenthesis deletion:

(→ Ø / (X __

where X contains no parenthesis.

c. Edge-marking: RLR: Ø→) / ∗__∗]

CV

d. Heads: rightmost.

As shown above, these rules make correct predictions for phrases containing two unaccented words. As exemplified below, they also predict the correct representations for other combinations of words. First, consider the case in which an unaccented word is followed by an accented word:

(23) *Unaccented + accented*: /gixon/ /andi+ak'/
'man' 'big.ABS.PL'

Word level rules *Phrase level rules*

```
          ∗        line 1                    ∗        line 1
 ∗(∗    ∗ (∗)∗     line 0   →   ∗(∗  ∗  ∗)∗     line 0
[gixon] [andixak]                [gixon andixak]
                                  |     |  |  |
                                  L     H  L
```

This case is similar to the one examined above, except that RLR at the phrase level (22b) applies vacuously. Since the last word in the phrase is accented there is already a right parenthesis in the environment where this rule applies.

More insteresting are cases in which the first word is accented. As we saw above, a left parenthesis is deleted at the phrase level whenever it is preceded by another left

parenthesis. Thus, when a phrase contains two unaccented words, the left parenthesis on the second word is deleted, but not the one in the first word. In the data we have seen so far, this means that only the left parenthesis on the first word is kept at the phrase level. Having two rules (parenthesis insertion at the word level and deletion at the phrase level) might seem redundant, since the same result could be obtained by having a rule inserting a left parenthesis on the phrase initial word. However, there are further data that show that the analysis proposed here is correct. This particular way of understanding the 'loss' of the initial low tone in non-phrase initial words makes the prediction that the left parenthesis of a given word is not deleted when the word is preceded by an accented word. As is known from the literature on Basque phonology cited in the introduction, this prediction is correct, as exemplified in the following cases:[12]

(24) *Accented + unaccented*: /belarri'/ /andi+a/
'ear' 'big.ABS.SG'

Word level rules *Phrase level rules*

```
   *          *   line 1          *       *     line 1
 *(*) *  *  (* *   line 0   →   *(*) * *  (*)*   line 0
[belarri] [andixe]              [belarri andixe]
                                 | |  | |   | |
                                 LH  LL   H L
```

(25) *Accented + accented*: /belarri'/ /andi+ak'/
'ear' 'big+ABS.PL

Word level rules *Phrase level rules*

```
   *        *     line 1          *       *     line 1
 *(*) *  *  (*)*  line 0   →   *(*) * *  (*)*   line 0
[belarri] [andixak]             [belarri andixak]
                                 | |  | |   | |
                                 LH  LL   H L
```

What distinguishes these cases from the ones we saw before is that there is a right parenthesis between the two left parentheses, due to the fact that the first word is

[12]The idea that the initial low tone (i.e. initial left parenthesis) that appears in some words is the result of two rules (a word level one and a phrase level one) was first proposed by Hualde 1991a. Although the rules he proposed were stated in terms of tones, rather than stress, the proposal made here is simply a translation of his insight into the formalism of the metrical grid. For a different view, see, among others, Elordieta 1997a.

accented. As predicted, left parenthesis deletion cannot apply, which results in both words contain an initial low tone. If we simply had a phrase level rule inserting a parenthesis on the phrase initial word, something additional would be needed to account for left parentheses appearing on words following accented words.

The present analysis can also account for more complex cases containing more than two words:

(26) /jon+n/ ‘Jon+GEN’ /arreba+an/ ‘sister+GEN.SG’ /ixen+a/ ‘name+ABS.SG’

Word level rules *Phrase level rules*

```
   *        *        *   line 1                          *      line 1
 *(*    *(* *    *(* *   line 0  →  *(*  *  * *  * *)*   line 0
[jonen] [arrebin] [ixena]            [jonen arrebin ixena]
                                      |                 |  |
                                      L                 H  L
```

(27) /ni+re/ ‘I+GEN’ /ama+an/ ‘mother+GEN.SG’ /lagun+an/ ‘friend+GEN.SG’ /txakur+a/ ‘dog+ABS.SG’

Word level rules

```
   *     *        *          *    line 1  →
 *(*  *(*    *(* *     *(*  *    line 0
[nire] [aman] [lagunan] [txakurre]
```

Phrase level rules

```
                                 *      line 1
→    *(* *  *   * * *    * *) *   line 0
    [nire aman lagunan txakurre]
     |                        |  |
     L                        H  L
```

In these phrases, which only contain unaccented words, left parenthesis deletion applies more than once, deleting all left parentheses except the one on the first word. The result, as in phrases with two words, is that the whole phrase contains only one line 0 foot.

