SEGMENTAL AND FEATURAL STRATEGIES TO AVOID ADJACENT SIBILANT SEGMENTS IN BALEARIC CATALAN. AN OPTIMALITY-THEORETICAL ACCOUNT*

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The purpose of this paper is to provide an Optimality-theoretical account of the different strategies triggered to avoid adjacent sibilant segments in Balearic Catalan (BC). In BC, adjacent sibilant segments are systematically avoided. The processes triggered due to this fact differ according to the dialectal variety, the domain of application, and the featural configuration of the consonants involved.

1. Data

As it can be seen in (1a), in Majorcan Catalan (MaC), a sequence of an alveolar sibilant consonant followed by a sibilant segment is resolved through a process of manner dissimilation, which gives a sequence of a stop followed by an affricate as a result. When the first segment of the cluster is palatal, a process of gliding with independent motivations applies (1b). The consonant affected by the process of dissimilation is always the one placed in coda position.

(1) Majorcan Catalan
a. tros sencer /tɾɔs#sɔn`sɔr/ [tɾɔts `sɔŋ `sɔ] ‘(the) whole piece’ (cf. tros [tɾɔs])
   tros gelat /tɾɔs#gel+a+d/ [tɾɔts `dʒel+a+d] ‘frozen piece’ (cf. tros [tɾɔs])
b. mateix suc /mɑªtei`tʃ#suk/ [mAªtei `ʃuk] ‘(the) same juice’ (cf. mateix [mAªtei])
   mateix joc /mɑªtei`tʃ#dɔk/ [mAªtei `dɔk] ‘(the) same game’ (cf. mateix [mAªtei])
   mateix tros /mɑªtei`tɾɔs/ [mAªtei `tɾɔs] ‘(the) same piece’ (cf. mateix [mAªtei])

In Minorcan Catalan (MiC), we find the process of manner dissimilation in the same contexts as in MaC, and when the first consonant is palatal as well (2a,

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b). As shown in (2c), in the varieties of MiC spoken in Ciutadella and Ferreries, a process of gliding or split is triggered when the first consonant of the cluster is palatal.

(2) Minorcan Catalan

a. All varieties

tros sencer /tɾo:s#sənsəɾ/ [tɾo.ʃəns.ʃəɾ] ‘(the) whole piece’
tros gelat /tɾo:s#ʒel+a+d/ [tɾo.ʃdʒəl.əd] ‘frozen piece’

b. Minorcan Catalan (general)

mateix joc /ma.teɨx.ʒok/ [ma.tə.jə.kə] ‘(the) same game’

mateix xalet /ma.teɨx.ʃəlet/ [ma.tə.ʃəl.ət] ‘(the) same house’

mateix suc /ma.teɨx.ʃuk/ [ma.tə.ʃək] ‘(the) same juice’

c. Minorcan Catalan (Ciutadella & Ferreries)

mateix joc /ma.teɨx.ʒok/ [ma.tə.jə.kə] ‘(the) same game’

mateix sol /ma.teɨx.ʃuk/ [ma.tə.ʃək] ‘(the) same juice’

In Eivissan Catalan (EC), a process of deletion/fusion applies, as it does occur in the rest of Catalan varieties. The resultant consonant of the process coincides with the consonant placed in second position (3a, b). If the first consonant is palatal and the second is alveolar, however, a strict process of fusion applies. The result of this process is a retracted alveolar sibilant consonant, which reflects a case of segmental coalescence (3c).

(3) Eivissan Catalan

a. tros sencer /tɾo:s#sənsəɾ/ [tɾo.ʃəns.ʃəɾ] ‘(the) whole piece’
tros gelat /tɾo:s#ʒel+a+d/ [tɾo.ʃdʒəl.əd] ‘frozen piece’

b. mateix joc /ma.teɨx.ʒok/ [ma.tə.jə.kə] ‘(the) same game’

c. mateix suc /ma.teɨx.ʃuk/ [ma.tə.ʃək] ‘(the) same juice’

Except for some unproductive cases, all these dialectal varieties show a process of epenthesis in lexical heteromorphemic sibilant clusters (4).2

(4) Balearic Catalan

cuses /kuz+ʒ/ [kuz.ʒəs] ‘(you) sew’ (cf. sents [ˈsens] ‘(you) hear’)

felices /fəliz+ʒ/ [fa.ʃli.ʃəs] ‘happy (fem. plur.)’ (cf. útils [ˈu.tiləs] ‘useful’ (pl.))

