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NEW PERSPECTIVES ON AUTOMATIC AND MORPHOPHONOLOGICAL ALTERNATIONS: HARMONIC PROCESSES IN TWO PENINSULAR VARIETIES OF SPANISH

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ABSTRACT. The present study investigated metaphony and vowel harmony (VH) in two varieties of Peninsular Spanish, Eastern Andalusian and Montañes, to determine whether the harmonic processes of either variety are better classified as automatic or morphophonological. Despite both varieties exhibiting VH, the triggers and targets for each variety result in harmonic alternations that are quite distinct, as based on the following eight criteria indicated in Haspelmath and Sims (2010): phonological versus morphological or lexical conditioning, phonetic coherency, phonetic distance, restriction to derived environments, extension to loanwords, sensitivity to speech style, creation of new segments, and restriction to the word level. Although previous research has extensively documented the VH of Andalusia and Montañes, no study has yet systematically compared the two using a singular metric to determine if the harmonic processes in each region are more characteristic of automatic (i.e., phonological) or morphophonological alternations. An in-depth analysis of the harmonic processes in each variety revealed that a binary classification was less appropriate than viewing these alternations on a continuum. The nuanced representation of these alternations on a continuum is a unique contribution to the literature on Spanish VH and provides a fresh perspective on the nature of alternations in Peninsular Spanish.

Keywords. morphology; metaphony; vowel harmony; alternation; morphophonology

RESUMEN. Esta investigación trata de la metafonía y la harmonía vocálica (HV) de dos variedades del español peninsular- las de Andalucía del este y Montañés, para determinar si los procesos harmónicos de cada variedad serían mejor clasificados como automáticos o morfofonológicos. Aunque las dos variedades tienen HV, los activadores y las metas de cada variedad resultan en alternaciones harmónicas bastante distintas, como indicados en los ocho criterios de Haspelmath y Sims (2010): el condicionamiento fonológico versus morfológico o lexical; la coherencia fonética; la distancia fonética; la restricción a los ambientes derivados, la extensión a los préstamos; la sensibilidad al estilo; la creación de segmentos nuevos; y la restricción al nivel de palabra. Aunque las investigaciones previas han documentado extensivamente la HV de Andalucía y Montañés, hasta ahora ninguna investigación ha comparado sistemáticamente las HVs de las dos regiones usando una medida singular para determinar si las alternaciones son automáticas o morfofonológicas. Un análisis detallado de los procesos metafónicos de cada variedad reveló que una clasificación binaria fue menos apropiada que examinar estas alternaciones como parte de un continuo. Esta representación matizada de las alternaciones es una contribución única a la literatura de la HV y provee una perspectiva nueva sobre la naturaleza de las alternaciones metafónicas del español peninsular.

Palabras clave. morfología; metafonía; harmonía vocálica; alternaciones; morfofonología

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1. Introduction

The present study[1] is an investigation of two differential forms of harmonic processes, vowel harmony (VH) and metaphony, in two varieties of Peninsular Spanish – that of Eastern Andalusian, spoken in the south of Spain and Jaén in particular, and Montañes, spoken in Cantabria in the north. VH is vowel assimilation that is spread throughout a given domain, such as the prosodic word (Archangeli & Pulleyblank 2007). Metaphony covers a range of diverse harmonic processes that occur in Romance languages and differs from canonical VH by virtue of its dependence on stress and the fact that it does not involve strict assimilation but rather raising or diphthongization (Mascaró 2016; Rose & Walker 2011). The two varieties under study undoubtedly exhibit VH; however, the triggers and targets for each variety result in alternations that are quite distinct. Thus, the goal of the current investigation is to examine the similarities and differences in the applications of harmonic processes in each of the varieties. Examining VH, especially in a language like Spanish, that does not typically make use of such a process, will allow for a greater understanding of the morphology-phonology interface in the language. An in-depth analysis of these harmonic processes will reveal whether each alternation is more characteristic of an automatic or morphophonological alternation in the two varieties in question.

Harmonic processes, such as VH, are traditionally classified as either automatic (i.e., phonological) or morphophonological alternations (for examples of classification criteria, see Bybee 1985, 2001; Dressler 1985). More recently, eight criteria have been outlined in Haspelmath and Sims (2010) in order to differentiate between the two types of alternations, arguing that binary distinctions of alternations as either automatic or morphophonological may fail to reveal that certain alternations contain characteristics of both. Such an approach is also consistent with a diverse body of work that addresses the benefits of deconstructing binary distinctions, as in Kaisse and McMahon's (2011) critique of post-lexical and lexical classifications and Kiparksy's (1993) problematization of the Revised Alternation Condition and the Strict Cycle Condition.

