UNEXPECTED HIATUS AND BASE-IDENTITY IN THE SPANISH VERBAL PARADIGM*

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Most accounts of standard Spanish phonology report that the high vowels /i/ and /u/ surface as the glides [j] and [w] respectively when followed by a vowel of rising sonority. Nevertheless, cases of exceptional hiatus are documented in the verbal paradigm when vowel-final stems are concatenated to vowel-initial inflectional suffixes (i.e. *confi-amos* [koŋ.fi.á.mos] 'entrust (1PL)'). The analysis developed here demonstrates that the failure for gliding to apply in this morphological context is a Paradigm Uniformity effect, whereby the unstressed high vowel surfaces as a moraic segment as a way of maintaining a uniform [V.V] sequence throughout the inflectional paradigm. Moreover, it is shown that underapplication of gliding in forms like [koŋ.fi.á.mos] complies with a morphological requirement that the stem in a derived word be phonologically identical to another form (i.e. a base) in the same paradigm. These data are shown to be theoretically challenging for the Optimal Paradigms approach to Paradigm Uniformity (McCarthy 2005), which does not acknowledge the presence of a base in inflectional morphology.

1. Introduction

Most accounts of the process of high vowel gliding that occurs in standard Spanish note that the underlying high vowels /i/ and /u/ surface as the glides [j] and [w] when they precede a more sonorous vowel. Representative examples of the phonological phenomenon referred to here as High Vowel Gliding (HVG) are given in (1a). As can be seen from the data in (1a), [ja] is the preferred output form, regardless of stress. HVG is systematically blocked before an inflectional suffix, however, and this is evidenced by the data in (1b). Such failure of a phonological process to apply in an environment in which its structural description is met is known as underapplication.

(1) High vowel gliding

a. Application of high vowel gliding

ampliación	[am.plja.θjón]	'enlargement'
patriarca	[pa.tɾjáɾ.ka]	'patriarch'
industria	[iŋ̟.dús.tɾja]	'industry'
cordial	[koɾ.ðjál]	'cordial'

b. Misapplication of high vowel gliding

confi-amos	[koŋ.fi.á.mos]	'entrust (present, 1PL)'
confi-aba	[koŋ.fi.á.ßa]	'entrust (imperfect, 1SG)'

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Ashley W. Farris-Trimble and Daniel A. Dinnsen, pp. 17-33. Bloomington, IN: IULC Publications.

It is argued here that underapplication of HVG is based on the principle known as Paradigm Uniformity (e.g., Benua 1997; Downing et al. 2005; Kenstowicz 1996; Steriade 2000), which stipulates that a phonological process can either underapply or overapply in a given context as a way of increasing segmental identity with morphologically related words. The notion of morphological uniformity is easily captured within the Optimality Theory framework (OT; Prince and Smolensky 1993/2004) by positing the existence of specific Output-Output (OO) constraints which demand phonological identity between a given output and its morphologically related words (Kager 1999). The notion that OO constraints compare affixed forms with an unaffixed base is fairly uncontroversial for derivationally related words. Whether or not base-identity is similarly applicable to inflectional paradigms, however, has been disputed in the OT literature. While some researchers have maintained that the evaluation of inflectional forms requires reference to a base (Albright 2004; Hall and Scott 2007; Kenstowicz 1996), others contend that inflectional paradigms do not obtain their identity by such reference. The latter view has been formalized by McCarthy (2005) in the Optimal Paradigms (OP) model. Although this model acknowledges that each member of a paradigm must retain the same phonological shape of other members of the same paradigm, it stipulates that no single cell within a paradigm should receive the special status of a 'base' form.

In terms of theoretical predictions provided by the OP model, McCarthy (2005) demonstrates that two general ranking hierarchies should follow from the model. If a canonical pattern is achieved by a general ranking of Markedness over Faithfulness (i.e. (2a)), then this regular pattern can infiltrate the rest of the inflectional paradigm—and in particular, in phonological contexts where it is not expected to apply—by means of a higher-ranking OP constraint. This first predicted OP hierarchy is given in (2b), and it is considered a case of overapplication. Additionally, McCarthy underscores the fact that underapplication as an outcome is achievable in the unique case that an independently-motivated markedness constraint is crucially ranked above the markedness constraint that is responsible for the canonical pattern. This situation is outlined in (2c). The opaque outputs rendered by the ranking in (2c) are not instances of "true underapplication", though, since these are really cases in which overapplication is blocked by the independent markedness constraint. McCarthy is quite explicit about this claim: "true underapplication is predicted not to occur" (2005:206).