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1 For an analysis framed on autosegmental phonology of the strategies triggered when a palatal segment is involved, see Palmada (1994a), and for an analysis of these strategies within the framework of OT, see Pons (2003b).

2 For expository reasons, these data concerning lexical clusters will not be analyzed in the present paper. The analysis of these lexical sequences can be found in Bonet & Lloret & Mascaró (2003a, b) and Pons (in preparation).
As it can be seen in the previous examples, the strategies triggered to avoid the adjacency of sibilant segments can differ according to the level of application, the dialectal variety, and the consonants involved. As for the level of application, we have seen that in the lexical level a process of epenthesis applies in all the dialectal varieties, whereas in the postlexical level other strategies are triggered. In this level, the type of processes triggered depends on the dialectal variety and the type of consonants involved. In MaC and MiC, we generally find a process of manner dissimilation. In contrast, EC shows a process of deletion/fusion. The nature of the consonants is also relevant for the resolution of the process: when the first consonant of the cluster is a palatal segment, processes like gliding, split, and fusion take place. This fact can be related to the resistance of palatal segments to losing their original configuration. Finally, it must be said that the syllabic position of the consonants is also a factor to be considered: the consonant affected by all these processes is the first one, that is, the consonant placed in coda position. This fact corroborates the perceptual prominence of the segments associated to the onset position, which is cross-linguistically recurrent.

2. Previous analysis

The dissimilation, the fusion or deletion, and the epenthesis processes we find in Catalan have been generally analyzed as different strategies to avoid the adjacency of identical or similar segments. This avoidance is found across a significant number of languages, and the strategies triggered are similar. Different authors (McCarthy 1986, Yip 1988) have attributed this behavior to the Obligatory Contour Principle (OCP), which bans the adjacency of identical elements. According to these authors, the OCP can act as a rule blocker and as a rule trigger. Processes like assimilation, dissimilation, epenthesis, degemination and so on are said to be triggered by the activity of this principle.

\(5\) Obligatory Contour Principle (OCP)
“At the melodic level, adjacent identical elements are prohibited” (McCarthy 1986)

The variety of processes that we find in Catalan has been largely explored within the framework of autosegmental phonology by Palmada (1994a, b). In these studies, it is argued that the principle responsible of this behavior is the OCP. Palmada (1994a) argues that the adjacent segments affected by this principle are those specified as [+continuant] and CORONAL, that is, adjacent sibilant segments according to her proposal. The process of manner dissimilation of MaC and MiC is understood as the result of a process of deletion of the discordant features (i.e., [+cont] and COR), and the subsequent introduction of the unmarked manner and place features (i.e., [-cont] and
COR), which are assigned by two default rules. This would be a typical case of the emergence of the unmarked. The process of reduction that occurs in EC is also interpreted as the deletion of the discordant features and the subsequent deletion of the empty segmental position. Finally, the epenthesis process that applies in all varieties in lexical heteromorphemic sibilant clusters is interpreted as a process of segmental insertion of the unmarked vowel in Eastern Catalan, which prevents the adjacency of the sibilant segments and ensures the preservation of their segmental and featural properties. In addition to some specific problems we will not refer to for expository reasons, the analysis proposed by Palmada, although it is very rich in its description of the processes, fails to account for a) the causes that motivate the triggering of one strategy or another according to the dialect or domain of application, b) the consonant affected by each process, and c) the emerging coalescence effects in these dialectal varieties. In this framework, these facts can only be accounted for by resorting to stipulative arguments which do not have plausible motivation. Indeed, within this interpretation, there is no mechanism that explains why in MaC & MiC a process of dissimilation applies, and why in EC a process of reduction is triggered: just the presence or the absence of certain rules. Similarly, as the author claims, the only way to justify the consonant affected by each process is establishing «that the mechanism of verification of the OCP acts from left to right». Some further questions arise: To what extent can it be claimed that segments specified as CORONAL and [-continuant] are the unmarked in Catalan, if we take into account its range of processes (cf. consonant epenthesis due to syllabic reasons in different Catalan varieties: /tem+re/ [tem,'bre]; lleó /λe`o/ [λe`yo])? Could it be the case that the resultant consonant of the dissimilation process of MaC and MiC is the result of the economy of language as well as a consequence of the contextual environment, rather than a real instance of the «emergence of the unmarked»? Apart from that, the relation between the OCP principle and the rules triggered to satisfy it remains unclear.