Turning to Haspelmath and Sims' (2010) eight criteria, we first note that canonical automatic alternations are phonologically conditioned, such as the English flap, which occurs only in post-tonic environments. For this type of alternation, the segments in question are phonetically coherent in that they affect natural classes (e.g., English flapping affects voiced and voiceless alveolar plosives) and are phonetically close, usually differing in only one feature (e.g., flaps and alveolar plosives share place of articulation). Additionally, automatic alternations are not restricted to derived environments, as seen in the English flapping that frequently occurs in *butter* or *matter*, neither of which is derived. Thus, an automatic alternation may occur in either a derived or non-derived environment, as it is the *restriction* to a derived environment that is indicative of a morphophonological alternation. It is also the case that these alternations may extend to loanwords (e.g., *armada*, borrowed from Spanish undergoes flapping) and are sensitive to speech style (flapping, for example, may be suppressed in formal contexts). New segments may be created by automatic alternations (e.g., [ɾ] is not a phone that otherwise exists in English), although automatic alternations do not *have* to create new segments. Finally, this first type of alternation is not restricted to the word level (flapping occurs across word boundaries such as in 'a lot of stuff' [ə lɒɾ əv stʌf], Haspelmath & Sims 2010).

[1] We are grateful to Antonio Fábregas and two anonymous reviewers for their helpful comments on our manuscript. All errors are ours alone.

Morphophonological alternations, on the other hand, are morphologically or lexically conditioned (Bybee 1985, 2001; Dressler 1985; Haspelmath & Sims 2010; Schleef 2013; van Compernolle 2008). For example, we find English trisyllabic shortening only for certain suffixes and words, occurring with *national* but not *notional*). Morphophonological alternations may – although need not – involve segments that are not phonetically coherent (e.g., the vowels that undergo trisyllabic shortening do not form a natural class). These alternations are phonetically distant, as the vowels that differ as a result of the trisyllabic shortening of *nation* [eɪ] to *national* [æ] diverge in several features. This second type of alternation is typically restricted to derived environments (for example, *vitamin* [vaɪtəmɪn] does not generally undergo an alternation because it lacks a morphological trigger, although we note that the word is shortened in dialects of British English). Such alternations also do not extend to loanwords and are constant across speech-styles (i.e., attention to speech should not enable a speaker to suppress this type of alternation). Finally, for morphophonological alternations, new segments are seldom created (e.g., all vowels produced in trisyllabic shortening already exist in English) and the alternation does not occur across word boundaries (Haspelmath & Sims 2010). Nevertheless, Haspelmath and Sims note that some categories within their criteria may apply to either type of alternation, and, thus, some are more predictive than others. Specifically, although the extension of an alternation to loanwords, the creation of new segments, or the occurrence across word boundaries would provide strong evidence for an automatic alternation, the alternative outcome for these criteria (e.g., lack of an extension to loanwords or the absence of the creation of new segments) would not necessarily provide evidence for a morphophonological alternation, since these are all criteria that may, but not obligatorily so, indicate the presence of an automatic alternation. In the same vein, alternations between segments that are phonetically coherent could provide support for either an automatic or morphophonological alternation, whereas the lack of phonetic coherence would provide strong evidence for a morphophonological alternation. In these cases of ambiguity, additional criteria would need to be considered to confidently conclude the automatic or morphophonological status of the alternation.

Returning to vowel harmony, previous research has documented the harmonic alternations of Andalusia (Hualde & Sanders 1995; Jiménez & Lloret 2007; Lloret & Jiménez 2009; Rodriguez-Castellano & Palacio 1948; Sanders 1998; Soriano 2012) and Montañes (Hualde 1989, 1998; McCarthy 1984; Penny 1994, 2009; Picard 2001) and has at times appealed to conditioning. Nevertheless, no study has systematically compared the alternations of the two varieties using a comprehensive metric for determining automatic and morphophonological alternations (i.e., using a range of eight relevant criteria, rather than only the criterion of conditioning, Haspelmath & Sims 2010). Accordingly, the two principal research questions guiding the analysis are as follows:

1) What similarities and differences in the systems of harmonic processes can be noted for Eastern Andalusia and Northern Spain?
2) Are the harmonic processes in these varieties of Spanish more characteristic of automatic or morphophonological alternations? In each case, does either classification accurately capture the alternation that occurs?

