Vowel contact resolutions across word boundaries in Catalan

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ABSTRACT

The goal of this article is to account for the resolution of vowel sequences across word boundaries in Catalan. Specifically, the paper accounts for the vowel resolutions between lexical word boundaries when V2 is a stressed vowel. The blocking of V1 glide formation will be put in relation with the systematic maintenance of schwa in this position (*cant*[i] *ara* 'I sing.subj now', *cant*[u] *ara* 'I sing now', *cant*[ə] *ara* 'he/she sings now'). That is, the final vowel of the first word does not undergo any change if it is followed by a lexically stressed vowel. Blocking of glide formation or schwa elision is not due to a stress clash, as almost all studies in this field have stated, but to the application of two alignment constraints which align the lexically stressed foot to the left edge of the prosodic word and the nuclear stressed vowels to the same position. These alignment constraints trigger a 'prosodic isolation' phenomenon which blocks any process of gliding or deletion.

1. INTRODUCTION

In Catalan, vowel contact resolutions are resolved in different ways according to three different factors: a) the sonority scale of the vowel sequence; b) the position of the vowel sequence in relation to the morpheme, the morpheme boundaries or the word boundaries; and c) the position of the prominent syllables in relation to the vowel sequence (initial word prominence, lexical stress and phrasal stress). Some other factors, such as syllable structure (closed vs. open) or syntactic categories of the related words, also have an effect on vowel sandhi. As stated in [1], root-initial syllables, roots and stressed syllables are some of the privileged positions that are crosslinguistically prominent in opposition to non-initial syllables, function words, clitics or affixes, and unstressed syllables; so prominent positions are more prone to be unchanged in the output form.

The behavior of unstressed high vowels as vowels or glides within words has been studied in detail ([2-9]). The results show that morphological boundaries block glide formation in falling sonority sequences (*poss*[əi]*dor*

'owner', *esmort*[əi]*dor* 'softening') but do not have any effect in rising sonority sequences (*som*[jə]*dor* 'dreamer', *concil*[jə]*dor* conciliatory'). This opposite behavior can be interpreted in terms of prominent positions in the sense that vowels at the beginning of the suffix are more salient than those at the end of the root. Thus, high vowels become glides in rising sonority sequences because they are located at the end of the root-morpheme, but remain unchanged in falling sonority sequences because of their relatively prominent position at the beginning of the suffix. On the other hand, word-initial prominence is reflected in the maintenance of high vowels as vowels at the initial syllable of the word if the lexical stress is no more than two syllables away from this vowel (e.g., *t*[i'o] 'log', *d*[i'a]*na* 'target', *d*[iə]*dema* 'diadem'). When the distance to the stressed syllable increases, gliding occurs (*d*[jə]*demeta* 'small diadem', *var*[jə]*c*['jo] 'variation', *històr*[jə] 'history') [NB: throughout the article, stressed syllables are marked in boldface].

Across word-boundaries both rising and falling diphthongs are possible in unstressed sequences (e.g., *fac*[j] *amigues*, 'he/she makes.subj friends', *dóna* [j]*matges* 'he/she/it gives images'). In other prosodic contexts rising sonority sequences are more resistant to glide formation than falling sonority sequences. When a word ends in a stressed vowel and the following word begins with a high vowel, the most general outcome is a falling diphthong (e.g., *cafè* [j]*rlandès* 'Irish coffee', *comprà* [w]*lleres* 'he/she bought glasses'). Conversely, when a word ends in an unstressed high vowel and the following word starts with a stressed vowel, glide formation is less prone to occur (e.g., *cant*[u] *àries* 'I sing arias', *begu*[i] *aigua* 'he/she/it drinks.subj water'). Many authors have claimed that in the rising sonority cases stress clash competes with the onset condition, preventing glide formation from applying ([2], [4], [5], [10], [9]).

The goal of this paper is to account for the resolution of vowel sequences across word-boundaries in Central Catalan in these two specific contexts (that is, unstressed V1 followed by stressed V2, and, conversely, stressed V1 followed by unstressed V2) and report some new findings coming from the transcription of a corpus of Catalan spontaneous speech (COC, Corpus Oral de Català). The data clearly demonstrates that stress clash is not what blocks glide formation from applying in rising sonority

sequences, as has been noted by [11] and [6]: thus, *don*[i ˈɛ]*ines* 'he/she/it gives.subj tools', *cant*[u ˈɔ]*pera* 'I sing opera' or *pos*[i ˈa]*igua* 'he/she pours.subj. water' are produced with a hiatus, as are *compra-l*[i ˈɔ]*li* 'buy oil for him), *facin-h*[u ˈa]*ra* 'you do it now' or *anàlis*[i ˈɔ]*ptica* 'optical analysis', even though in the latter cases there is no risk of stress clash emerging if glide formation applies. On the other hand, it will be shown that schwa-deletion follows the same pattern as high vowels, namely, that hiatus is the general outcome in this context: thus, sentences such as *amig*[ə ˈi]*ntima* 'intimate friend', *amig*[ə ˈɔ]*rfena* 'orphan friend', *posa-te-l*[ə ˈa]*ra* 'put it on now' are resolved with no schwa deletion.