In this paper we are going to prove that these kinds of processes and their motivations are better analyzed within the OT framework, in its version of Correspondence Theory (McCarthy & Prince 1995). The analysis we propose is that the manner dissimilation, the deletion/fusion, and the epenthetic processes that apply in BC are different strategies motivated by the activity of the *[sib][sib] constraint (7a), which bans adjacent sibilant segments.\(^3\) This

\(^3\) In Bonet & Lloret (2002), where other data are analysed, the constraint adduced to explain the avoidance of adjacent sibilant segments is OCP-Sibilant, with the same effects. Wheeler (p.c.) suggests that the constraint responsible for this behavior could be *GEMINATESIBILANT. We disregard this constraint because the processes of dissimilation, fusion and deletion also affect heterorganic adjacent sibilants segments (see examples in § 1), so that another constraint should be invoked to explain these cases.
constraint has an articulatory and a perceptual motivation: as pointed out in Wheeler (2002), following Kirchner (1998), sibilant segments require a greater articulatory effort than others consonants do; thus, the avoidance of adjacent sibilant segments. On the other hand, the continuance of this kind of consonants obscures its length perception; the reduction process could be interpreted as a consequence of that and the dissimilation process, a prevention strategy (see Boersma 1998 for further discussion on this subject).

3. Manner dissimilation in Majorcan and Minorcan Catalan

The process of manner dissimilation of MaC and MiC can be understood, in this framework, as a strategy to satisfy the *[sib][sib] markedness constraint through the minimal alteration of the consonants of the cluster. This minimal alteration explains the preservation of the segments involved as well as the maximal preservation of the manner and place features associated to these segments. The first fact is expressed through the faithfulness constraint MAX-IO, according to which every segment of the input must have a correspondent in the output. The second fact is partially explained by means of specific versions of the faithfulness constraint IDENT(F), which advocate for the preservation of the input featural specification. As we will see, the relevant constraint in our case is IDENT(-sonorant). This constraint ensures the obstruent configuration of the resultant consonant. This minimal change, however, is conditioned by contextual factors that are expressed in terms of the AGREE(place) markedness constraint, which is highly ranked in Majorcan and Minorcan Catalan (where regressive place assimilation is really common). The effect of this constraint favors the coronal nature of the resultant consonant, given that the second consonant of the cluster always has this specification.

In (6) we reproduce a provisional ranking for MaC and MiC, where some basic constraints have been considered (7). The tableau in (8) shows the effects of this ranking on a sequence such as pos sal ‘(I) put salt’.

(6) Provisional ranking for Majorcan and Minorcan Catalan
*[sib][sib], ALIGN-Words, ALIGN-Prefix >> MAX-IO >> DEP-IO

(7) Basic constraints
a. *[sib][sib]: Adjacent sibilant segments are prohibited (see Bonet & Lloret 2002)
b. ALIGN-Words (ALIGN-W): The right edge of the word must be aligned with the left edge of another word (See McCarthy & Prince 1993; Dols 2000, Bonet & Lloret 2002 for Catalan)
c. ALIGN-Prefix (ALIGN-Pref): The right edge of the prefix must be aligned with the left edge of the stem (See McCarthy & Prince 1993; Dols 2000, Bonet & Lloret 2002 for Catalan)
d. MAX-IO (MAX): Every element in S1 has a correspondent in S2 (McCarthy & Prince 1995)
e. DEP-IO (DEP): Every element in S2 has a correspondent in S1 (McCarthy & Prince 1995)

\[(8) \text{pos sal} / \text{pos##sal} / [\text{pot.}\overline{\text{sal}}]^4\]