Another type of example worth considering is one in which a phrase with more than two words contains an accented word in medial position:

(28) /ni+re/ ‘I+GEN’ /auma’+an/ ‘grandmother+GEN.SG’ /lagun+an/ ‘friend+GEN.SG’ /txakur+a/ ‘dog+ABS.SG’

Word level rules

```
   *     *            *            *     line 1  →
 *(*   *(* ) *    *(* *       *(*  *     line 0
[nire] [a uman] [lagunan] [txakurre]
```

Phrase level rules

```
          *                    *        line 1
→    *(* ** ) *   *(* *     * *) *      line 0
     [nire auman lagunan txakurre]
      |   \\ |   |   |   \\\\\\\\ |   |
      L    H  L   L            H   L
```

In this case, the left parenthesis on the phrase medial word *lagunan* is not deleted, since it is preceded by a right parenthesis on the accented word *aúman*. On the other hand, the left parenthesis on *aúman* itself is deleted, since it is preceded by the left parenthesis on the first word of the phrase.

Note that, both at the word and phrase levels, there is a line 0 rule (21d and 22c) which designates the rightmost element in feet created in line 0 as the head, i.e. this element projects further to line 1. This is exemplified in (29) with two different kinds of phrases. (29a) contains two unaccented words, and (29b) contains an accented word followed by an unaccented word.

(29) *Projection to line 1*

a. *Unaccented + Unaccented*: /gixon/ /andi+a/
'man' 'big+ABS.SG'

Word level rules *Phrase level rules*

```
   *          *    line 1  →          *       line 1
 *(*    *  (* *    line 0        *(*  *  *)*   line 0
[gixon] [andixe]                 [gixon andixe]
```

b. *Accented + Unaccented*: /auma'+an/ /ixen+a/
'grandmother+GEN.SG' 'name+AS.SG'

Word level rules *Phrase level rules*

```
   *          *    line 1  →    *       *      line 1
 *(* ) *   *(* *    line 0    *(* ) *  *(*)*   line 0
[a uman] [ixena]               [a uman ixena]
```

A question that arises at this point is whether there is projection to higher lines at the phrase level, especially in cases like (29b), where more than one vowel projects to line 1. When a phrase contains more than one stress, it can be pronounced in different ways. Specifically, the high tone of one of the accents is pronounced at a higher pitch than the other ones. Although any of the accents can in principle be pronounced at a higher pitch, there is a neutral pronunciation in which the first accent is higher (see Elordieta 1997a for details). Thus, in its neutral pronunciation, the leftmost accent is more prominent than the other ones, i.e. the vowel corresponding to this accent projects a higher column in the grid than the other accented vowels. Given the metrical analysis developed so far, this means that we need additional rules that project the leftmost line 1 grid element onto line 2.

To summarize so far, we need the following rules to account for the facts examined. First, at the word level, the stress rules in (21) above apply. At the phrase level, the stress rules in (30) below apply, giving phrase level prominence. The new rule which determines phrase prominence is (30bii). The tone rules in (10), repeated below as (31), apply at the phrase level, after all the stress rules.

(30) *Phrase Level Stress*

a. *Line 0:*

i. Project a grid element for each syllable head.

ii. Left parenthesis deletion:
(→ Ø / (X __
X contains no parenthesis.

iii. Edge-marking: RLR:
Ø→) / ∗__∗]
CV

iv.) (→)[13]

v. Heads: rightmost.

b. *Line 1:*

i. Edge-marking: LLL:[14]
Ø → (/ #__∗

ii. Heads: leftmost.

(31) *Tone Rules*

a. *H-insertion*

```
          *   line 1
Ø → H / *     line 0
        |
        _
```

b. *H-spread*

```
** → **
|    \|
H     H
```

c. *Default low tone*

```
* → *   line 0
    |
    L
```

(32-32b) below contain full derivations for the two examples in (29).

(32) a. *Unaccented + Unaccented*: /gixon/ ‘man’ /andi+a/ ‘big+ABS.SG’

Word level stress (21) *Phrase level stress* (30)

```
                                  *      line 2
   *         *   line 1   →        ( *    line 1   →
 *(*   *  (* *   line 0          *(*  *  *)*   line 0
[gixon] [andixe]                [gixon andixe]
```

Tone rules (31)

```
                *      line 2
              ( *      line 1
→   *(*  *  *)*      line 0
   [gixon andixe]
    |   \   \| |
    L        H L
```

b. *Accented + Unaccented*: /auma’+an/ ‘grandmother+GEN.SG’ /ixen+a/ ‘name+ABS.SG’

Word level stress (21) *Phrase level stress* (30)

```
                                 *          line 2
   *         *   line 1   →     (*      *   line 1   →
 *(* ) *   *(* *   line 0     *(* ) *  *(*)*   line 0
[a uman] [ixena]              [a uman ixena]
```

[13]This rule was motivated in §2.3 to account for bisyllabic accented words. However, it is also necessary in order to account for bisyllabic phrases, in which both a left and a right parenthesis is inserted between the two grid elements on line 0. By applying this rule at the phrase level, it takes care of both cases.