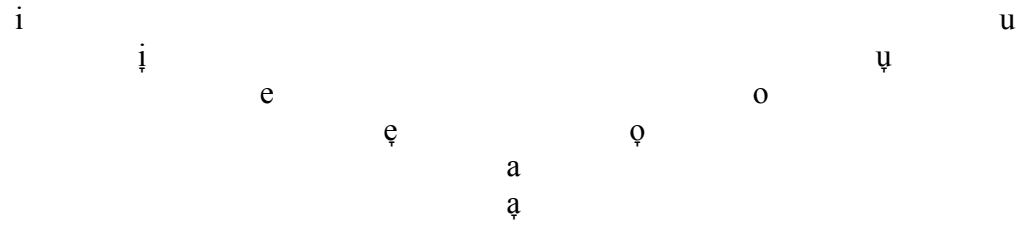
To address these research questions, a detailed description of the harmonic processes in each variety will be given. Each system will then be classified as an automatic or morphophonological alternation according to Haspelmath and Sims'

(2010) eight criteria outlined above, before revisiting the research questions and concluding with an alternative take on the binary distinction of canonical automatic and morphophonological alternations.

2. Eastern Andalusian Harmonic Processes

Eastern Andalusian Harmonic Processes comprise two distinct alternations – one triggered by morphology and the second triggered by phonology (Soriano 2012). For both alternations, Tongue Root Harmony results in the five-vowel system of standard Castilian Spanish [a, e, i, o, u] expanding to include lax segments [ạ, ɛ, ɔ] and, disputably, [i̱, u̱]. Exactly how many vowels are included in the Andalusian inventory is contested among three different accounts. While some authors have established a 10-vowel system, with an open vowel for every standard counterpart (Alvar 1955; Salvador 1957), others have posited a system with only nine vowels by excluding [u̱] (Salvador 1977). Finally, still others have provided evidence for an eight-vowel system that excludes the doubling of both high vowels [i̱, u̱] (Sanders 1994). The phonetic space of these vowels can be visualized in Figure 1 below, modeled after Salvador (1957).

Figure 1. Phonetic space of Eastern Andalusian Harmonic Processes



Although the exact number of vowels in the inventory is beyond the scope of the current study, what the arguments of Alvar (1955), Salvador (1957, 1977), and Sanders (1994) share is the phonemic nature of [ạ, ɛ, ɔ], which form minimal pairs as shown in (1) below (from Jiménez & Lloret 2007; Lloret & Jiménez 2009).

(1)	ve	ves
	be	bɛ
	see.3SG	see.2PL
	‘he/she sees’	‘you see’

The first harmonic alternation in Eastern Andalusian is VH that is triggered by the deletion of word-final morphological /s/, such as a plural marker or second person singular affix, and is spread throughout the domain – in this case the prosodic word (Jiménez & Lloret 2011). Despite the resulting absence of an overt morphological marker /s/ in second person forms, the second and third person conjugations are still semantically contrastive, as exemplified in (2) below (from Soriano 2012).

(2)	come	comes	coméis
	kome	kɔmɛ	kɔmɛj
	eat.3SG	eat.2SG	eat.2PL
	‘(s/he) eats’	‘(you SG) eat’	‘(you PL) eat’

Although seemingly similar, the second alternation in Eastern Andalusian is metaphony, rather than VH, that is triggered by the word-final deletion of any consonant (excluding nasals), including non-morphological /s/.[2] When such a segment is deleted, the vowel preceding the deleted segment becomes lax. However, spreading throughout the word does not occur. That is to say, the alternation is restricted to the preceding vowel and does not additionally apply to other vowels within the word. An example of this alternation is shown below in (3) (from Soriano 2012).

(3) yogur
ʒoɣu̯
yogur
'yogurt'

It should be noted, however, that many other varieties of Spanish also have deletion of both morphological and non-morphological /s/. Nevertheless, resolutions other than metaphony have developed to disambiguate meaning. These resolutions include voiceless gemination or compensatory lengthening of the following consonant in some parts of Andalusia ([bos.ke] → [bok.ke] 'forest'; Campos-Astorkiza 2003), fortition of preceding intervocalic approximants in the Canary Islands ([laðos] → [lado] 'sides'; Lipski 1994), and aspiration in many varieties including the Spanish of the Caribbean, Buenos Aires, and Central Colombia ([las kasas] → [lah kasah] 'the houses'; Hualde 2005; Lipski 2010; Penny 2000). Thus, metaphony is not an inherent consequence of /s/ weakening, but it does have a functional explanation in its creation of a semantic contrast where a contrast had been diminished, just as the function of compensatory lengthening, fortition, and aspiration is to contribute to the retention of the semantic material encoded in the weakened morphological /s/.