<table>
<thead>
<tr>
<th>\text{pos##sal}</th>
<th>*\text{[sib]}[\text{sib}]</th>
<th>ALIGN-W</th>
<th>MAX</th>
<th>DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [pos.'sal]</td>
<td>*!</td>
<td></td>
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<tr>
<td>b. [pos.z₂.'sal]</td>
<td>*!</td>
<td>*</td>
<td></td>
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<td>c. [pos.'sal]</td>
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<td>d. [pot.'sal]</td>
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</table>

As can be seen in (8), the most faithful candidate, (8a), with two adjacent sibilants, fatally violates the *\text{[sib]}[\text{sib}] markedness constraint. The candidate (8b), with epenthesis, is discarded by the constraint ALIGN-W, according to which the right edge of a word must be aligned with the left edge of another word.\(^5\) This constraint is highly-ranked in most Catalan varieties, since epenthesis never takes place postlexically. The faithfulness constraint MAX, which bans the deletion of a segment present in the input and which is ranked above DEP (see, for example, Bonet & Lloret 1996 for a justification of this ranking in Catalan) rules out the candidate (8c), with deletion of the first consonant. The candidate selected as the optimal is (8d), that is, the candidate that shows manner dissimilation.

The ranking proposed so far, however, is not complete enough to obtain the desired results, since any candidate with a non-sibilant segment in coda position could be selected as the optimal.\(^6\) In order to obtain the actual

\(^4\) For expository reasons, we disregard, for the moment, the actual candidate in MaC and MiC with an affricate in onset position ([pot.\overline{\text{sal}}]). This candidate will be introduced later on.

\(^5\) A reviewer points me out that if we consider that the epenthetic vowel is part of the base, ALIGN-Words would not be violated, so that another constraint such ALIGN-Stem should be invoked. In fact, this is not true because the dissimilation process also affects adjacent sibilant segments where the first consonant is not part of the stem (cf. cases sabudes \(/\text{kɔz}+s+\overline{z}##\text{[sɑb}+\overline{d}+s+z/; [\text{kɔz}.\overline{z}.\text{ʊ.}\overline{d}.\text{s}]\) ‘known things’, where the first s is the plural morph), so that a candidate such as \([\text{kɔz}.\overline{z}.\text{ʊ.}\overline{d}.\text{s}]\) would vacuously satisfy ALIGN-Stem. This constraint, though, could be added to discard a candidate with epenthesis as a part of the base, although it could not be high-ranked because in Catalan there is final epenthesis due to syllabic reasons (centre /\text{sɛntɾɛ}; centre petit /\text{sɛntɾi##pɛtɪt}/ [\text{sɛntɾɛ.p}.\text{ˈtɪt}], where the epenthetic vowel can be considered part of the stem). See McCarthy (2003) for an extensive discussion of these aspects.

\(^6\) We consider candidates with non-obstruent consonants in coda position because some languages show drastic featural changes to avoid specific configurations, what has been called ‘overkill’; in some varieties spoken in Ghana, for instance, /r…t/ sequences are resolved
candidate as the winner, it is necessary to introduce some new constraints. On the one hand, we must consider the activity of the faithfulness constraints that regulate featural changes. These constraints are responsible for the minimal change adduced before. The constraints relevant for the purposes of our data are IDENT(sibilant), according to which correspondent segments must have the same specification for the feature [sibilant] (9a), and IDENT(-sonorant), according to which an input [-sonorant] segment must also be [-sonorant] in the output (9b). In BC, IDENT(sib) is ranked higher than IDENT(-sont), since sibilant segments usually do not lose their featural configuration for markedness reasons, but other obstruents do.

Another constraint is necessary to achieve the actual candidate, i.e., AGREE(place). As stated in (9c), AGREE(place) requires that adjacent segments have the same place of articulation; as said before, the effect of this constraint favors the coronal nature of the resultant consonant, since the second segment of the cluster has always a coronal specification. This constraint, on the other hand, impedes that the process of dissimilation gives a labiodental fricative ([f], [v]) as a result; in fact, this type of consonants share more features with sibilants (stridency and continuancy) than stops do. In BC, where regressive place assimilation is really common, this constraint occupies a high position, concretely above IDENT(-sont) and below IDENT(sib). It should be noticed, on the other hand, that the potential effects of IDENT(place) are inhibited by AGREE(place), which, in Balearic Catalan, is ranked above.