The paper is organized as follows. Section 2 presents the data on vowel sandhi in Catalan in cases when V2 is a stressed vowel [a, ɛ, e, i, ɔ, o, u] in comparison with the opposite situation (that is, when V1 is a stressed vowel) as well as a brief overview of the literature on vowel sandhi in other Romance languages. Section 3 presents an interpretation of the data within the Optimality Theory framework, in which it is shown that the reason for blocking glide formation or deletion is not a stress clash avoidance condition but an alignment constraint which associates the lexical stress of the initial vowel with the prosodic word when it coincides with the nuclear stress of the sentence.

2.   DATA

Vowel resolutions across word boundaries work differently from vowel contacts inside the word in the sense that the opposition between falling and rising sequences is not crucial. Stressed vowels in word-initial position are parsed as separate syllables in the surface representation and thus tend to prevent both gliding or deletion from the previous syllable. As is shown in (1), this fact is independent of the distance to the stress of the preceding word: thus, stress clash does not play a crucial role in the maintenance of hiatus. Notice that V1 has the same behavior in groups (1a), (1b) and (1c), demonstrating that gliding and/or deletion processes are independent of the distance between stresses. Also, note that the transcriptions in (1a) erase the first stress in a stress clash situation, as contended by [5] and [15].

(1)   a.   ˈV ## ˈV   b. ˈV . V ## ˈV
      camí únic [iˈu]   demano eines [uˈɛ]
      camí alt [iˈa]   amiga òrfena [əˈɔ]
      cantar indi [aˈi]   faci anys [iˈa]
      xampú òptim [uˈɔ]   article àrab [əˈa]
      cafè àrab [[ɛˈa]   desprenia èter [əˈɛ]
      tabú únic [[uˈu]   canti himnes [iˈi]

      c.   ˈV . (V) . V . V ## ˈV
      anàlisi única [iˈu]
      canta-me-li òpera [iˈɔ]

catàstrofe única [əˈu]
posa-te-la ara [əˈa]
sàpiga obres [əˈɔ]
anàlisi híbrida [iˈi]

When V1 is a schwa and belongs to a function word, a lexicalized form or a clitic (proclitic), deletion is the general norm: *pobre home* [ɔ] 'poor man', *aquella hora* [ɔ] 'that time', *quinze anys* [a] 'fifteen years', *una eina* [ɛ] 'a tool', *l*(a) *obro* [ɔ] 'I open it'. Other clitics such as the conjunction *que* have a different behavior depending on the modality of the sentence. If the utterance is a statement, deletion is the normal outcome: *No vull que obris* [ɔ] 'I do not want you to open it'. If the utterance is interrogative or imperative both results are possible: nevertheless, the vowel tends not to delete when the utterance is short and the intonational contour has to be realized in the (short) available segmental material: *que obres?* 'Can you open it?' *que obris!* 'Open it!' [ɔ] / [əˈɔ]. On the other hand, clitic pronouns such as *ho* [u] and *hi* [i] are quite resistant to becoming glides when a preceding consonant occupies the onset position: *li obro* [iˈɔ] 'I open it for him', *t'ho obro* [uˈɔ] 'I open it to you'; if that is not the case, both outcomes (diphthong or hiatus) are possible depending on the rate of speech and the degree of prominence of the stress: *hi era* [iˈe] / [ˈje] 'he/she/it was there', *ho entro* [uˈe] / [ˈwe] 'I bring it in'.

On the other hand, the data show a clear contrast between vowel contact resolutions involving different degrees of prominence: that is, when phrasal main stress (or focal stress) is involved hiatuses are more prone to occur than when word stress is subordinated in the phrase (e.g., *parl*[iˈa]*ra* 'he/she talks.subj now' vs. *parl*[ja]*ra mateix* 'he/she talks.subj immediately'; *parl*[əˈa]*ra* 'you talk now' vs. *parl*[a]*ra mateix* 'you talk immediately', *alg*[uˈɔ]*bre* 'someone opens it' vs. *alg*[wɔ]*bre la po rta* 'someone opens the door'). By way of comparison, the same phenomenon can be observed in Brazilian and European Portuguese (e.g., *Ele cómpr*[u]*vas caras* 'She bought expensive grapes' vs. **Ele compr*[ˈu]*vas* 'She bought grapes'; see [12], [13], [14]). In Brazilian Portuguese we can observe the same result when V1 is /a/. In other cases V1 becomes a glide but will never be deleted (e.g. *coma uvas* [aˈu] 'he/she eats.subj grapes', *come uvas* [ˈju] 'he/she eats grapes', *como uvas* [ˈwu] 'I eat grapes'; [13: p.159]. The blocking effects of nuclear (or sentence-) stress have also been observed in Spanish (e.g., *sagrad*[aˈu]*rna* 'sacred urn'; [16: p.152], [21]).

In contrast with stressed vowels in word-initial position, stressed vowels in word-final position do not prevent V2 glide formation or deletion from applying. As is shown in (2), glide formation and schwa-deletion is the general solution at a normal speech rate and when the schwa belongs to a closed syllable.