2.1 The automatic versus morphophonological nature of Eastern Andalusian Harmonic Processes

The morphologically and phonologically conditioned harmonic processes of Eastern Andalusia are similar in several ways, especially with regards to the criteria indicated by Haspelmath and Sims (2010). These characteristics will be discussed together, followed by the criteria for which they differ. First, both the morphologically and phonologically conditioned alternations involve the addition of the segments [ạ, ɛ, ɔ] and, disputably, [i̯, u̯] (Sanders 1998). Each tense and lax counterpart differs by only one feature, with only minor differences in F1 and F2 values (Sanders 1998), perhaps, though not definitively, suggesting that this alternation is automatic. Although they are phonetically close, the phonemic status of these segments indicates that new segments which do not exist elsewhere in the dialect are created, again suggesting a possible, though not necessarily, automatic alternation. Relatedly, these segments are phonetically coherent. Aside from their variation in the features [±back], [±round], [±front], and [±high], all of the segments are alike in their classification as [+syllabic], [-consonantal], [+approximant], [+sonorant], [+voice]. This formation of a natural class again points to an alternation that could be automatic. Both Eastern Andalusian processes are also related in that these alternations are not obligatory. This is suggested

[2] In the present study, we refer to the second Eastern Andalusian phenomenon as metaphony rather than VH because, as an anonymous reviewer notes, the phenomenon does not meet all definitions of VH, since a vowel is not spreading. Nevertheless, we note that some prior research does use the term VH in describing the second Eastern Andalusian phenomenon (Lloret & Jiménez 2009; Soriano 2012), although other work avoids the term (Hualde & Sanders 1995; Sanders 1994).

by Sanders (1998:109), whose participants were a selected group of speakers who demonstrated variability. That this alternation is variable within the variety also points to the alternation possibly being automatic. Though these three characteristics (i.e., formation of new segments, phonetic coherence, and optionality of production) can be signs of an automatic alternation, it is important to note that they are not prerequisite for such a classification and can also be characteristics demonstrated by morphophonological alternations. Furthermore, an alternation may have characteristics of both. The restriction of the alternation to the word-level, however, singularly suggests a morphophonological alternation. Whether the alternations can be applied to loanwords cannot be conclusively addressed, as this has not been attested in the literature.

Regarding characteristics for which the alternations differ, the restriction to a derived environment applies to morphologically, but not phonologically motivated alternations. Additionally, the phonologically motivated alternation is triggered by a non-morphological process, typical of an automatic alternation, whereas the morphologically motivated process is, of course, triggered by morphological /s/, which is characteristic of a morphophonological alternation. These two pieces of evidence suggest that these two processes may not belong to the same alternation type. Before attempting to classify each alternation as automatic or morphophonological, it is important to note that morphophonological alternations permit, but do not require phonetically coherent or close segments. In the case of the morphologically motivated alternation, morphological conditioning and restriction to the word level are telling signs of a morphophonological alternation, and thus outweigh the phonetic characteristics that may but do not obligatorily point toward an automatic alternation. Accordingly, the characteristics identified by Haspelmath and Sims (2010) lead to the classification of morphologically conditioned VH as a canonically morphophonological alternation, whereas the phonologically conditioned alternation is more characteristic of a canonically automatic alternation. The characteristics used in classifying the alternations are summarized in Table 1. Qualities that can, but do not necessarily, point to an automatic alteration are listed as being ‘likely automatic’. The most decisive characteristics are presented first, followed by the characteristics that do not give definitive evidence of either type of alternation.

Table 1. Summary classification of Eastern Andalusian Harmonic Processes as morphophonological or automatic