In order to obtain the actual candidate, it is crucial that MAX dominates IDENT(sib) because otherwise the candidate with deletion, which vacuously satisfies IDENT(sib), would be selected as the optimal. Moreover, the ranking of *[sib][sib] above IDENT(sib) is also crucial, because it guarantees the non-sibilant character of the consonant in coda position. As can be seen in (11), the inclusion of these new constraints ensures the selection of the candidate with a stop in coda position.

(9) Required faithfulness and markedness constraints
a. IDENT(sibilant) (IDENT(sib)): Correspondent segments must have the same specification for [sibilant] (See McCarthy & Prince 1995)
b. IDENT(-sonorant) (IDENT(-sont)): Correspondent segments must have the same specification for [-sonorant] (See Patern 1999, McCarthy & Prince 1995)
c. AGREE(place) (AGREE(pl)): Adjacent consonants must share the place of articulation.

through a process of dissimilation that turns the first /r/ into [t]. See Struijke & Lacy (2000) for extensive discussion on this subject.
(10) New provisional ranking for MaC and MiC

\[^{[sib][sib]}, \text{ALIGN-W, ALIGN-Pref >> MAX >> IDENT(sib) >> AGREE(pl) >> IDENT(-sont) >> DEP}\]

(11) pos sal /pɔz#sal/ [pɔtˌsəl]

<table>
<thead>
<tr>
<th>/pɔz#sal/</th>
<th>*[sib][sib]</th>
<th>ALIGN-W</th>
<th>MAX</th>
<th>IDENT (sib)</th>
<th>AGREE (pl)</th>
<th>IDENT (-sont)</th>
<th>DEP</th>
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<tbody>
<tr>
<td>a. [pɔtˌsəl]</td>
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<td>b. [pɔpˌsəl]</td>
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<tr>
<td>c. [pɔrˌsəl]</td>
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<td>d. [pɔlˌsəl]</td>
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<td>e. [pɔmˌsəl]</td>
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<td>f. [pɔfˌsəl]</td>
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An additional constraint is required to discard a candidate with change of manner of articulation of the second consonant of the cluster (*[pɔsˌtal]). The impossibility of such realizations is justified by the positional faithfulness constraint IDENTONSET(F), according to which the consonant in onset position must preserve the place, the manner, and the voice features of its correspondent in the input. The relevant constraint in this case is IDENTONSET(sibilant), which requires that the segment placed in onset position maintains the sibilant specification of its correspondent in the input and that allows the process of affrication of the segment placed in onset position.

(12) Required positional faithfulness constraint
IDENTONSET(sibilant) (IDENTONS(sib)): The segment placed in onset position must preserve the sibilant specification of its correspondent in the input (See Beckman 1998, Lombardi 2001)

(13) New provisional ranking for MaC and MiC
IDENTONS(sib), *[sib][sib], ALIGN-W, ALIGN-Pref >> MAX >> IDENT(sib) >> AGREE(pl) >> IDENT(-sont) >> DEP

Before concentrating on the analysis of the behavior of EC, we should consider another set of candidates, which we have left apart because of their complexity. These are the candidates in (14), among which we can find the actual candidate in MaC and MiC, (14c), and the candidate until now considered the actual, (14e). We can also find a candidate with fusion of both consonants to an alveolar sibilant consonant, (14a); a candidate with fusion to an affricate alveolar consonant, (14b); and a candidate with change of manner of
articulation of the first consonant and syllabification of /s₁/ and /s₂/ in onset position (14d).