[14]This rule ensures that there is a foot in line 1. If there were not, there could be no projection to line 2.

Tone rules (31)

```
      *                 line 2
     (*        *        line 1
→   *(* ) *  *(*)*      line 0
    [a uman ixena]
     | |  |  | | |
     L H  L  L H L
```

2.5 Conclusion

To conclude, the surface tonal patterns of words and phrases in Ondarroa Basque are accounted for in terms of (i) metrical rules which apply at the word and phrase levels, and (ii) rules of tone insertion and sprreading which apply after all metrical rules have applied.

Appendix A: Monosyllabic Words and Underlying Tones

In this chapter, we saw that certain words have penultimate accent. In the analysis proposed, this is due to RLR edge-marking applying at the word level. An interesting question that arises is what happens when an accented word only has one syllable, since, in this case, there is no penultimate syllable where accent could fall. In this section, I show that monosyllabic words in fact cannot be accented, that is, I show that there are no monosyllabic accented words, and that this is not an accidental gap. Furthermore, I show that the framework adopted here can readily account for this fact. In §A.2, I argue that these facts pose a problem for analyses which employ underlying tones, rather than the metrical grid, in order to explain the surface tonal patterns in this language (cf. Hualde 1991a).

A.1 Stress in Monosyllabic Words

There are two roots that can be used to show that there are no accented monosyllabic words in Ondarroa Basque: /mai'/ 'table', and /plai'/ 'beach'. In what follows, the arguments are based on /mai'/, but it should be noted that the facts are exactly the same for /plai'/. First, we need to show that these roots are indeed marked, i.e. we need to show that words that contain them are accented. In all the following examples, there is a word which contains the root /mai'/ and some suffix.

(33) a. /mai'+a/ ma xe
'table+ABS.SG'

b. /mai'+ak'/ ma xak
'table+ABS.PL'

c. /mai'+ko/ mai ko
'table+LGEN.SG'

d. /mai'+antzako'/ ma xantza ko
'table+BEN.SG'

(34) a. /ori/ /mai'+a/ o ri ma xe
'that.ABS.SG' 'table+ABS.SG'

b. /mai'+a/ /da/ ma xe ra
'table+ABS.SG' 'is'

c. /mai'+ko/ /anka+ak'/ mai ko an kak
'table+LGEN.SG' 'leg+ABS.PL'

The examples in (33, 34) show that /mai'/ is indeed a marked root. As with any other marked root, any word containing /mai'/ and a marked or unmarked suffix is accented on the penultimate syllable (cf. 33).[15] Furthermore, as shown in (34), this accent is kept in any position within a phrase. Thus, it is clear that /mai'/ is a marked root.

However, when /mai'/ is unsuffixed, the pattern that emerges is quite different. Consider the following examples:

(35) a. /mai'/ /bat+ntzako/ mai batenza ko
'table' 'one+BEN'

b. /iru/ /mai'/ i ru mai
'three' 'table.ABS'

c. /iru/ /mai'/ /andi/ i ru mai an di
'three' 'table' 'big.ABS'

In all these examples, the tonal patterns indicate that unsuffixed /mai'/ is *not* accented, since it does not contain a drop in pitch. This is seen more clearly when compared to unmarked monosyllabic roots, such as /bar/ 'bar' in the same contexts:

(36) a. /bar/ /bat+ntzako/ bar batenza ko
'bar' 'one+BEN'

[15] Note that the two vowels in the root /mai'/ are realized as a diphthong (*mai*), so that the root corresponds to only one syllable. Whenever it is followed by a vowel (e.g. /mai'+ak/ in 33b), an epenthetic *x* (a voiceless prepalatal fricative [š]) is inserted, as is always the case in the environment *i__V*. Finally, in this environment (i.e. *V__palatal C*), the glide *i* is optionally deleted. In all the examples where this deletion rule can apply, I give the form in which it applies. These are all regular rules in Ondarroa Basque (and in many other dialects). See Hualde 1991a (§2) for details.

b. /iru/ /bar/ i[ru]bar
'three' 'bar.ABS'

c. /iru/ /bar/ /andi/ i[ru bar an]di
'three' 'bar' 'big.ABS'

Morevover, just as with unaccented words, unsuffixed /mai'/ has phrase accent when it is in the right position within the phrase (i.e. penultimate):

(37) a. /mai'/ /bat/ mai͡]bat
'table' 'one.ABS'

b. /bar/ /bat/ bar]bat
'bar' 'one.ABS'

The necessary conclusion is that a word containing a marked monosyllabic root is accented only if the word containing it has more than one syllable.