(2) Paradigm Uniformity effects in the OP model

a. Canonical pattern
   Markedness1 » IO Faithfulness

b. Paradigm Uniformity effects (overapplication)
   OP Faithfulness » Markedness1 » IO Faithfulnes

c. Paradigm Uniformity effects (overapplication blocked)
   OP Faithfulness » Markedness2 » Markedness1 » IO Faithfulness

The data provided in the current paper will be shown to be incompatible with McCarthy's prediction. It will be shown that the failure for HVG to apply in forms of the type (1b) is representative of true underapplication within inflectional morphology, such that

a phonological process misapplies as a means of maintaining morphological identity with an inflectionally related form, that is, with a base. Although this stance is in opposition to McCarthy's claims, it will be shown here if an OP analysis of the Spanish verbal paradigm were to be carried out, no independently-motivated Markedness constraint (i.e. Markedness2 in (2c)) could be posited to prevent an overapplication paradigm candidate from surfacing. Another theoretical issue that this paper will address is the realization of future and conditional tense forms (i.e. *confiaré* [koŋ.fja.ɾé] 'entrust (future, 1SG)'), in which base-identity effects are rendered opaque. It will be argued that for these forms, the failure for the underlying /VV/ sequence to surface as such is due to the fact that the vowel immediately adjacent to the high vowel is in unstressed position. This "distance-to-stress" effect (cf. Cabré and Prieto 2006:215) is captured by the promotion of an anti-hiatus constraint in the Spanish constraint hierarchy.

This paper is structured as follows. In section 2, I review representative data which motivate the rule of HVG. I present an OT analysis to account for them and also present an analysis of contexts not related to inflectional morphology in which HVG is rendered opaque. In section 3, I introduce data from the Spanish verbal paradigm and, in particular, forms in which HVG underapplies. The analysis of these data is provided within a base-identity framework. In section 4, I discuss McCarthy's (2005) OP model, which proves to be incompatible with the Spanish data presented here. I conclude and present directions for future research in section 5.

2. High Vowel Gliding (HVG)

2.1 The canonical pattern

The first issue that immediately arises for an analysis of /VV/ sequences in Spanish is the question of syllable structure in the language. In accordance with Hualde (2005), we assume that onset clusters may have at most two consonants in Spanish; their structure is constrained to consist of an obstruent stop or /f/ followed by the liquid consonants /l/ or /ɾ/. With regard to the syllable nucleus in Spanish, it may contain a glide before the nuclear vowel, or a single nuclear vowel only. That is, prevocalic glides are generally parsed within a branching nucleus; postvocalic glides, however, are parsed in the coda (see Colina 2006 for more information). What is most relevant for the current analysis is that prevocalic glides are dominated by the nucleus portion of the syllable and are not syllabified under the onset node of the syllable.

With regards to syllable weight considerations, the present analysis follows Hayes (1989) in assuming that short vowels in Spanish are monomoraic underlyingly. The moraic status of glides is not as clear, however. While some generative accounts of Spanish stress posit that both onglides and offglides are moraic in the language (Harris 1992), more recent accounts of Spanish syllable structure have adopted the position that only offglides retain their mora at the level of phonetic representation, since they are parsed in the coda and contribute their weight to stress assignment (Cabré and Prieto 2006; Colina 2006). The position that will be taken here follows these more recent accounts and assumes that onglides are not moraic at the phonetic level.

The first data set that is pertinent to the present analysis is provided in (3). It is repeated from what was given in (1a). As can be seen from the data in (3), [ja] sequences sur-

face in word-medial and word-final positions, regardless of stress. Although not documented here, it should be noted that word-medial and word-final [je] and [jo] sequences demonstrate the same pattern in Spanish. The same general principle applies for diphthongs whose first component derives from an underlying back vowel, that is, sequences of the type [wa], [we], and [wo].[1]

(3) Forms with diphthong in word-medial and word-final positions

ampliación	[am.plja.θjón]	'enlargement'
patriarca	[pa.tɾjáɾ.ka]	'patriarch'
industria	[iɲ.dús.tɾja]	'industry'
cordial	[koɾ.ðjál]	'cordial'

Given the background on Spanish syllable structure provided at the beginning of this section, I will present a formal optimality-theoretic analysis of the data in (3), introducing the constraints and constraint rankings when appropriate. First, in considering the data in (3), we note that an underlying /ia/ sequence (representative of /VV/ sequences of rising sonority) contracts to tautosyllabic [ja] at the phonetic level. Two constraints are necessary to account for this pattern. They are given in (4).

(4) Constraints that account for the canonical pattern

ONSET: Every syllable must have an onset
MAX-μ: A mora in the input must have a correspondent in the output

Within OT, the constraint ONSET expresses the general restriction that every syllable must have an onset; it motivates the universal preference for CV syllables rather than onsetless syllables. To show that every mora in the input must have a correspondent in the output, we assume the general faithfulness constraint MAX-μ. The interaction between ONSET and MAX-μ can be observed in (5). Although the moraic status of inputs and potential output forms has not been provided in the tableaux of this paper, it is expected that the reader bear in mind that input vowels are monomoraic and that onglides are not.

(5) Canonical ranking

/patɾiaɾka/ 'patriarch'	ONSET	MAX-μ
a. pa.tɾi.áɾ.ka	*!	
b. ☞ pa.tɾjáɾ.ka		*

The attested candidate (5b), which surfaces with tautosyllabic [ja], violates low-ranking MAX-μ as a means of respecting higher-ranked ONSET. We note that while Richness of the

[1] Word-initial sequences (i.e. *miaja* [mi.á.xa] 'crumb') yield exceptional hiatus due to interactions of positional faithfulness and positional augmentation constraints (Cabré and Prieto 2006; Henriksen 2007). These instances of exceptional hiatus, although theoretically interesting on other grounds, are not the result of Paradigm Uniformity and thus are not addressed here.