(14) Other candidates

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>a. [p ot₁sal]</td>
<td>1) Fusion of /s₁/ and /s₂/ to [s₁₂]; 2) Preservation of manner of articulation of /s₁/ and /s₂/; 3) Syllabification of /s₁/ and /s₂/ in onset position</td>
</tr>
<tr>
<td>b. [p ot₁ts₂al]</td>
<td>1) Change of manner of articulation of /s₁/ and /s₂/ to [ts₁₂]; 2) Syllabification of /s₁/ and /s₂/ in onset position</td>
</tr>
<tr>
<td>c. [p ot₁, ts₂al]</td>
<td>1) Change of manner of articulation of /s₁/ and /s₂/; 2) Syllabification of /s₁/ in coda position and /s₂/ in onset position (actual candidate)</td>
</tr>
<tr>
<td>d. [p ot₁, t₁s₂al]</td>
<td>1) Change of manner of articulation of /s₁/; 2) Syllabification of /s₁/ and /s₂/ in onset position</td>
</tr>
<tr>
<td>e. [p ot₁, t₁s₂al]</td>
<td>1) Change of manner articulation of /s₁/; 2) Syllabification of /s₁/ in coda position and /s₂/ in onset position</td>
</tr>
</tbody>
</table>

As seen in (15), the candidates with fusion, (15b, c), are discarded thanks to the activity of ALIGN-W. The candidate with change of manner of articulation of the first segment and syllabification of the cluster in onset position, (15e), is discarded because of the activity of IDENTONS(sib). However, two candidates fare even: the candidate until now considered the optimal (15a) and the actual candidate (15d).

(15) pos sal /pɔzʃsal/ [p ot₁sal]

<table>
<thead>
<tr>
<th>/pɔzʃsal/</th>
<th>IDENTONS(sib)</th>
<th>*[sib][sib]</th>
<th>ALIGN-W</th>
<th>MAX</th>
<th>IDENT(sib)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [p ot₁, s₂al]</td>
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<td>b. [p ot₁, s₂al]</td>
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<td>*!</td>
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<tr>
<td>c. [p ot₁, ts₁al]</td>
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<td>*!</td>
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<tr>
<td>d. [p ot₁, ts₂al]</td>
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<td>*!</td>
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</tr>
<tr>
<td>e. [p ot₁, t₁s₂al]</td>
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In order to achieve the actual output, (15d), it is necessary to introduce a new constraint, SYLLABLECONTACT, which demands that heterosyllabic adjacent clusters show the same or a decreasing degree of sonority.

(16) Required (syllabic) markedness constraint
SYLLABLE CONTACT LAW (SYLLCONT): Adjacent heterosyllabic segments must show the same or a decreasing degree of sonority (Vennemann 1988, Clements 1990; Bonet & Mascaró 1995, Jiménez 1997, 1999 and Pons 2003a for Catalan)

The syllabic transition in the candidate [p ot₁sal] (15a) shows an increasing degree of sonority, so that it is discarded thanks to the constraint SYLLCONT.
As justified in Pons (2003, in preparation), where SYLLCONT is invoked to explain regressive manner assimilation, this constraint is ranked below IDENT(sib) and above AGREE(place).

(17) New ranking for MaC and MiC
IDENTONS(sib), *[sib][sib], ALIGN-W, ALIGN-Pref >> MAX >> IDENT(sib) >> SYLLCONT >> AGREE(place) >> IDENT(-sont) >> DEP

4. Deletion and fusion in Eivissan Catalan

As said before, in EC sibilant contacts are resolved through a process which gives a single sibilant as a result. Apart from the clusters integrated by a palatal and an alveolar segment, there is no further evidence whether in Eivissan a process of reduction (which consists on the elision of the first consonant) or a process of fusion of the two segments to one apply. Given the fact that we do not have more empiric evidence than that related to the contacts of a palatal sibilant followed by an alveolar sibilant, we can hypothesize that it can be triggered either a process of fusion or a process of deletion of the first segment. In Optimality Theory, this circumstance can be expressed through the lack of dominance between two constraints that are in conflict with respect to the deletion and fusion processes. This fact motivates the selection of two candidates as optimal: the candidate with fusion and the candidate with deletion. Before we move on, we should see first some basic differences with respect to the ranking proposed for MaC and MiC. As shown in (18), the constraints IDENTONS(sibilant) and *[sib][sib] are ranked at the top of the hierarchy. The first one guarantees that the change of manner of articulation of the second consonant is not a possible strategy to avoid adjacent sibilant segments in this variety; the second one avoids the presence of two adjacent sibilants. A basic difference between EC and MaC and MiC is the position of IDENT(sib). This constraint must be placed as high as possible in EC in order that the dissimilation process does not apply. The optionality between fusion and deletion can be explained through the lack of dominance between MAX, which disfavors the candidate with deletion, and the alignment constraints, ALIGN-W and ALIGN-Pref, which rule out the candidates with fusion. In the next tableau, it can be observed that the lack of dominance between both constraints ensures a tie between the candidate with deletion (19c) and the candidate with fusion (19e).