Intuitively, this fact seems rather natural, given the general properties of stress placement in Ondarroa Basque. Since stress is penultimate, and there is no penultimate syllable in monosyllabic words, it follows that there can be no monosyllabic accented words. In order to make this intuition more precise, we need to take a detailed look at the rule that is ultimately responsible for penultimate accent: RLR at the word level. This rule inserts a right parenthesis to the left of the rightmost element in line 0. I propose that it is formalized as follows:

(38) *RLR at the word level*

Ø →) / *__*#

Given this formulation of RLR, it cannot apply to unsuffixed /mai'/, since it contains only one grid mark on line 0. Thus, after all word level metrical rules (21) apply, it has the follwoing metrical grid:

(39) *(line 0
[mai]

This correctly predicts that this word behaves exactly as an unaccented word, as shown in (40). Note that, at the word level, there is a left parenthesis on *mai* which does not form any foot. At the phrase level, this left parenthesis groups grid marks belonging to words following it in (40a), or is deleted by phrase rules (rule 30ai in 40b,c, and 30aiii in 40d).

(40) a. /mai'/ /bat+ntzako/
'table' 'one+BEN'

Word level stress (21) *Phrase level stress* (30)

```
                 *    line 1   →                 *     line 2
                              →                (*     line 1   →
  *(   *(*   * *   line 0          *(  * *   *)*   line 0
[mai] [batentzako]                [mai batentzako]
```

Tone rules (31)

```
                 *     line 2
                (*     line 1
→     *(  * *   *)*   line 0
    [mai batentzako]
      |     \\ | |
      L       H L
```

b. /iru/ /mai'/
'three' 'table.ABS'

Word level stress (21) *Phrase level stress* (30)

```
                                  *      line 2
  *          line 1        →    (*      line 1        →
*(*    *(    line 0             *(* ) *   line 0
[iru] [mai]                     [iru mai]
```

Tone rules (31)

```
    *        line 2
   (*        line 1
→ *(* ) *    line 0
  [iru mai]
  | | |
  L H L
```

c. /iru/ /mai'/ /andi/
'three' 'table' 'big.ABS'

Word level stress (21) *Phrase level stress* (30)

```
                                          *        line 2
  *           *   line 1   →            (*        line 1   →
*(*    *(  *  (*  line 0              *(*   *  *) *  line 0
[iru] [mai] [andi]                   [iru mai andi]
```

Tone rules (31)

```
                *        line 2
               (*        line 1
→   *(*   *  *) *        line 0
    [iru mai andi]
     |   \   \|  |
     L     \  H  L
      \     \
       \     \
```

d. /mai'/ /bat/
'table' 'one.ABS'

Word level stress (21) *Phrase level stress* (30)

```
                                 *        line 2
            line 1        →    (*        line 1        →
  *(    *(  line 0              *)  *     line 0
[mai] [bat]                   [mai bat]
```

Tone rules (31)

```
      *        line 2
     (*        line 1
→     *)  *    line 0
    [mai bat]
      |   |
      H   L
```

This result is possible due to the fact that the analysis is based on the hypothesis that the tonal patterns of words in Ondarroa Basque are the phonetic realization of stress. As noted above, the intuitive idea is that stress is penultimate, and, since monosyllabic words do not have a penultimate syllable, they cannot be stressed. These data also bring out an important part of the analysis. What distinguishes accented words from unaccented words is that they are lexically specified to undergo RLR at the word level. That is, they are not lexically specified with underlying tones or accents. If they were, monosyllabic accented words would be expected to occur.

By treating the lexical idiosyncrasy of accented words in terms of a metrical rule that applies only to them, we are able to derive the fact that there are no monosyllabic accented words.

In the remainder of this section, I compare this analysis to previous ones in the light of these data. Specifically, I argue that previous analyses which posit underlying tones in Ondarroa Basque cannot handle the data introduced in this section in a natural way. First, in §A.2, I discuss Hualde's (1991a) tonal analysis, in which stress plays no role in accounting for the surface tonal patterns of words in the pitch accent dialects of Basque. Although evidence has already been presented in the literature that a metrical analysis is to be preferred (see, in particular Hualde 1991b and Hualde and Bilbao 1993), the data discussed in this section provide further evidence that this is the case.

A.2 Hualde 1991a

In the first extensive analysis of Basque prosody in the generative literature, Hualde (1991a, Ch. 6) develops an analysis of the pitch accent dialects of Basque which is completely independent of stress. The basic idea of the analysis is that accented words have underlying tones, whereas unaccented ones do not, and that this is what is ultimately responsible for the differences in their surface tonal patterns. In the specific case of Ondarroa Basque (§6.1.3), he proposes that marked morphemes contain an unlinked low tone in their lexical representation, as exemplified in (41) for several roots and affixes.

(41) *Hualde 1991a: Marked Morphemes*

a. *Marked Roots*

leko	'place'	lenguso	'cousin'	alkondara	shirt'
L		L		L	

b. *Marked Affixes*

-tik	'ABL.SG'	-antzako	'BEN.PL'	-ak	'ABS.PL'
L		L		L	

The surface tonal patterns are obtained through the following rules:[16]

(42) *Hualde 1991a: Tone Rules*

a. The initial syllable is marked extratonal.

b. A high tone is inserted to the left of any tone already present.