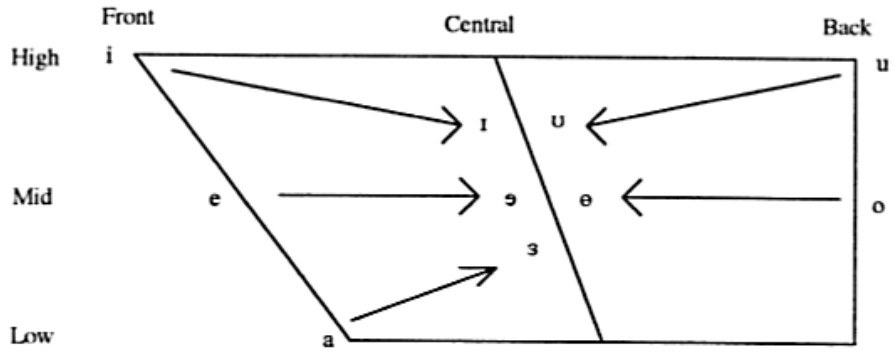
Morphologically Conditioned Vowel Harmony		**Phonologically Conditioned Metaphony**	
Characteristic	**Typically Classifies**	**Characteristic**	**Typically Classifies**
Restricted to derived environment	Morphophonological	Not restricted to derived environment	Automatic
Morphological conditioning	Morphophonological	Non-morphological conditioning	Automatic
Word-level restrictions	Morphophonological	Word-level restrictions	Morphophonological
Phonetically coherent	Likely automatic	Phonetically coherent	Likely automatic
Creation of new segments	Likely automatic	Creation of new segments	Likely automatic
Non-obligatory status	Likely automatic	Non-obligatory status	Likely automatic
Phonetically close	Likely automatic	Phonetically close	Likely automatic
Application to loanwords	Indeterminate	Application to loanwords	Indeterminate
Preliminary conclusion: ***morphophonological***		Preliminary conclusion: ***likely automatic***	

3. Montañes Vowel Harmony

The VH found in Montañes, Cantabria, is quite distinct from the Eastern Andalusian Harmonic Processes. Although several sub-varieties of Montañes apply VH alternations, the current study focuses on Pasiego, due to the existing literature on this variety, which enables a suitable analysis (e.g., Hualde 1989; Jiménez & Lloret 2011; McCarthy 1984; Picard 2001). Pasiego is spoken in Valles Pasiegos, situated approximately 40 kilometers south of Spain's northern coast. Two independent VH alternations will be examined – (1) centralization, a form of Tense/Lax Harmony, and (2) Height Harmony.

Centralization occurs when a word-final high back vowel spreads throughout the prosodic word (Hualde 1989; McCarthy 1984; Picard 2001). The centralization of the five standard vowels of Castilian Spanish creates five new segments [ɜ, ɘ, ɪ, ɵ, ʊ] per IPA standards, as shown in Figure 2. However, these segments have been represented as [A, E, I, O, U] in the literature and will therefore be represented as such in the present study. Each centralized vowel is phonemically contrastive from its non-centralized counterpart (McCarthy 1984).

Figure 2. Phonological changes due to centralization (from Picard 2001)



The target for this alternation is the prosodic word. The trigger of this VH is the high, back, unstressed, word-final /u/, appearing to be phonologically motivated. However, the question of phonological versus morphological motivation is complicated by the appearance of /u/ only as a masculine singular count noun (4a) or adjective suffix (4b) (from Hualde 1989).

(4)	(a) Count noun	(b) Adjective
	soldado	sucio
	sOldÁU	sÚθyo
	soldier.MASC.SG	dirty.MASC.SG
	‘soldier’	‘dirty’

Although McCarthy (1984) takes this as evidence for morphological conditioning, the existence of other masculine singular count nouns and adjectives that do not end in /u/ and that do not trigger VH suggest that this may, instead, be a phonologically motivated alternation (Hualde 1989).[3] For example, *picazón* is a masculine singular count noun that does not trigger centralization, due to its non /-u/ ending, as exemplified in (5a; Hualde 1989). Similarly, adjectives with suffixes other than masculine singular also do not undergo centralization (5b; Picard 2001), nor do verbs of any person or number (5c; McCarthy 1984).

(5)	a. Mass noun	b. Adjective	c. Verb
	picazón	sucios	sintís
	pikaθón	súθyos	sintís
	itching.MASC.SG	dirty.MASC.PL	feel.PRS.2PL
	‘itching’	‘dirty’	‘(you PL) feel’

In addition to centralization, the second type of VH attested in Montañes is Height Harmony, or tongue-height assimilation. This alternation is distinct from the others mentioned thus far because the trigger is not a word-final consonant or vowel, but rather the stressed vowel. The target, then, is any mid vowel to the left of the stressed vowel within the domain of the prosodic word, shown in (6) (from Hualde 1989) below.

[3] As an anonymous reviewer notes, the existence of non-morphological [u] would provide greater evidence of a phonologically-motivated alternation. Nevertheless, such examples have not been attested for Pasiego.