Base would provide for either a glide or a vowel in the input, the fact that high-ranking markedness is decisive in determining the output makes the input irrelevant in these types of forms.

2.2 Prefixes and compound words: Contexts for blocking

Let us now consider cases where the rule of HVG is blocked, but for reasons other than paradigm uniformity. The examples in (6a) and (6c) illustrate that HVG does not apply if a high vowel and the vowel immediately to its right are separated by a morpheme boundary. They can be contrasted with the data from (6b) and (6d), where no morpheme boundary intervenes in the /VV/ sequence. We see that the generalization that HVG misapplies across morpheme boundaries is relevant for prefixed and compound words, so that if the high vowel ends the first morpheme and a stressed vowel of greater sonority begins the second, the high vowel surfaces as a moraic segment.

(6) Gliding blocked across morpheme boundaries

a. Prefixed words

bi-enio	[bi.é.njo]	'biennium'
bi-óxido	[bi.ók.si.ðo]	'dioxide'

b. Non-prefixed words

viento	[bjén̪.to]	'wind'
diócesis	[djó.θe.sis]	'dioceses'

c. Compound words

boqui-ancho	[bo.ki.án.t͡ʃo]	'wide-mouthed'
barbi-hecho	[baɾ.ßi.ét͡ʃo]	'clean-shaven'

d. Non-compound words

patriarca	[pa.tɾjáɾ.ka]	'patriarch'
ambiente	[am.bjen̪.te]	'environment'

The underapplication of HVG in (6a) and (6c) should not be considered extraordinary from a prosodic perspective of prefixed and compound words. Essentially, it is the presence of a prosodic boundary that thwarts the application of HVG in these contexts. With regards to the prosody of prefixed words, we adhere to proposals put forth in Wiltshire (2006), among others, who states that prefixes in Spanish "[generate] a recursive PW structure, so that a PW edge intervenes between prefix and base" (364). In terms of compound word prosody, we can account for these data by adhering to the proposal made by Hualde (2005) for Spanish and Raffelsiefen (2005) for English that compound words consist of two independent phonological words. Thus, it could be claimed that HVG fails to operate because of the presence of a prosodic boundary between the high vowel and its adjacent vowel. That is, HVG only applies when the high vowel and following vowel belong to the same prosodic

word. Thus, I assume the example prosodic representations in (7), for which alignment constraints of the type ALIGN-L (PW, σ) and ALIGN-R (PW, σ) would be relevant.[2]

(7) The prosody of prefixes and compounds

bióxido	[bí.][ok.si.ðo]$_{\omega}$]$_{\omega}$	'dioxide'
boqui-ancho	[bó.ki]$_{\omega}$[án.t͡ʃo]$_{\omega}$	'wide-mouthed'

Finally, the data in (8) are indicative of compound words in which neither of the vocoids separated by the word boundary is stressed. Here, we see that the generalization put forth in the previous paragraph is rendered opaque. This pattern has been accounted for by Cabré and Prieto (2006), who suggest that a "distance-to-stress effect" (215) is operative in Spanish phonology, whereby a high vowel expected to remain in hiatus is susceptible to gliding when its adjacent vowel is unstressed. Keeping this in mind, it should not be taken as particularly remarkable that these /VV/ sequences surface tautosyllabically, since neither of the two vocalic segments in question is stressed.[3]

(8) Distance-to-stress effect in compound words

boqui-abierto	[bo.kja.ßi̯é̯ɾ.to]	'open-mouthed'
barbi-espeso	[baɾ.ßjes.pé.so]	'with a thick beard'

It is important to emphasize that while the prosodic solution put forth in the preceding paragraphs accounts for the data provided in (6), it fails to generalize to the data provided in (1b) of this paper. The reason is that inflectional suffixes in Spanish are generally accepted as belonging to the phonological word of the stems to which they concatenate (cf. Wiltshire 2006:364). That is, unlike prefixes and compounds, suffixes are not traditionally analyzable as independent phonological words which contain a prosodic structure independent of their stem. Keeping this in mind, the following sections of this paper are dedicated to providing a principled optimality-theoretic account of exceptional hiatus in the Spanish verbal paradigm.

3. Underapplication as base-identity

3.1 Stress in the Spanish verbal paradigm

Since it will be argued below that the reason that HVG underapplies in the Spanish verbal paradigm is that the stem of the suffixed form remains faithful to a base, I first review some

[2] A similar solution could be proposed for suffixed forms such as *virtu-oso* [biɾ.tu.óso] 'virtuous', *manu-al* [ma.nu.ál] 'manual', and *santu-ario* [saṉ.tu.á.ɾjo] 'santuary', for example, by positing that these suffixes represent independent phonological words. Mascaró (1978) argues that suffixes like *-oso* are lexically marked for stress and Colina (1999) provides a base-identity OT account of words derived with this suffix. Nevertheless, the fact that gliding is blocked for stems that end in back vowels only does not seem to be fully captured by a base-identity analysis. I leave this issue open to investigation in future analyses.

