DELETION AND DISAMBIGUATION IN PUERTO RICAN SPANISH

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Consonant deletion processes may reduce sentence redundancy and thus increase the possibility of ambiguity. Historically, languages have adapted to such processes through a variety of changes in morphology and higher levels of grammar. Synchronic quantitative evidence of such adaptation is provided here through examination of the behavior of two Puerto Rican Spanish phonological variables which interact with the grammatical system in the capacity of plural markers. Although the data contain entire sentences with no morphological trace of the plural, this paper demonstrates that—through a complex interplay of semantic, syntactic, and morphological factors—no instance in the corpus shows ambiguity of number resulting from marker deletion.*

1. INTRODUCTION. Attrition and erosion of word-final consonants are widespread linguistic tendencies, well-documented for a variety of languages, both diachronically (e.g. Alonso 1962, Politzer 1972, Ferguson 1975, Foley 1975, Chen 1975) and synchronically (Labov et al. 1968, Cederberg 1973, Wolfram 1974, Terrell 1975a,b, 1978). While articulatory or phonetic factors are fundamental to the actuation of consonant reduction and deletion processes (Chen & Wang 1975), their propagation through time and throughout a linguistic system is also subject to syntactic and semantic influences. These processes tend to reduce sentence redundancy, and thus may increase the possibility of ambiguity. Functional requirements eventually entail morphosyntactic innovation and reorganization. Historically, these changes can be studied by comparing two stages in the evolution of a language. But synchronic assessment of change in progress is difficult—since the heterogeneity and variability which characterize change effectively mask its nature, direction, and rate. But systematic quantitative analysis of a large corpus of the spoken language can clarify these aspects of change. This paper adopts such an approach to the analysis of a phenomenon common to dialects of the Hispanic Caribbean, and particularly prevalent in Puerto Rican Spanish as spoken in the United States: weakening and deletion of two word-final phonemes which, even after centuries of erosion in Romance, remain in the Spanish inflectional system. (s) and (n) appear in Spanish in the environments listed in Table 1.

<table>
<thead>
<tr>
<th>Environment</th>
<th>(s)</th>
<th>(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word-internal</td>
<td>esto 'this'</td>
<td>ence 'between'</td>
</tr>
<tr>
<td>Word-final in stems</td>
<td>mes 'month'</td>
<td>tren 'train'</td>
</tr>
<tr>
<td>Word-final plural</td>
<td>cosas 'things'</td>
<td>hablan 'they speak'</td>
</tr>
<tr>
<td>2d person singular</td>
<td>hablas 'you speak'</td>
<td></td>
</tr>
</tbody>
</table>

* The field work and analysis for this report were supported by National Science Foundation Grant SOC-75-00245, Project on Linguistic Change and Variation, under the direction of William Labov. At various stages this paper has benefited from suggestions by Bill Labov, David Sankoff, Don Hinde, and Greg Guy, to whom I am very grateful. Thanks also to my colleagues on the Language Policy Task Force of the Center for Puerto Rican Studies for reading and commenting on this paper.
I focus specifically on those phonemes which interact with the grammatical system in the capacity of plural markers. Standard Spanish marks plurality redundantly across the NP, copying the plural marker onto each noun, adjective, and determiner in the constituent:

(1) *Tienen muchos juegos de estos pintados en el suelo diferentes* 'They have many different games like that painted on the ground.' (C.T. 80)\(^1\)

Plurality is similarly repeated in the VP, where the verb must agree with its subject in person and number—resulting in maximal redundancy within the sentence:

(2) *Tu sabes, los doctores trataron de—sin operarla, a ver si la podían arreglar* 'You know, the doctors tried to—without operating, to see if they could fix her up.' (E.O. 12)

Both (s) and (n), however, are subject to well-documented processes of weakening and deletion. The most frequently attested phonetic realizations resulting from these processes are:

(3) 
- (s) [s] alveolar sibilant
- [h, ʰ] voiceless or voiced laryngeal fricative
- [θ] phonetic zero

- (n) [n] alveolar nasal
- [N] homorganic realization with following consonant
- [ŋ] velar nasal
- [Ṽ] deleted nasal with nasalization of preceding vowel
- [θ] phonetic zero

The presence of these [θ] variants of both (s), the nominal plural marker,\(^2\) and (n), the verbal plural marker, naturally raises the following question: If the plural markers are deleted from both the NP and the VP, theoretically rendering certain plural sentences like 4b indistinguishable from singular sentences like 4c, and if these sentences are still perceived as conveying plurality, what are the factors responsible for disambiguation?

(4) a. Plural: *Bailaban unas nenas bien bonitas* 'Some pretty girls were dancing.'
    c. Singular: *Bailaba una nena bien bonita* 'A pretty girl was dancing.'

2. A FUNCTIONALIST HYPOTHESIS. An initial working hypothesis follows from Kiparsky's (1972) 'distinctness conditions', that there is a tendency for semantically relevant information to be retained in surface structure. According to this functionalist view, we would expect phonological processes to be blocked in those environments where their application would wipe out morphological distinctions on the surface. Conversely, in those environments where other types of disambiguating information are present, lessening the 'functional load' of these distinctions, we might expect the phonological processes to apply more often. Thus Labov et al. (130) found a higher rate of [-t, -d] deletion in monomorphemic types like mist than

\(^1\) Information in parentheses refers to speaker, and to location on the tape of his or her utterance.

\(^2\) 'Nominal' should here be taken to mean 'within the NP'.

\(^3\) The term 'marker' in this paper refers to any phonetic realization of a particular variable other than phonetic zero.
in past tense forms like missed, leading them to postulate that deletion rules would operate more frequently in monomorphic words than if the deleted element were itself a morpheme.

A first examination of my Puerto Rican Spanish data, however, appears to contradict this hypothesis. As can be seen in Table 2, there is more deletion of inflections, as in cosar and hablan, than in monomorphic forms like mer and tren.

<table>
<thead>
<tr>
<th>Grammatical Status</th>
<th>(s)-Deletion</th>
<th>(n)-Deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflection</td>
<td>65%</td>
<td>9%</td>
</tr>
<tr>
<td>(n = 8566)</td>
<td>(n = 3184)</td>
<td></td>
</tr>
<tr>
<td>Monomorphic word</td>
<td>54%</td>
<td>1%</td>
</tr>
<tr>
<td>(n = 4028)</td>
<td>(n = 3457)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.

Similarly, Cedergren (110) found that the deletion rate in Panama for inflectional (r) was higher than that for monomorphic (r). These findings suggest that grammatical status is not the only, or even the most important, constraint governing marker deletion—and that, if the functional hypothesis is true, it is subtly mediated in more complex ways than have heretofore been examined. We are led, then, to examine various factors constraining deletion vs. retention of some plural markers in Puerto Rican Spanish, as well as the factors responsible for disambiguation in the case of marker deletion. The understanding of processes by which languages undergo lenition and deletion of elements with a heavy functional load, as well as the mechanisms by which they compensate for these deletions, is an important issue for general linguistic theory.

3. The Social Dialectology of (s) and (n). As early as 1903, Marxuach, in a description of Puerto Rican Spanish, remarked (p. 22): "The only thing we have to say regarding the determiner is that it is very difficult to distinguish plurals from singualrs in our pronunciation." So frequent is the [θ] variant that Matluck (1961:334) states: "the only Puerto Rican Spanish /s/ which neither disappears nor is aspirated is initial /s/. In syllable-final position, it is aspirated; in absolute final position, it is completely eliminated." Years before, in his monumental work on Puerto Rican Spanish, Navarro-Tomás (1948:69) recognized the inherent sociolinguistic variability of (s): 'Final /s/ is generally aspirated in Puerto Rico over all social classes and regions. Educated people give this aspirated /s/ a fairly regular form, while the uneducated submit it to varians of pronunciation.' However, at the time of Navarro-Tomás' study, the quantitative methodology necessary for a systematic account of large-scale inherent variation was lacking. This methodology is now available (cf. Labov 1969, Cedergren & Sankoff 1974).