(18) IDENTONS(sib), *[sib][sib] >> IDENT(sib) >> ALIGN-W, ALIGN-Pref, MAX >> DEP
Things become difficult, however, when the second segment of the cluster does not show the same place of articulation as the first one. We should explain why in the sequences of an alveolar sibilant followed by a palatal sibilant this last consonant is the one preserved. In the tableau (20), we see that the wrong candidates are selected as the optimal, and this is because we do not have any constraint that regulates the featural specification of the fused segment, nor any that determines which consonant is deleted in case of deletion. Apart from the actual candidates, (20b), with deletion of the first consonant, and (20d), with fusion of the two segments to a palatal segment, candidates such as (20c), with deletion of the second consonant, (20e), with fusion to an alveolar segment, or (20f), with fusion to a retracted alveolar, are also selected as the optimal.

An important aspect to be considered before analyzing these data is that when dealing with fusion and deletion, the reference to the onset position is not an available strategy to regulate the featural changes. Positional faithfulness constraints such as IDENTONS(F) prescribe that when one segment is placed in onset position it must show the same featural specification as its correspondent in the input. Given the lack of underlying syllabification, these kinds of constraints are not sufficient when there is deletion or fusion. For example, a candidate such as (20c), with deletion of the second consonant and syllabification of the first consonant in onset position, satisfies this positional...
faithfulness constraint, since it shows the same featural specification as its correspondent in the input. In Optimality Theory, there are different ways to regulate the consonant which must be deleted and the featural specification that the candidate with fusion must acquire. One of them is appealing to the OUTPUT-OUTPUT faithfulness constrains (Benua 1997), as proposed in Bonet & Lloret (2002) for Central Catalan, and adapted to EC in Pons (2003a). Another strategy, pointed out to me by an anonymous reviewer, could be resorting to targeted constraints (Wilson 2001). This kind of approach, however, could deal only with cases of deletion, but not with cases with fusion. Finally, the fact that is always the second consonant of the cluster the one imposed could be explained by means of a positional faithfulness constraint that targets the initial segment of a root-domain (21a), as pointed out to me by another anonymous reviewer. This constraint rules out, as it can be seen in (22), the candidate with deletion of the second consonant.

As we have seen before, however, in this variety a process of fusion is also possible, so that it is necessary to introduce some more constraints to explain the palatal character that the candidate with fusion acquires. One of these constraints is IDENT(-ant), according to which an [-anterior] input segment must also be [-anterior] in the output (21b). IDENT(-ant) captures the universal resistance of palatal segments to losing their original configuration in spite of being placed in weak syllabic position, such as coda. In fact, a constraint like IDENT(pal) would do the same job. As shown in the tableau (23), this constraint rules out a candidate like (23f), with fusion to an alveolar segment. Finally, the constraint IDENT(place)-INITIALROOTC, ranked at the bottom of the hierarchy, is responsible for the avoidance of a candidate with fusion of the two consonants to a retracted alveolar sibilant segment (23g).

(21) Required I-O and positional faithfulness constraints
a. MAX-INITIALROOTC (MAX-INRC): The initial segment of a root must be preserved in the output.
b. IDENT(-anterior) (IDENT(-ant)): Correspondent segments must have the same specification for [-anterior] (See Pater 1999, McCarthy & Prince 1995)
c. IDENT(place)-INITIALROOTC (IDENT(pl)-INRC): The featural specification of the initial segment of the root must be preserved in the output.

