Towards a sociophonetic explanation of progressive and regressive assimilation in NC clusters

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1. BACKGROUND

NC clusters tend to be homorganic, with the nasal stop fully assimilated for place to the following oral stop. However, nasals are also able to alter the articulation of the post-nasal stop in different ways, as documented e.g. in many varieties of the Italo-Romance area [2,5,7].

1) As for place of articulation, nasals are notoriously the target of regressive assimilation: it. /banka/ ‘bank’; [banka] and not *[banta].

The constraint of homorganicity in NC clusters reflects a fundamental tendency of coarticulation, anticipatory assimilations being more frequent than perseverative ones [1,4].

2) As for laryngeal assimilation, voiceless post-nasals voice in some central southern Italian dialects: dende ‘tooth’ (lt. dente), cambo ‘field’ (lt. campo), biangio ‘white’ (lt. bianco) [7].

3) Complete assimilations of homorganic clusters are also left-to-right: in some southern dialects, voiceless post-nasals totally assimilate to nasals, resulting in geminates: munn ‘world’ (lt. mondo), piammo ‘lead’ (lt. piombo), lijia ‘tongue’ (lt. linguo) [7].

Both laryngeal and complete assimilations are generally believed to function as sociolinguistic variables in conveying the speaker’s socio-cultural and geographical identity.

AIMS

The experiment aims at replicating an experimental setting the conditions for a sound change which has clear socio-phonetic implications in some Italo-Romance areas (i.e., nt > rd, nd > nn, nk > g),

(i) We expect that different types of assimilation originate from different conditions in the relative timing among sounds in sequences varying for voicing of the postnasal consonant;

(ii) Given the external evidence sketched above, we hypothesize that Alveolar clusters undergo temporal reductions in pre-voiceless nasals more consistently than Velar ones;

(iii) We wanted to verify whether the temporal relationship among sounds in NC clusters is consistent across different rates of speech, or rather, varies in accordance with some articulatory constraints which can be used as a potencial for the explanation of attested sound changes.

RESULTS

2. Speech rate variations

The three elicited styles (F, N, S) were significantly different in sentence duration (p < .0001), /anCa/ duration (/p < .0001), and /nC/ cluster duration (p < .0001), thus confirming that the three elicited ‘styles’ were significantly different as for duration of different-size units.

![Fig. 1](image)

2. Analysis of N/C duration ratio

![Fig. 2](image)

Table 1

<table>
<thead>
<tr>
<th>Speech rate</th>
<th>Voicing</th>
<th>Mean N-C ratio</th>
<th>Std deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Voiced</td>
<td>1.056</td>
<td>0.24</td>
</tr>
<tr>
<td>N</td>
<td>Voiced</td>
<td>1.704</td>
<td>0.58</td>
</tr>
<tr>
<td>S</td>
<td>Voiced</td>
<td>2.057</td>
<td>0.70</td>
</tr>
</tbody>
</table>

3. ALTERNATIONS IN PLACE

N-to-Alveolar and N-to-Velar clusters differ inasmuch assimilations triggered by the former cluster type are geographically more widespread than the latter, at least in the Italo-Romance domain.

- In southern Italy, only limited areas of Sicily, Calabria, Lucania, Puglia, and the Salentine peninsula show /ng/ > [ni] . According to linguistic atlases (e.g., AIS), nasals are usually geminate in the muno (mundo) type, while they are often short in the lijja (lingua) type.

Though usually neglected in sociophonetic research, speech rate enters into the picture because of its intrinsic complexity as an explicable parameter of both change initiation and transmission.

Increased rates of speech have demonstrable effects on the mechanics of articulators and on the relative organization of speech gestures (i.e., on change initiation), but on the other hand these effects “could be voluntarily overridden by the speaker, who could increase his articulatory explicitness” [8], thus influencing the transmission of change in a non-deterministic manner.

→ Speech rate variations must be included as a crucial factor in the investigation of the socio-phonetic bases of NC progressive and regressive assimilations, in order to explore the degree of gestural reorganization due to temporal compressions.

CONCLUSIONS

(i) Cluster Internal Balance Hypothesis strongly supports, across speech rates and places:

- There is a clear tendency for nasals to be longer before voiceless plosives, shorter before voiceless ones, w.r.t. the post-nasal C.

Such difference in cluster intrinsic timing depending on the laryngeal specification of the post-nasal C is likely to be a universal speech property.

(ii) Place alternations play a role in this effect: Pre-voiced N lengthening more evident in Alveolar than Velar clusters (see Fig. 2).

The preference for progressive assimilations in Alveolar clusters (w.r.t. Velars), as attested in diastratic, areal and sociolinguistic variation of southern Italian dialects, seems to have some grounding in the durational properties of the clusters.

(iii) Speech rate also plays a role: Cluster Internal Balance gets looser in Fast speech, w.r.t. N and S (see Table 1). Temporal compressions imply gestural restructuring, besides gestural shortening.

Increased rates of speaking do not create conditions that favor assimilations. The complexity of nasal cluster assimilation cannot be reduced to aspects of connected speech processes.