(6) por el camino
pU- I kAmÍnU
by- DET.MASC.SING. path.MASC.SING
'by the path'

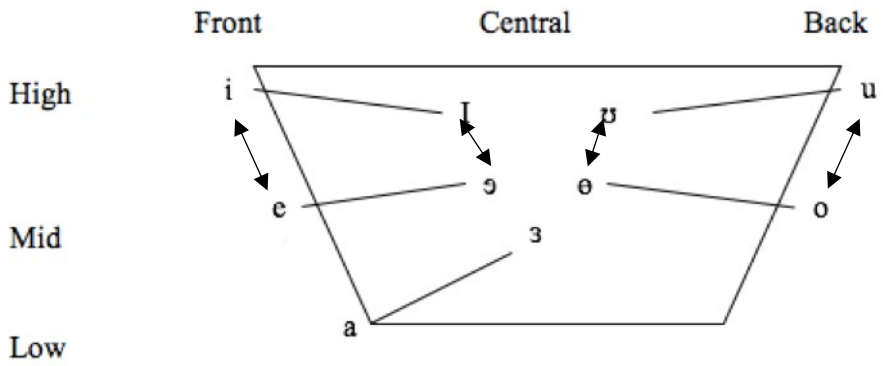
No new segments beyond those that were introduced for centralization are created. Height harmony simply requires that in addition to an agreement of tenseness, vowels within the domain must also agree in tongue height. Three different sets of vowels, with examples of each, as shown in Figure 3, demonstrate the respective groupings, with each set containing both tense and centralized, lax vowels.

Figure 3. Vowel height corresponding with Height Harmony (adapted from McCarthy 1984)

Set 1- [+high]	i [míya] I [mÍyU]		u [simpátikus] U [sImpÁtIkU]
Set 2- [-high]	e [érmAnU]		o [sóldaus] O [sÓldÁU]
Set 3- Neutral		A [mÁlU] a [mála]	

With the triggering, stressed vowel, all targeted vowels in the domain then raise or lower to the vowel set that corresponds to the stressed vowel, as can be seen in Figure 4. In other words, if the stressed vowel is /o/, belonging to Set 2, other vowels in the domain must also shift to vowels within Set 2. Vowels from Set 1 cannot combine with vowels from Set 2 within the same prosodic word. Vowels from Set 3 are neutral in that they are excluded from Height Harmony. They can mix freely with vowels from Sets 1 and 2. No lax counterpart of /e/ exists; such a segment would be realized as the tense /e/. With the lowercase, tense vowels, representing the five-vowel system of standard Castilian Spanish, and the uppercase vowels representing the tense, centralized vowels created by Tense/Lax Harmony, it is apparent that Height Harmony does not create new segments.

Figure 4. Vowel chart illustrating the phonetic space of Height Harmony (Picard 2001)



It should be noted that, while centralization and Height Harmony are independent alternations, centralization is limited, occurring specifically in masculine singular count nouns and adjectives. On the other hand, Height Harmony, due to being triggered by a stressed vowel, present in every prosodic word, is a pervasive alternation within

Montañes. In other words, Height Harmony can occur without centralization, but centralization does not occur without Height Harmony, as shown in (7). The singular form undergoes centralization triggered by word final /u/ which is then spread throughout the prosodic word. This intermediate stage is seen in (7a). Additionally, the stressed vowel, /I/, triggers recursive Height Harmony that raises vowels from Set 2 to Set 1 in order to correspond with /I/, as seen in (7b) (from McCarthy 1984).

(7) con el maestro

a. kOn el mAyestɾO

b. kUn Il mAyIstɾU

with DET.MASC.SG. teacher.MASC.SG

'with the teacher'

3.1 The automatic versus morphophonological nature of Montañes VH

Similar to the two Eastern Andalusian Harmonic Processes, the characteristics that are shared between centralization and Height Harmony in Montañes will be discussed together, followed by the criteria for which they differ. Both centralization and Height Harmony involve segments that are phonetically close. For centralization, the shift from [a, e, i, o, u] to [ɜ, ɘ, ɪ, ɵ, ʊ] involves only a change in the feature [±tense] (McCarthy 1984). In the case of Height Harmony, [+high] vowels become [-high, -low] and [-high, -low] vowels become [+high]. All other features are maintained. Similarly, all segments are alike in the features [+syllabic], [-consonantal], [+approximant], [+sonorant], and [+voice], thus forming a natural class. Furthermore, centralization and Height Harmony are phonologically conditioned. Finally, both types of VH in Montañes are not applied obligatorily, meaning that some speakers suppress these processes, as demonstrated by findings that both centralization and Height Harmony are associated with lower levels of education, predominantly rural areas, and unguarded speech styles (Penny 2009).