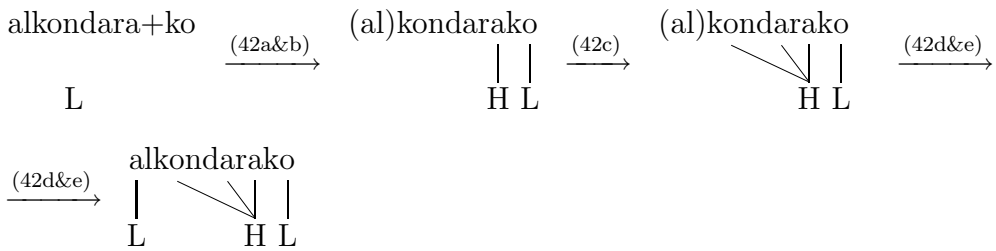
c. Left-to-right high tone spreading.[17]

d. Remove initial extratonality.

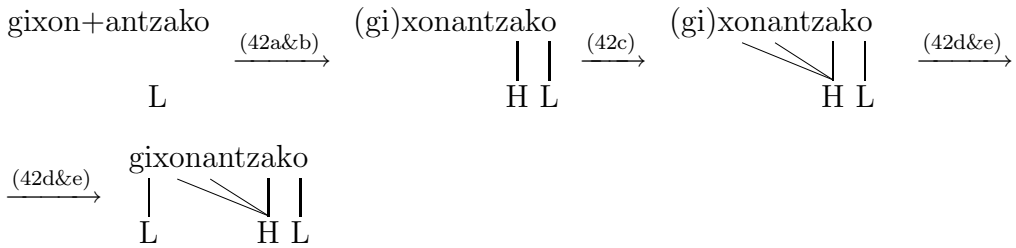
e. Associate a low tone to any toneless Tone Bearing Unit.

These rules derive the correct tonal patterns in words with more than two syllables:

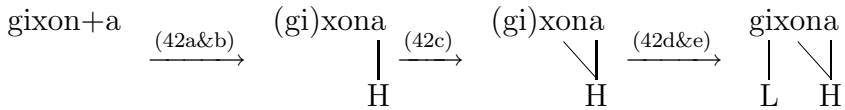
(43) *Marked root + unmarked suffix*: /alkondara'+ko/ 'shirt+LGEN.SG'



(44) *Unmarked root + marked suffix*: /gixon+antzako'/ 'man+BEN.PL'



(45) *Unmarked root + unmarked suffix*: /gixon+a/ 'man+BEN.PL'



[16] I have not included here words containing more than one marked morpheme, which, in this analysis, would contain more than one underlying low tone. For these cases, Hualde proposes that a rule motivated by the OCP deletes all underlying low tones except one.

[17] In fact, in order to get the facts right in all the dialects he discusses, Hualde posits bidirectional spreading: high tones spread to the left, and low tones spread to the right. Since there is no need for rightward low tone spreading in Ondarroa Basque (the only relevant tone is first associated to the last syllable), I have ignored this aspect of Hualde's analysis here.

In bisyllabic accented words, the derivation is a bit different. Before initial extratonality is removed, the high tone remains unlinked. After extratonality is removed, this high tone is linked to the initial vowel, so that there is no need to insert the default low tone (42e):

(46) *Bisyllabic accented word*: /jone'/ 'Jone'

```
jone   (42a-c)   (jo)ne   (42d&e)   jone
       -------->    |    -------->   | |
 L                  H L             H L
```

Consider now monosyllabic words in this analysis:

(47) *Monosyllabic word containing a marked morpheme*: /mai'/ 'table'

```
maî   (42a-c)   (maî)   (42d&e)   * maî
      -------->         -------->   /\
 L                H L             H  L
```

Given that, as we saw in the previous section, the root /mai'/ is marked, it is specified as containing an unlinked underlying tone in this analysis. Since the first (and only) syllable in the word is extratonal, no tone association occurs, and two unlinked tones (H and L) remain. After extratonality is removed, the two tones are linked to the only syllable in the word, as shown in (47). This wrongly predicts that the uninflected root surfaces as an accented word.

The main problem with this analysis is that marked morhemes are lexically specified as containing a low tone, which wrongly predicts that all words containing marked morphemes are accented. This problem does not arise in the metrical analysis defended in this thesis, since the crucial property that marked morphemes have is that they trigger the application of a specific rule. If, as in the case of monosyllabic words, the structural description of the rule is not satisfied, it does not apply.