[3] For further discussion on the distance to stress effect in Spanish and in Romance languages in general, the reader is directed to Chitoran and Hualde (2007). For a formal account of the constraint necessary to capture this generalization, see Section 3.2 of this paper.

basic principles of the stress patterns that develop in the verbal morphology. The data in (9) are representative of the majority of Spanish verbs, since their stem is consonant-final. In terms of stress assignment, we note that stress falls on the vowel immediately to the left of the stem-final consonant. The data in (9a) are representative of the *-ar* class, (9b) of the *-er* class, and (9c) of the *-ir* class.

(9) The majority of Spanish verbs contain consonant-final stems

a. First conjugation verbs

habl-o	[áß.lo]	'I speak'	cf. *hablar*
compr-o	[kóm.pro]	'I buy'	cf. *comprar*

b. Second conjugation verbs

vend-o	[bén̪.do]	'I sell'	cf. *vender*
com-o	[kó.mo]	'I eat'	cf. *comer*

c. Third conjugation verbs

viv-o	[bí.ßo]	'I live'	cf. *vivir*
impid-o	[im.pí.ðo]	'I impede'	cf. *impedir*

A different pattern emerges, however, when we consider verbs whose stem is vowel-final. The forms in (10) illustrate a particular subset of vowel-final stems in which the last vowel of the stem is a high vowel. As noted in both Hualde (2005:82-83) and Quilis (1993:183-184), although hiatus is possible in verb forms of the type (10b) and (10d), it is entirely impossible in other verbs with orthographically identical sequences of the type (10a) and (10c).

(10) Stem-internal and stem-final stress in *-iar* and *-uar* verbs:

a. *-iar* verbs with stem-internal stress

cambi-o	[kám.bjo]	'I exchange'	cf. *cambiar*
limpi-o	[lím.pjo]	'I clean'	cf. *limpiar*

b. *-iar* verbs with stem-final stress

confi-o	[koŋ.fí.o]	'I confide'	cf. *confiar*
envi-o	[em.bí.o]	'I send'	cf. *enviar*

c. *-uar* verbs with stem-internal stress

evacu-o	[e.ßá.kwo]	'I evacuate'	cf. *evacuar*
averigü-o	[a.ße.ɾí.ɣwo]	'I verify'	cf. *averiguar*

d. *-uar* verbs with stem-final stress

evalu-o	[e.ßa.lú.o]	'I evaluate'	cf. *evaluar*
actu-o	[ak.tú.o]	'I act'	cf. *actuar*

When we compare the *-iar* verbs given in (10a) and (10b), we note that the placement of stress in surface forms such as [kám.bjo] and [koɱ.fí.o] is unpredictable. Since there is no way to predict whether stress will be stem-internal (10a) or stem-final (10b), I assume that stress is stored lexically for these forms. That is, stress is marked in input forms as /kámbi-/ and /konfí-/ for the verbs *cambiar* and *confiar* respectively. A more principled distribution emerges, however, when we compare the *-uar* verbs given in (10c) and (10d). In particular, we notice that the glide [w] surfaces after velar consonants only. In all other contexts (i.e. those provided in (10d)), the underlying high vowel surfaces in hiatus with the vowel of the stem. Since this distribution follows from a predictable property of pronunciation, it would make little sense to posit different lexical representations for the two classes of *-uar* verbs provided in (10c-d). Thus, I consider that all *-uar* verbs are lexically marked for stress on the stem-final vowel and that a special markedness constraint would be necessary to account for why verbs of the (10c) type yield surface glides.

In order to account for these distributions in formal terms, I first employ a faithfulness constraint IO-STRESS (see (11)), which captures the special demand to maintain underlying stress specifications for verbs of the type (10b) and (10d). Since these verb forms violate high-ranking ONSET in that their /VV/ sequences surface heterosyllabically, the higher-ranking IO-STRESS constraint must preserve the underlying stress of the stem-final vowel. This assumption that certain inputs are lexically specified for stress in Spanish is not novel, as the basic premise has been put forth to account for patterns that prevail in other realms of Spanish morphology (see Mascaró 1978, for example). In order to capture the special pattern that emerges for *-uar* verbs, I appeal to the *$C_{[velar]}$uV constraint (see (11)) proposed by Cabré and Prieto (2006) in their account of a similar distribution that develops for word-initial /VV/ sequences.[4] Hualde (1999) has also commented on this peculiar distribution: "after a velar, there is no hiatus /uV/; cf. k[wa]tro (*kuV)" (191).

(11) Constraints that account for the distribution of *-iar* and *-uar* verbs:

IO-STRESS: A segment that is stressed in the input must be stressed in the output
***$C_{[velar]}$uV:** A high back vowel after a velar consonant and before a vowel is banned

The constraints put forth to account for the canonical process of HVG (see (4)) can now be ranked with respect to those which are necessary to account for the general distribution of *-iar* and *-uar* verbs. This is given in the tableaux in (12) and (13). We recall that while IO-STRESS is relevant for evaluation of both inputs, the constraint *$C_{[velar]}$uV is active for *-uar* verbs only. In terms of the constraint IO-STRESS, it must be ranked above ONSET in the constraint ranking, since there would be no other way to allow for the underlying /VV/ sequence to surface in hiatus. This interaction can be observed in (12). To show that the