As was the case with the Eastern Andalusian phenomena, these characteristics might suggest that this form of VH is automatic, although they do not disqualify the possibility of it being morphophonological. Nevertheless, the restriction of both alternations to the prosodic word (Hualde 1989), as opposed to across word boundaries, points toward this being a morphophonological alternation.

Centralization and Height Harmony differ with regards to creating new segments. Centralization leads to the creation of [ɜ, ɘ, ɪ, ɵ, ʊ], which are phonemically contrastive with [a, e, i, o, u] (McCarthy 1984), possibly suggesting an automatic alternation. Height Harmony, on the other hand, although it involves height assimilation, does not create new segments and thus suggests a morphophonological alternation. Though there is not enough data in the previous literature to comment on the application of centralization to loanwords, McCarthy (1984) notes that Height Harmony does not apply to loanwords, again pointing to a morphophonological alternation.

Taking these criteria into consideration holistically reveals that the distinction between automatic and morphophonological alternations in Montañes is even less delineated than in Eastern Andalusia. While centralization shares many of the features of an automatic alternation, Height Harmony presents more of a challenge. Namely, three characteristics point toward its classification as a morphophonological alternation and two indicate an automatic classification. The phonetic distance, phonetic coherency, and non-obligatory status characteristics do not decisively classify the alternation as either type. With these considerations in mind, conditioning – typically the most telling predictor – would usually be the decisive indicator. Since it is not restricted to a derived environment and does not result from morphological

conditioning, Height Harmony appears to be more characteristic of an automatic than a morphophonological alternation. These classifications are summarized in Table 2.

Table 2. Summary of classification of centralization and Height Harmony in Montañes as morphophonological or automatic alternations

Centralization		**Height Harmony**	
Characteristic	**Typically Classifies**	**Characteristic**	**Typically Classifies**
Not restricted to derived environment	Automatic	Not restricted to derived environment	Automatic
Non-morphological conditioning	Automatic	Non-morphological conditioning	Automatic
Word-level restrictions	Morphophonological	Word-level restrictions	Morphophonological
Phonetically coherent	Likely automatic	Phonetically coherent	Likely automatic
Creation of new segments	Likely automatic	No creation of new segments	Morphophonological
Non-obligatory status	Likely automatic	Non-obligatory status	Likely automatic
Phonetically close	Likely automatic	Phonetically close	Likely automatic
Application to loanwords	Indeterminate	Non-application to loanwords	Morphophonological
Preliminary conclusion: ***automatic***		Preliminary conclusion: ***likely automatic***	

4. Discussion

We now return to the research questions which guided the present investigation. The first research question considered the similarities and differences of the harmonic systems in Eastern Andalusia and Northern Spain (i.e., Cantabria). Not only are the triggers and targets different between each region, but they also vary depending upon the phenomenon within each region, briefly summarized in Table 3.

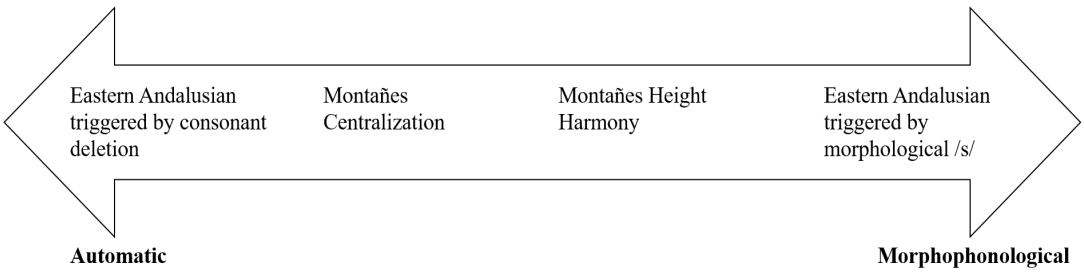
Table 3. Summary of harmonic processes in Eastern Andalusia and Montañes

	Eastern Andalusia		**Montañes**	
	Morphological VH	**Phonological Metaphony**	**Height Harmony**	**Centralization**
Trigger	Morphological /s/	Deletion of word-final consonant (excluding nasals)	Stressed vowel	Word-final high back vowel /u/
Target	Prosodic word	Vowel preceding deleted consonant	Mid vowels left of the stressed vowel within prosodic word	Prosodic word

The second research question considered whether harmonic processes in Eastern Andalusia and Montañes were more characteristic of automatic or morphophonological

alternations. Although the typical forced binary classification was made, it became evident that the four alternations examined cannot all be neatly categorized in this way. Rather, these alternations can be considered relative to one another and are better thought of as existing along a continuum. Morphologically conditioned VH in Eastern Andalusian is canonically automatic, while phonologically conditioned Eastern Andalusian Metaphony is canonically morphophonological. However, the case of Montañes VH is much less transparent. Centralization can be somewhat neatly, though not indisputably, classified as automatic. Height Harmony, on the other hand, seems to fall roughly in the middle of the continuum. Ultimately, its phonological conditioning was appealed to, which tipped the scales of an otherwise very balanced comparison. The proposed continuum for the aforementioned four phenomena is illustrated in Figure 5.