Appendix B: Stress, Vowel Deletion and Cyclicity

A crucial feature of the analysis of stress in Ondarroa Basque developed so far is that stress rules apply cyclically: first, certain rules apply to words, and then other rules apply to phrases. However, there are certain facts having to do with vowel deletion which seem to contradict this hypothesis. In fact, this contradiction has been used in Hualde 1996 to argue against cyclic rule application, and, as a consequence, against derivational phonology.[18] In this section, I argue that a more comprehensive look at the Ondarroa Basque data in fact shows that there is no contradiction, and, hence, no argument against cyclic rule application or derivational phonology. Furthermore, the data examined in this section also justifies certain small changes in the stress rules proposed so far.

Phonological processes occurring in Basque vowel clusters are well-known for their complexity and substantial dialect variation. As argued for in de Rijk 1970 and Hualde 1991a (§2), this complexity and variation can be explained in terms of simple rules which are ordered in different ways in different dialects. In this section, I discuss one such process as it applies in Ondarroa Basque, vowel deletion, and its interaction with stress assignement.

In Ondarroa Basque, the non-high unrounded vowels *a* and *e* are deleted when preceded by a high vowel:

(48) *Vowel Deletion* (Hualde 1991a, §2.5.2.1)

$$\begin{bmatrix} \text{V} \\ -\text{high} \\ -\text{round} \end{bmatrix} \rightarrow \emptyset \ / \ \begin{bmatrix} \text{V} \\ +\text{high} \end{bmatrix}\text{—}$$

Vowel deletion is exemplified in the following:

(49) a. /gixon+a/ → gixona $\xrightarrow{(48)}$ N.A.
'man+ABS.SG'

b. /on+en'+a/ → onena $\xrightarrow{(48)}$ N.A.
'good+SUP+ABS.SG'

[18] A similar argument is made in Hualde 1999b, based on these facts and others taken from several dialects of Basque.

(50) a. /alaba+a/ → alabia $\xrightarrow{(48)}$ alabi

'daughter+ABS.SG'

b. /arbola'+a/ → arbolia $\xrightarrow{(48)}$ arboli

'tree+ABS.SG'

(51) a. /etxe+a/ → etxia $\xrightarrow{(48)}$ etxi

'house+ABS.SG'

b. /beste'+a/ → bestia $\xrightarrow{(48)}$ besti

(52) a. /asto+a/ → astua $\xrightarrow{(48)}$ astu

'donkey+a'

b. /leko+a/ → lekua $\xrightarrow{(48)}$ leku

'place+ABS.SG'

All these examples contain the suffix -*a*, which is deleted by (48) when preceded by a high vowel. In (49), vowel deletion does not apply, since *a* is not preceded by another vowel. In (50-52), the suffix is preceded by a high vowel, and deletion applies. Note that, in all these examples, the vowel triggering deletion becomes high by certain rules that raise low and mid vowels in hiatus contexts. The exact formulation of these rules is not important for present purposes, and I will ignore it for ease of exposition (see de Rijk 1970 and Hualde 1991a, §2, for details).

Hualde 1996 argues that the interaction of vowel deletion and stress assigment provides evidence against cyclic rule application. His basic observation is that word level and phrase level stress appear to interact differently with vowel deletion, and in a manner inconsistent with the hypothesis that rules with smaller domains apply before rules with bigger domains. Recall that, as we saw in the previous sections, word level stress in Ondarroa Basque falls on the penultimate syllable in accented words, and that unaccented words may be stressed due to phrase level stress, which makes the penultimate syllable in a phrase stressed. Consider word level stress first. As shown in the following examples, accented words have penultimate stress when the final vowel is deleted:

(53) *Stress and vowel deletion in accented words: penultimate stress*

a. /arbola'+a/ → arbóli

'tree+ABS.SG'

b. /beste'+a/ → bésti

'other+ABS.SG'

c. /leko'+a/ → léku

'place+ABS.SG'

Given that word level stress assigns penultimate stress, these data show that word level stress applies after vowel deletion:

(54) Word level stress → Vowel deletion

A different conclusion is reached when we examine the interaction of vowel deletion with phrase level stress:

(55) *Stress and vowel deletion in unaccented words: final stress*

a. /alaba+a/ → alabí

'daughter+ABS.SG'

b. /etxe+a/ → etxí

'house+ABS.SG'

c. /asto+a/ → astú

'donkey+ABS.SG'

In this case, the result is final stress. Since phrase level stress assigns penultimate stress, the conclusion is that phrase level stress precedes vowel deletion:

(56) Vowel deletion → Phrase level stress

The necessary conclusion from (54) and (56) is that phrase level stress precedes word level stress. However, this order contradicts the ordering of stress rules assumed in the previous sections. In fact, it contradicts the standard hypothesis of cyclic rule application in Generative Phonology: rules that apply to smaller domains (e.g.

words) must apply before those that apply to larger domains (e.g. phrases). Thus, as argued by Hualde, unless an alternative account is provided, the data discussed above consitute an argument against the cyclicity hypothesis.