[4] Roca (2006) would disagree with this analysis, since he proposes that *-uar* verbs with expected gliding in all forms are defined as having stress in the root; this "avoid[s] the problem of having to deal with potentially non-universal *$C_{[velar]}$uV constraint" (253). Nevertheless, the *$C_{[velar]}$uV constraint could be viewed as a local conjunction of the markedness constraints OCP-[dorsal] (i.e. a specific instance of the Obligatory Contour Principle) and ONSET. This conjunction of constraints follows suit with analyses put forth in traditional OT accounts of local conjunction, since it combines two markedness constraints. The entire realm of operability of this constraint in the domain of Spanish phonology (and that of other languages) is left open to investigation in future analyses.

constraint *$C_{[velar]}$uV is active, let us consider [e.ßá.kwo], the attested form in (13), in which an underlying /kúo/ sequence surfaces with the diphthong [wo]. As can be seen, markedness *$C_{[velar]}$uV must be ranked above faithfulness IO-STRESS in order to allow for glide formation after a velar consonant.

(12) *-iar* verbs with lexically-stored stress

/kámbi-o/ 'change (1SG)'	*$C_{[velar]}$uV	IO-STRESS	ONSET	MAX-μ
a. kam.bí.o		*!	*	
b. ☞ kám.bjo				*

/konfí-o/ 'entrust (1SG)'	*$C_{[velar]}$uV	IO-STRESS	ONSET	MAX-μ
a. ☞ koɱ.fí.o			*	
b. kóɱ.fjo		*!		*

(13) *-uar* verbs with lexically-stored stress

/ebakú-o/ 'evacuate (1SG)'	*$C_{[velar]}$uV	IO-STRESS	ONSET	MAX-μ
a. e.ßa.kú.o	*!		*	
b. ☞ e.ßá.kwo		*		*

/ebalú-o/ 'evaluate (1SG)'	*$C_{[velar]}$uV	IO-STRESS	ONSET	MAX-μ
a. ☞ e.ßa.lú.o			*	
b. e.ßá.lwo		*!		*

3.2 The base-identity model

A representative sample of inflected forms for the verbs mentioned in (10a-d) is provided below in (14). The cells of the paradigm which involve underapplication have been shaded.[5] A generalization about stress patterns is in line before the OT analysis of these outputs can be put forth. We note that stress falls on the final vowel of the stem in the present first, second and third persons singular, and in the present third person plural. A different pattern emerges for the infinitive, gerund, present first and second persons plural, and imperfect, such that primary stress shifts from the stem to the first vowel of the inflectional suffix. We underscore the fact that primary stress falls immediately to the right of the stem-final high vowel in these forms. In the future and conditional tenses, however, stress is not adjacent to the high vowel in question. Rather, it is located on the following syllable (i.e. the second syllable of the inflectional suffix), and hiatus is lost.

[5] It is true that the shaded forms may surface with a diphthong, as noted in Hualde et al. (2007). However, contraction of the [V.V] sequence in these contexts is due to a "Postlexical Syllable Contraction Rule" (3), through which words that contain an exceptional hiatus in their citation form may also be realized with a diphthong in their phonetic forms. These forms are in stark contrast to the majority of Spanish words which contain an obligatory diphthong in their citation form, due to application of HVG, which is a lexical rule.

(14) Verb conjugations

	cambiar 'exchange'	*confiar* 'confide'	*evacuar* 'evacuate'	*evaluar* 'evaulate'
INFINITIVE	[kam.bjáɾ]	[koŋ.fi.áɾ]	[e.ßa.kwáɾ]	[e.ßa.lu.áɾ]
GERUND	[kam.bjáɴ̪.do]	[koŋ.fi.áɴ̪.do]	[e.ßa.kwáɴ̪.do]	[e.ßa.lu.áɴ̪.do]
PRESENT 1SG	[kám.bjo]	[koŋ.fí.o]	[e.ßá.kwo]	[e.ßa.lú.o]
PRESENT 2SG	[kám.bjas]	[koŋ.fí.as]	[e.ßá.kwas]	[e.ßa.lú.as]
PRESENT 3SG	[kám.bja]	[koŋ.fí.a]	[e.ßá.kwa]	[e.ßa.lú.a]
PRESENT 1PL	[kam.bjá.mos]	[koŋ.fi.á.mos]	[e.ßa.kwá.mos]	[e.ßa.lu.á.mos]
PRESENT 2PL	[kam.bjáis̪]	[koŋ.fi.áis̪]	[e.ßa.kwáis̪]	[e.ßa.lu.áis̪]
PRESENT 3PL	[kám.bjan]	[koŋ.fí.an]	[e.ßá.kwan]	[e.ßa.lú.an]
IMPERFECT 1SG	[kam.bjá.ßa]	[koŋ.fi.á.ßa]	[e.ßa.kwá.ßa]	[e.ßa.lu.á.ßa]
FUTURE 1SG	[kam.bja.ɾé]	[koŋ.fja.ɾé]	[e.ßa.kwa.ɾé]	[e.ßa.lwa.ɾé]
CONDITIONAL 1SG	[kam.bja.ɾí.a]	[koŋ.fja.ɾí.a]	[e.ßá.kwa.ɾí.a]	[e.ßa.lwa.ɾí.a]