(22) New provisional ranking for Eivissan Catalan
IDENTONS(sib), MAX-INRC, *[sib][sib] >> IDENT(sib), IDENT(-ant) >> ALIGN-Pref, MAX >> DEP >> IDENT(pl)-INRC
5. Dissimilation and gliding in Minorcan Catalan

As introduced before, the clusters integrated by a palatal segment followed by a sibilant behave differently. In most MiC dialects, a process of dissimilation applies. Therefore, it can be adduced the same ranking proposed to account for the clusters with an alveolar segment in first position. In some varieties of MiC, those spoken in Ciutadella and Ferreries, a process of gliding is triggered. This process can be understood, similarly to the process of fusion of EC, as a strategy to avoid the adjacency of sibilant segments without losing the palatal configuration of the first segment of the cluster. IDENT(-ant) is the constraint responsible for this behavior, and it must be ranked below AGREE(place), because in these varieties the segments specified as [-anterior], such as the velar stop, assimilate to the following consonant, losing their [-anterior] specification.

(24) Ranking for Ferreries & Ciutadella

IDENTONS(sib), *[sib][sib], ALIGN-W, ALIGN-Pref >> MAX >> IDENT(sib) >> SYLLCONT >> AGREE(place) >> IDENT(-ant), IDENT(-sont) >> DEP

(25) mateix sol /matej##sol/ [mo.tej.'sol]
Let us focus now on the behavior of EC when the first segment of the cluster is palatal and the second is alveolar. We have seen that in these cases a strict process of fusion which gives as a result a retracted alveolar sibilant applies. As shown in the tableau of (26), with the ranking given in (22) we do not obtain the desired results, since candidate (26c) is wrongly selected as the optimal. And this is because the actual candidate, (26h), fatally violates IDENT(pl)-INRC. Moreover, the selected candidate, (26c), vacuously satisfies the IDENT(-ant) constraint, so that the apparent prominence of palatal segments is lost.

An additional constraint is necessary to discard a candidate like (26c). This constraint is MAX-FINALROOTC, according to which the final consonant of a root in the input must have a correspondent in the output. This constraint, placed in the same position as the alignment constraints and above IDENT(place)-INRC guarantees the discarding of a candidate with deletion of the final consonant of the base. The final ranking proposed for EC in (27) predicts that deletion only applies if the first segment is not part of a root, which is a desirable result if we take into account the greater prominence of stems and roots in relation to prefixes. The activity of this constraint explains the systematic application of fusion when the first consonant is palatal, because in Catalan there are no prefixes ending in a palatal segment. That is to say, all the cases where a palatal segment meets another consonant are instances of sequences of words and compounds.
(27) **Required positional faithfulness constraint**
MAX-FINALROOTC (MAX-FinRC): The final consonant of a root must have a correspondent in the output.

(28) **Definitive ranking for EC**
IDENTONS(sib), MAX-INRC, *[sib][sib] >> IDENT(sib), IDENT(-ant) >> ALIGN-Words, ALIGN-Pref, **MAX-INRC >> MAX >> DEP >> IDENT(pl)-INRC**

(29) **mateix sol /mətuʃ#sol/ [mə.te.ʃ1,2ol]**

<table>
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<tr>
<th></th>
<th>MAX-INRC</th>
<th>*[sib][sib]</th>
<th>ID (-ant)</th>
<th>ID (sib)</th>
<th>ALIGN-W</th>
<th>MAX-FinRC</th>
<th>MAX</th>
<th>DEP</th>
<th>IDENT(pl)-INRC</th>
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<tr>
<td>a. [ma.te.ʃ1,2ol]</td>
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<td>b. [ma.te.ʃ1,2ol]</td>
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<td>c. [ma.te.s1,2ol]</td>
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<td>d. [ma.te.s1,2ol]</td>
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<td>e. [ma.te.s1,2ol]</td>
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<td>g. [ma.te.ʃ1,2ol]</td>
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</table>

To sum up, the analysis we propose for EC is that a process of deletion of the first consonant or fusion between the two consonants can apply when the first consonant is alveolar. This fact is captured, as seen, through the lack of dominance between two constraints that are in conflict with respect to deletion and fusion processes: ALIGN-W, ALIGN-Pref and MAX-FinRC. This unranked hierarchy motivates the selection of two candidates as optimal: the candidate with fusion and the candidate with deletion. Two positional faithfulness constraints determine the segmental quality that the fusion candidate acquires and the consonant that is preserved in case of deletion. Another positional faithfulness constraint, MAX-FinRC, prevents deletion when it would imply the loss of the final segment of a root. The activity of this constraint explains the lack of deletion and the systematic application of fusion when the first consonant of the cluster is palatal.

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