A crucial assumption in Hualde's argument is that word level and phrase level stress rules both assign penultimate stress in all contexts, including those in which the relevant domain ends in a vowel cluster. For instance, for the unaccented word *etxí* (55b), the assumption is that before vowel deletion, phrase level stress results in penultimate stress (*etxía*). Similarly, the assumption that word level stress always assigns penultimate stress motivates the ordering of word level stress after vowel deletion. If it applied before, the result would be final stress. However, the assumption that both word and phrase level stress assign penultimate stress in final VV contexts is in fact wrong. Examples showing this are not easy to find, due precisely to the rule of vowel deletion discussed above and other rules that modify vowel clusters.[19] In particular, we need to find cases in which the first vowel in the VV cluster is not high when vowel deletion applies.

A quite productive case is provided by the allative suffix -*ra*, when following a V-final stem. As in many other dialects, *r* is deleted when preceded by a non-high vowel and followed by a vowel.[20] Vowel clusters resulting from this rule are not subject to vowel deletion, since the first vowel is not high, and by hypothesis, the rule applies after all the relevant rules which apply to vowel clusters and which could result in the first vowel being high (see the discussion around 48). Consider now the interaction of word level stress with *r*-deletion. The result, as exemplified below, is antepenultimate, rather than penultimate, stress:[21]

[19]Other relevant rules include one which inserts *x* between a high vowel and a vowel (see footnote 15), and another vowel deletion rule which affects *a* when followed by another vowel. See Hualde 1991a (§2) for details.

[20]In general, the consonants *r*, *b*, *d* and *g* are deleted intervocalically. The exact context where deletion applies vary depending on the specific consonant, and deletion is optional in some cases. In the case of the allative suffix -*ra* deletion is obligatory.

[21]Not all final VV clusters yield word level antepenultimate stress. For instance, this is not the case when the VV cluster occurs morpheme internally, as in /idea'/ → *idéa*. I assume that the rule that is responsible for antepenultimate stress (cf. 60) does not apply morpheme internally. Another case is provided by the commitative suffix /gas'/. Since *g* is deleted between vowels (see footnote 20), when this suffix is attached to a stem ending in a vowel, the resulting surface form has a final vowel

(57) *Word level stress in final VV clusters: antepenultimate stress*

a. /beste'+ra/ $\xrightarrow{r-\text{del.}}$ bestea $\xrightarrow{\text{Word st.}}$ béstea

'other+ALL.SG'

b. /bilbo'+ra/ $\xrightarrow{r-\text{del.}}$ bilboa $\xrightarrow{\text{Word st.}}$ bílboa

'Bilbao+ALL.SG'

This shows that words ending in final VV clusters in which the second vowel is deleted do not provide any avidence for the ordering of vowel deletion and word level stress. If the order were as posited in (54), vowel deletion before word level stress, the result would be penultimate stress, as discussed above. If, on the other hand, the order were word level stress before vowel deletion, the result would *also* be penultimate stress: before vowel deletion, the word ends in a VV cluster, so antepenultimate stress is assigned. The result after vowel deletion is penultimate stress, as desired.

Thus, we can posit the following order of rules, which is compatible with cyclic rule application:

(58) Word level stress → Phrase level stress → Vowel deletion

This order can account for all the relevant data. In particular, the fact that vowel deletion follows word level stress does not result in final word level stress, since, precisely in the contexts where vowel deletion applies, word level stress is antepenultimate. The final result in these cases is penultimate stress, due to vowel deletion. For instance, the derivation for the accented word *bésti* in (53b) would be as follows:

(59) /beste'+a/ → bestia $\xrightarrow{\text{Word st.}}$ béstia $\xrightarrow{(48)}$ bésti

'other+ABS.SG'

In order to account for the fact that, in final VV contexts, word level stress is assigned to the antepenultimate vowel, rather than the penultimate one, I propose that a word level rule makes the final vowel in this context unstressable, i.e. it deletes

cluster: e.g. /inaki+gas/ → *Iñakías*. The result in this case is penultimate, not antepenultimate, stress. I assume that *g*-deletion, unlike *r*-deletion, applies after word level stress is assigned.

the line 0 grid mark corresponding to this vowel. This follows Halle's (1998§6) analysis of similar facts in English.[22] Thus, in this context, the final vowel does not 'count' for word level stress rules, resulting in antepenultimate, rather than penultimate stress. This rule is stated in (60), where the fact that a grid mark is deleted is represented as with a dot '.' in pace of the grid mark:[23]

(60) $* \rightarrow . \; / \; \underset{\text{V+V}}{\underline{\quad}}\# \quad$ line 0

The metrical grid for an example like (57a) is then as follows:

(61) /beste+ra/ → béstea

'other+ALL.SG'

```
  *        line 1
  *)*.     line 0
 bestea
```

Another important question we have not dealt with so far is what the interaction is between phrase level stress and vowel clusters in final position. Recall that part of Hualde's argument is that phrase level stress must precede vowel deletion because, in contexts where the final vowel is deleted, the result is final, rather than penultimate, stress. This argument rests on the assumption that, in final VV clusters, penultimate stress is assigned at the phrase level. As with word level stress, this assumption is in fact incorrect. Phrase stress is final in these contexts. Nevertheless, as I argue below, we still need the ordering posited by Hualde: vowel deletion applies after phrase level stress.