(2) a. Schwa deletion   b. Glide formation
    camí enfangat [i]   xampú idoni [uj].
    sabó especial [o]   camí ombrívol [iw]
    paté andorrà [e]   cançó illenca [oj]
    xampú excel·lent [u]   sabó olorós [ow]
    cafè antic [ɛ]   pagar interessos [aj]
    això encara [ɔ]   cafè irlandès [ɛj]

In cases with a schwa belonging to an open syllable, the vowel sonority scale has to be taken into account since not only high vowels but also the less sonorous vowel in the sequence become glides, proving that the stress of V1 is eliminated, as shown in (3). This fact corroborates the results in [15], which show that sequences such as *camí net* 'clean path' —with stress clash— and *caminet* 'small path' —with only one stress— are homophonous in normal speech. On the other hand, there is a gradation in the deletion of schwa. Even though some dialects tend to delete schwa in all contexts, we can observe a resistance to deletion depending on vowel height features of the two vowels.

(3) a. Schwa deletion   b. Glide formation
    sofà elegant [a]   tabú amorós [wə]
    cafè aromàtic [ɛ]   vestir elegant [jə]
    això allunya [ɔ]   sabó adient [o̞ə]
          paper aromàtic [e̞ə]

In spite of the weakness of [ə], it is resistant to deletion in contact with other high vowels, as shown in (3b). This can also be understood as a consequence of initial root prominence. When the schwa is deleted in closed syllables (in 2a), the coda consonant remains as a representation of this initial prominence. These facts corroborate in part Casali's crosslinguistic results [17] that languages preferentially preserve phonological elements in prominent positions (cf. V2).

3. PROMINENCE AND ALIGNMENT CONDITIONS

Generalized Alignment [18], developed within the Optimality Theory framework [19], has adapted the notion of edge alignment from [20], ALIGN-XP. OT constraints are ranked and violable. In the cases at hand, that is, when V2 is a stressed vowel, it is claimed that the alignment constraint ALIGN(STRESS-FOOT, LEFT, PW, LEFT), which aligns stressed vowels to the left boundary of prosodic words, is what causes the blocking of deletion or glide formation, as shown by the two tableaux in (4). The apparent faithfulness of V1 to the word-final position is not triggered by the singular and specific behavior of Catalan in opposition to the universal prominent positions, neither to a stress clash avoidance condition (as has been claimed in the literature), but to the high ranking position

of an alignment constraint which 'aligns' the initial prominent root position with the main word stress. The result of this is that word-initial syllables are 'isolated' from the preceding syllables, blocking schwa deletion and glide formation of V1 from applying. Note that Onset enforces the application of either gliding or deletion depending on other requirements that are not made explicit here.

(4) a.

canta-li òpera	AlignL Ft-Pw	Onset
☞ canta-l[iˈɔ]pera		*
canta-l[ˈjɔ]pera	*!	

b.

catàstrofe única	AlignL Ft-Pw	Onset
☞ catàstrof[əˈu]nica		*
catàstrof[ˈu]nica	*!	

When the same ranking is applied to cases in (2) and (3) above (that is, stressed V1 plus unstressed V2), the alignment constraint AlignL Ft-Pw is not violated by the data. Consequently, gliding and vowel deletion are the general norm in these cases:

(5) a.

cançó illenca	AlignL Ft-Pw	Onset
☞ canç[oj]llenca		
canç[oi]llenca		*!

b.

sofà elegant	AlignL Ft-Pw	Onset
☞ sof[a]legant		
sof[aə]legant		*!

To account for the effect of the degrees of prominence that we have seen above, we propose the alignment constraint ALIGN(NUC-STRESS, LEFT, PW, LEFT) which aligns nuclear (or sentence-) stressed vowels to the left boundary of prosodic words. This constraint explains the different behavior of V1 when the sentence stress is on V2 or it has been moved to the right (cf. *canti ara* 'you sing now' vs. *canti ara mateix* 'you sing immediately').

As mentioned before, this analysis allows for a unified analysis of vowel sandhi resolutions in Catalan involving both gliding and deletion processes. Basically, nuclei properties in Catalan are maintained to preserve both word-initial prominence and sentence-stress prominence. In other words, the syllabic properties in word-initial position are only maintained when they are 'protected' by stress, indicating that faithfulness to word initial prominent positions is acting together with faithfulness to prosodic heads.

4. CONCLUSIONS

Let us summarize the descriptive results obtained in this article:

—V1 doesn't delete or become a glide if V2 carries the main stress of the sentence.

—V1 loses its word stress when followed by a stressed lexical word because it can become a glide.

—Schwa deletion is the general outcome in V2 position in closed syllables or those preceded by lower vowels.

The inalterability of V1 when V2 is stressed cannot be explained by stress clash avoidance conditions (as almost all studies in this field have stated) since the lexical stress of the first word is deleted. Moreover, the results are always the same regardless of the position of the stress. Finally, the blocking of V1 gliding/deletion is interpreted as a consequence of the application of two alignment constraints (AlignL Ft-Pw and AlignL NucStress-Pw) which trigger the prosodic 'isolation' from the previous sequence and block any process of gliding or deletion from applying.

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