Figure 5. Illustration of harmonic processes as a continuum of automatic and morphophonological alternations



Returning to the idea that Height Harmony is a more pervasive process than centralization, it is somewhat counterintuitive that Height Harmony is the less canonically automatic alternation of the two. Nevertheless, it would be predicted that a more frequently occurring alternation would be more likely to become morphophonological over time, although this is certainly not a requirement (Bybee 1985, 2001; Dressler 1985; Kaisse & McMahon 2011). This shift from an automatic to morphophonological alternation over time may occur diachronically due to a shifting of the alternation's underlying representation towards that of the surface representation, leading speakers to reanalyze the alternation (Haspelmath & Sims 2010; Joseph & Janda 1988; Wurzel 1980). For example, the finding that morphophonological processes can gain pervasiveness over automatic alternations is consistent with what has been documented for other phenomena of language change, such as Finnish stem-final vowel alternations (Anttila 2002). Within these Finnish alternations, phonology was previously the dominant conditioner, with morphology emerging only in cases in which the phonology was underdetermined. That is, what began as a phonologically conditioned alternation became morphological in specific environments.

Similarly, although Kaisse and McMahon (2011) also provide many examples in support of this transition from phonological to morphological (i.e., post-lexical to lexical), they also note the limitations of these classifications such that the data do not fully support the Lexical Phonology and Morphology theory (Kiparsky 1982) – for which post-lexical and lexical classifications bear many similarities to the automatic/morphophonological dichotomy discussed here. In other words, prior work also points to the shortcomings of binary distinctions that seem better resolved by considering to what extent a particular phenomenon may demonstrate characteristics of two different processes (Kaisse & McMahon 2011), which adds to the compelling case

to consider phenomena relative to each other rather than absolutely belonging to one type of process or another.

Furthermore, prior research has offered nuanced methods for classifying alternations that are congruent with those presented in the current study. For example, the Revised Alternation Condition and the Strict Cycle Condition have been compared to determine how accurately and elegantly each accounts for alternations in nonderived environments cross-linguistically (Kiparksy 1993). Accordingly, although each condition offers certain strengths in accounting for alternations in nonderived environments, a new interpretation of the classification conditions provides improved combinatorial accuracy in accounting for attested forms with elegance (Kiparsky 1993). Taken in conjunction with the present study, we see further evidence for nonbinary distinctions yielding nuanced conclusions that are greater than the sum of the component parts of prior distinctions.

In sum, the present study has taken four Peninsular phenomena and first identified characteristics for each that are associated with canonically morphophonological and canonically automatic alternations. Next, crucially, the study has revealed that the four phenomena are comprised of a range of characteristics, which makes determining an ultimate classification a decision that is far from binary. Rather, the relationship is best represented on a nuanced continuum, with the two Eastern Andalusian harmonic processes falling on the ends of the continuum and the Montañes VH processes falling between these two extremes.

5. Conclusion

Overall, the present analysis has provided a more nuanced account of vowel harmony and metaphony in Peninsular Spanish than had been performed previously. The study also presented evidence for automatic and morphophonological variability within the varieties examined. Nevertheless, the study utilized examples documented from the previous body of literature; future research will benefit from considering new sources of data collection. Due to the data source of the present investigation, the application of loanwords to centralization and both Eastern Andalusian processes could not be considered in the analysis, since such borrowings were absent from the existing body of work. Future studies will do well to incorporate data elicitation to be able to use application to loanwords as a factor in the analysis, in addition to determining whether the descriptions of the other criteria are accurate for present-day speech.

Although the previous literature had used one criterion (i.e., conditioning) to examine each alternation as being phonologically or morphologically conditioned, the seven other criteria appealed to in the present study had not been systematically examined (Haspelmath & Sims 2010). Thus, such an analysis has provided a fresh perspective on the nature of harmonic alternations in Peninsular Spanish. Furthermore, and of greater consequence, the present study has offered the conclusion that these alternations are best represented on a continuum, which is a unique contribution to the literature on VH and metaphony in Peninsular Spanish.

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