We keep these data in mind as we now consider underapplication in the *confiar* and *evaluar* paradigms, concentrating especially on the moraic status of the high vowel in each stem. Note that with the exception of the future and conditional, the stem is invariably pronounced as either [koŋ.fi] or [e.ßa.lu] in each of the cells of the verbal paradigm. That is, there is no stem allomorphy. In order to acknowledge that a Paradigm Uniformity effect is at work, though, we must be able to show that at least one of these forms illustrates a case of rule misapplication. The crucial data that allow us to do so are those in which the unstressed high vowel surfaces in hiatus when in contact with a stressed vowel, namely the infinitive, gerund, present first and second persons plural, and imperfect. These are the morphological contexts in which the canonical phonology (i.e. HVG) fails to apply. We recall that it was shown in (5) that /VV/ sequences of rising sonority generally surface as diphthong as a means of respecting high-ranking ONSET. Thus, we have a case of underapplication.

I argue that the underapplication of HVG in high vowel-final stems like *confiar* and *evaluar* is most properly analyzed when we adhere to the general principle known as base-identity (cf. Hall and Scott 2007; Kager 1999; Kenstowicz 1996). Since the opaque forms in (14) preserve a specific segmental property of a base (i.e. they maintain the moraic structure of their base correspondent), a specific version of the BASE-IDENTITY constraint is employed here (see (15)) as a means of formally capturing this correspondence relationship.[6]

[6] The current analysis is not the first to appeal to the notion of base-identity as a way of accounting for cases of exceptional hiatus in Spanish. Colina (1999) employs a base-identity analysis in her account of hiatus in compound words, derivationally related words, and inflectionally related words. However, her paper only presents one case of exceptional hiatus within the realm of inflectional morphology (i.e. *actúa~actuar*). Although the present analysis and Colina's analysis are guided by the same principle, that is, base-identity, this paper is designed to expand considerably on Colina's account, since it seeks to address the entire range of issues—both in terms of the phonological phenomena discussed as well as the theoretical claims that have been put forth to account for them—relating to inflectionally-motivated hiatus.

(15) Base-identity constraint

BASE-IDENT-μ: Every μ in the base must have a correspondent in the derived word

A few notes about base-identity relationships and inflectional morphology are required before the relevant tableaux can be presented. First, the fact that the constraint in (15) makes reference to a 'base' gives us unique insight into the organization of inflectional morphology in Spanish. Essentially, it claims that inflectional morphology acknowledges a base as the reference point for the creation of paradigmatically related forms. It should be emphasized that such a view is not totally novel to our optimality-theoretic understanding of inflection, as it follows from ideas put forth in Hall and Scott (2007) for Southern German dialects. Second, I follow Kager (1999:281-282) in assuming that the base must adhere to all of the following three criteria: (a) it is a surface form, (b) it is a free standing output form, and (c) it is compositionally related to its derived counterpart. Keeping this in mind, the current analysis proposes that the base for the Spanish verbal paradigm is the first person singular, although any of the grammatical persons which are faithful to the lexically specified stress of the high vowel in question could equally have been given this special status.

We now consider the evaluation of the tableaux that account for the data in (14) as a way of illustrating how BASE-IDENT-μ operates. The tableau in (16) evaluates the first person singular form (i.e. the base), and the tableau in (17) evaluates an opaque output, that is, an output in which the canonical process of HVG has underapplied.[7] We observe that high ranking BASE-IDENT-μ allows for candidates with hiatus to surface as optimal. The status of base-identity is not wholly apparent in (16), however, since it could be argued that IO-STRESS eliminates the candidate that contains a glide. This issue is immediately resolved when we examine the constraint interaction in (17), where IO-STRESS is irrelevant in choosing the optimal output, since it is violated by both candidates. There, it is clear that the BASE-IDENT constraint is indispensable for choosing the underapplication candidate as the correct output. Essentially, underapplication wins out over normal application because of a demand to maintain phonological identity of the suffixed form with the base. Although tableaux have not been provided for the other shaded cells in (14), one can imagine how the same principle of base-identity is systematically applicable for them as well.

(16) Evaluation of 1SG *-iar* verb with stem-final stress

/konfí-o/ 'entrust (1SG)' Base: [koɱ.fí.o]	BASE-IDENT-μ	IO-STRESS	ONSET	MAX-μ
a. ☞ koɱ.fí.o			*	
b. kóɱ.fjo	*!	*		*

[7] In addition to specifying for the input, both tableaux specify for the base. This is in line with previous base-identity accounts of inflectional morphology (i.e. Hall and Scott (2007:162), Kager (1999:284)).