A context where we can verify this is the same as the one we used for word level stress above: the suffix *-ra* when preceded by a non-high vowel final stem. As shown above, in this context, the *r* deletes, and the resulting final VV cluster remains on the surface. In this case, phrase level stress assigns *final*, rather than penultimate, stress:

[22] In particular, Halle considers several English words in which stress is one syllable to the left of what is expected given regular rules. He proposes that these words are subject to a rule that renders the final vowel in them unstressable.

[23] As noted in footnote 21, this rule does not apply morpheme internally.

(62) *Phrase level stress in final VV clusters: final stress*

a. /etxe+ra/ $\xrightarrow{r-\text{del.}}$ etxea $\xrightarrow{\text{Ph. st.}}$ etxeá

'house+ALL.SG'

b. /paris+ra/ → parisera $\xrightarrow{r-\text{del.}}$ parisea $\xrightarrow{\text{Ph. st.}}$ pariseá[24]

'Paris+ALL'

Even though, in these cases, stress is not penultimate, as expected, but final, we still need to assume the ordering of phrase level stress before vowel deletion. In the relevant cases, i.e. where the second vowel of a final VV cluster is deleted, final stress can only be the result of this ordering. If vowel deletion applied before phrase level stress, stress would be expected to be penultimate. This is exemplified for the word *etxí* below:

(63) *Vowel deletion → Phrase level stress

/etxe+a/ → etxia $\xrightarrow{(48)}$ etxi $\xrightarrow{\text{Ph. st.}}$ *étxi

'house+ABS.SG'

In order to implement the fact that in word final vowel clusters phrase level stress is final, we need to modify one of the phrase level rules discussed in §2.4. Recall that penultimate stress at the phrase level is mainly due to an RLR edge-marking rule, and to the fact that feet are right-headed (cf. 30). I propose that RLR needs to be restated as follows:

(64) *Phrase level RLR*

$$\emptyset \rightarrow \ ) \ / \ *\underset{\text{CV}}{\underline{\quad}}*] \quad \text{line 0}$$

Given this formulation, RLR at the phrase level does not apply to phrases that end in a vowel cluster. Since feet are right-headed on line 0, the result is final stress. This is exemplified for *etxeá* below:

[24]Note that in this case, the vowel *e* preceding the deleted *r* is epenthesized to avoid the *sr* consonant cluster. This is the normal epenthetic vowel in Basque (see Hualde 1991c for discussion.)

(65) /etxe+ra/ → etxeá

'house+ALL.SG'

Word level stress (21&60)			*Phrase level stress* (22&64)	
	*	line 1	*	line 1
* (*.		line 0	* (**	line 0
etxea			etxea	

Note that, at the word level, (60) renders the last vowel unstressable. However, since new line 0 rules apply at the phrase level, this vowel becomes stressable again, and in fact, is the stressed vowel in the phrase.

Now consider what happens in cases in which the second vowel of a final VV cluster is deleted. As we showed above, the order of rules must be phrase level stress before vowel deletion. The output of the stress rules for a word like *etxí* is as follows:

(66) /etxe+a/ → etxia $\xrightarrow{\text{Stress}}$ *
* (**
etxia

Next, vowel deletion applies, deleting the stressed vowel. The question now is what happens to the portion of the metrical grid corresponding to this vowel. As first discussed in Halle and Vergnaud 1987, the formalism of the metrical grid predicts that stress shifts to the next available vowel *within the foot*. This basic prediction of the formalism in fact constitutes one of the strongest arguments in favor of the metrical grid over other ones which employ ony the grid (e.g. Prince 1983). In the case of Ondarroa Basque, it also makes the correct prediction: as can be seen in (66), there is only one foot on line 0, which contains the two last vowels; after deletion of the rightmost one, i.e. the head of the foot, stress shifts to the vowel which is to the left:

(67) * line 1
* (* line 0
etxi

To sum up this section, we have seen that Hualde's (1996) conclusion that the stress data in Ondarroa Basque constitute an argument against derivational phonology is not warranted. Further examination of the data reveals that one of the basic

premises of this argument, that word level stress in final VV clusters is penultimate, is incorrect. Once these data are taken into account, the problematic ordering posited by Hualde is not the only possible one. Furthermore, we have also seen that the new data exmained in this section justify certain small changes to the stress rules introduced in the previous sections.