(17) Evaluation of 1PL *-iar* verb form with exceptional hiatus

/konfí-ámos/ 'entrust (1PL) Base: [koɱ.fí.o]	BASE-IDENT-μ	IO-STRESS	ONSET	MAX-μ
a. ☞ koɱ.fi.á.mos		*	*	
b. koɱ.fjá.mos	*!	*		*

A closer examination of all the data presented in (14) shows the principle of base-identity developed in the preceding paragraphs cannot intuitively capture the full range of forms that exist in the *-iar* and *-uar* verbal paradigms. In particular, we notice that a formal analysis of the future and conditional forms (i.e. [koɱ.fja.ɾé] and [koɱ.fja.ɾí.a]) necessitates the use of a special markedness constraint prohibiting surface hiatus of [V.V] sequences when neither of the adjacent vocoids is stressed. We recall from section 2 of this paper that this process was discovered to be relevant for compound morphology as well (see (8)). We express this general principle through a markedness constraint *VV, which is formalized below. For similar proposal for insular Catalan (i.e. *AA), see Lloret (2004).[8]

(18) Anti-hiatus constraint

***VV:** Unstressed adjacent vowels in hiatus are banned

To see how *VV functions within the constraint hierarchy, we consider the evaluation of the first person singular future tense form in (19). A fundamental point to bear in mind is that the assessment of this type of output does not undermine the base-identity proposal put forth in (15), since reference to the base is made in the tableau in (19). What is unique about the future tense form, though, is that neither of the two vocoids derived from the /VV/ sequence contains primary stress. That is, while candidate (19a) maintains the moraic identity of its base by respecting BASE-IDENT-μ, it does so by violating an equally-ranked constraint prohibiting unstressed adjacent vowels in hiatus, namely *VV. Candidate (19b), on the other hand, respects *VV, but does so by losing faithfulness to its base. What this means is that the decision between the form with hiatus (i.e. (19a)) and the diphthongized form (i.e. (19b)) is passed onto ONSET. Thus, it is the candidate with a glide—which in this case violates BASE-IDENT-μ as a means of respecting *VV—that surfaces as the most harmonic according to the language-specific ranking.

[8] The *AA constraint proposed by Lloret (2004) could be viewed as a local conjunction of ONSET and OCP, since it bans identical unstressed vowels in hiatus. Nevertheless, the fact that the anti-hiatus component of the local conjunction is necessary for Lloret's analysis would seem to be in line with the general principle put forth here. For further discussion of the NO-HIATUS constraint, see McCarthy and Prince (1993:119).

(19) Evaluation of verb form in which stress is not adjacent to stem-final high vowel

/konfí-aɾé/ 'will entrust (1SG)' Base: [koɱ.fí.o]	BASE-IDENT-μ	IO-STRESS	*VV	ONSET	MAX-μ
a. koɱ.fi.a.ɾé		*	*	*!	
b. ☞ koɱ.fja.ɾé	*	*			*

4. The Optimal Paradigms model

McCarthy's (2005) OP model tries to capture similarities among morphologically related words in inflectional morphology (as opposed to derivational morphology) via specific output-output correspondence constraints. The OP model follows from two basic principles that are highlighted here. First, potential output candidates consist of entire inflectional paradigms. Second, OP constraints compare each surface form in a paradigm with other surface forms in the paradigm, assessing a violation mark for every pair of candidates whose forms are not in correspondence with one another. Crucially, inflectional paradigms do not have a base in the OP model.

Having established this background, we can posit what an OP account of the *confiar* paradigm might look like. We must first consider the underapplication paradigm, i.e. the winning paradigm, which is abbreviated in (20a) below. In addition to demonstrating how this combination of forms surfaces as the optimal output, we must also be able to explain why a normal application paradigm (i.e. where HVG applies only to an unstressed high vowel in contact with another vowel, as stipulated by the canonical phonology) and an overapplication paradigm (i.e. where HVG applies in expected and unexpected contexts) are less harmonic. The normal application candidate is abbreviated in (20b) and the overapplication candidate is abbreviated in (20c). It is important to bear in mind that three paradigm members are listed here, since different phonological phenomena have been shown to be relevant for each of these three morphological categories in the Spanish verbal paradigm.

(20) Abbreviated paradigm candidates for *confiar*

a. Underapplication of HVG
[koɱ.fí.o ~ koɱ.fi.á.mos ~ koɱ.fi.a.ɾé]

b. Normal application of HVG
[koɱ.fí.o ~ koɱ.fjá.mos ~ koɱ.fja.ɾé]

c. Overapplication of HVG
[kóɱ.fjo ~ koɱ.fjá.mos ~ koɱ.fja.ɾé]

A glimpse of the paradigm candidates listed in (20) raises a concern that should not be taken lightly, since the winning paradigm candidate is not given there. It has been provided in (21), although no rule-based nomenclature can be used to refer to this type of paradigm candidate, since one of its verb forms demonstrates underapplication of HVG (i.e. [koɱ.fi.á.mos]), while another appears to demonstrate normal application of the same rule

(i.e. [koɱ.fja.ɾé]). It is worth mentioning that this type of paradigm candidate was never considered by McCarthy (2005) as a potential output candidate for inflectional morphology.

(21) Winning paradigm candidate for *confiar*

[koɱ.fí.o ~ koɱ.fi.á.mos ~ koɱ.fja.ɾé]

The OP analysis would have to comply with the hierarchy responsible for the canonical pattern (i.e. ONSET » MAX-μ) as well as acknowledge two other important stipulations for Spanish phonology, designated here by the undominated constraints IO-STRESS and *VV. Additionally, it would be necessary to posit a high-ranking OP constraint that allowed for the occurrence of onsetless syllables throughout the verbal paradigm. This would counteract the strength of ONSET in the hierarchy for a form like [koɱ.fi.á.mos]. Thus, the constraint OP-MAX-μ would need to be ranked above ONSET, yet below IO-STRESS and *VV. The full ranking is shown in (22).[9] For ease of interpretation, the constraint IO-STRESS is evaluated for the present tense first person singular only, since the other two verb forms lose root stress for reasons not concerned with the current analysis.

(22) OP account of *confiar* paradigm

/konfí-o ~ konfí-ámos ~ konfí-aɾé/ 'entrust'		IO-STRESS	*VV	OP-MAX-μ	ONSET	MAX-μ
a.	koɱ.fí.o ~ koɱ.fi.á.mos ~ koɱ.fi.a.ɾé		*!		***	
b. ☞	koɱ.fí.o ~ koɱ.fjá.mos ~ koɱ.fja.ɾé			**	*	**
c.	kóɱ.fjo ~ koɱ.fjá.mos ~ koɱ.fja.ɾé	*!				***
d. ☜	koɱ.fí.o ~ koɱ.fi.á.mos ~ koɱ.fja.ɾé			**	**!	*

The immediate outcome of the OP analysis provided in (22) is that it makes the wrong prediction for the *confiar* paradigm. This is because the OP constraint is ineffective for making the correct decision between the two most serious candidates. That is, both the normal application candidate (22b) and the winning candidate (22d) represent non-uniform paradigms; they are irrelevant to the OP constraint. Their evaluation by OP-MAX-μ results in a tie, and thus it is ONSET that makes the forced decision between the two. The markedness constraint incorrectly chooses (22b), since it contains one hiatus less than its competitor (22d). What this analysis shows is that there is no intuitive way to employ the OP model in an account of the Spanish verbal paradigm, since the paradigm type that actually surfaces for *confiar* is inconsistent in terms of the moraic status of its stem-final vowel. We recall that

[9] An OP account of the same paradigm type was put forth in Cabré and Prieto (2006). There, it was shown that the OP constraint was not sufficient in predicting the correct paradigm candidate. Cabré and Prieto's analysis differs from what is being proposed here in that they argue for the use of the production and perception-based constraint PROSODIC PROMINENCE.

the two truly uniform paradigm types ((22a) and (22c)) were eliminated on other grounds, namely that one contained hiatus in an unstressed [VV] sequence, and that another violated correspondence restrictions for stress. The conclusion to be drawn from this discussion is that McCarthy's rejection of a base within the OP framework creates predictions that are too strong and that would contradict the principles that have been shown to underlie the vowel ~ glide allophony that is evidenced in the Spanish verbal paradigm.

5. Conclusion

This paper has presented a thorough study of the underapplication of a process known as High Vowel Gliding (HVG) in the Spanish verbal paradigm. The drive to achieve a uniform inflectional paradigm was evidenced in forms of the type [koŋ.fi.á.mos] and [koŋ.fi.ái̯s], in which the unstressed high vowel failed to glide as a means of maintaining identity with a base. It has been shown that the most insightful way of capturing the existence of these types of surface forms—in addition to accounting for the normal application of HVG in forms like [kam.bjá.mos] and [kam.bjái̯s]—is to work within the base-identity framework. Moreover, the fact that future tense forms such as [koŋ.fja.ɾé] do not abide by the base-identity principle was captured by the fact that an undominated *VV constraint exists in the Spanish constraint hierarchy. Crucially, these data were shown to be problematic for McCarthy's Optimal Paradigms model, due in great measure to the fact that this latter model does not acknowledge the need for a base in inflectional morphology. Since Spanish verb paradigms with stem-final high vowels are not uniform with respect to their moraic structure, there was no way to account for them by adhering to the OP model. The present analysis has demonstrated that BASE-IDENTITY constraints, when integrated with respect to undominated constraints like IO-STRESS and *VV, make the correct prediction that some, but not all verb forms in Spanish, are in correspondence with their base.

Finally, this paper responds to other general issues presented in recent analyses that have been put forth to account for underapplication Paradigm Uniformity effects (i.e. Albright 2004; Hall and Scott 2007). First, it strengthens the claim that the base-identity framework offers an accurate account of Paradigm Uniformity. Albright and Hall and Scott argue for this type of analysis for Yiddish and German respectively, but little has been said with respect to Romance phonology until now. Furthermore, this analysis is in line with Hall and Scott's prediction that "features that have a purely phonological function are the only ones which can potentially be present in a high-ranking BASE-IDENT constraint" (175), since vowel morae have a purely phonological (and not morphological) function in Spanish. That is, the phenomena associated with Spanish HVG and German s-dissimilation are in stark contrast to what occurs with German umlauted vowels discussed by Hall and Scott—which do not yield uniform paradigms—since this latter phenomenon is considered one of morphological marking only. As a concluding remark, there is little doubt that the status of underapplication in Paradigm Uniformity offers promising possibilities in terms of future lines of research. Future analyses should seek to account for these effects within the theoretical framework proposed here in order to understand the complete range of phenomena that is attested cross-linguistically.

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