The first investigation to study an Hispanic dialect quantitatively was Ma & Herasimechuk 1971, which found that the realization of a number of Puerto Rican Spanish sociolinguistic variables, including (s) and (n), was correlated with their distribution by speech style. However, since the main issue addressed was one

* The translation is mine here, and in ensuing quotes.
of communicative appropriateness, not all the relevant linguistic factors which could potentially affect the realization of (s) and (n) were included. Subsequently, Cedergren's investigation of the interplay of social and linguistic influences on the major phonological variables in Panamanian Spanish showed that a wealth of environmental factors could be instrumental in explaining the distribution of the variants.

These seminal contributions set the pattern for a series of comparative phonological studies in the field of Luso-Hispanic dialectology, e.g. Fontanella de Weinberg 1974 for Buenos Aires Spanish, Hammond 1977 for Miami Cuban, Jiménez Sabater 1977 for Dominican, Terrell 1975a,b, 1978 for Puerto Rican and Cuban, plus Lemle & Naro 1977 and Guy & Braga 1976 for Brazilian Portuguese. Though few of these studies have gone beyond quantification of surface phonological and morphological co-occurrences, there has been an awareness of the importance of the broader syntactic context for the realization and evolution of the plural marker (cf. Terrell 1975a, Guy & Braga, Lemle & Naro). Even these studies, however, have limited themselves to the examination of surface features of the sentence.

In this paper I suggest that morphological, syntactic, and semantic features—both within the constituent in which the plural marker appears and within the larger context of discourse—must be taken into account to clarify the processes of deletion and disambiguation.

4. The Sample. The data on which this study is based were collected during a year's ethnographic study of a single block in a working-class Puerto Rican neighborhood in North Philadelphia. They consist of tape-recorded interviews with 24 first-generation Puerto Ricans over age 21. All are dominant (if not monolingual) speakers of Puerto Rican Spanish; and a third claim to speak no English at all, although many have lived in Philadelphia for over 20 years. Because this block is located two blocks from a well-established Hispanic business district, most business transactions (such as food shopping) can be conducted wholly in Spanish. At no time during the period of field work was any block resident heard to address another in English spontaneously.

The linguistic interviews were conducted wholly in Puerto Rican Spanish, using an interview schedule adapted to suit the needs of the community. Because reading skills were not well developed among the informants, the interview contained no formal elicitation devices, such as word lists and reading texts. Instead, it concentrated on childhood games, recipes, customs and other cultural aspects of the Puerto Rican community. The resulting interviews are two to three hours long and highly informal in style, containing many narratives of personal experience and group interactions among family members. The fact that these data are closer to the 'vernacular' than the more formal speech data used in other studies of Puerto Rican Spanish (e.g. Ma & Herasimchuk, Terrell 1978) may explain much of the divergence between the findings reported below and those of other investigators.

5 The interview schedule, PRS Q-GEN II, was adapted from the one developed for the Philadelphia speech community by the Project on Linguistic Change and Variation.
5. PLURAL (s). From the taped data, 8566 occurrences of plural (s) were coded for features which previous studies (e.g. Ma & Herasimchuk, Cedergren, Terrell 1975a, 1978) have indicated to be relevant distinctions of grammatical category, following phonological segment, and following stress. In addition, for each occurrence of plural (s), I coded for the presence of what I call functional factors: additional information, both within and outside the NP, which could convey plurality in case of marker deletion. Four major types of disambiguating information were distinguished: inflectional, other morphological, non-morphological, and any combination of the above. These are exemplified below:

(5) Types of disambiguating information:
   a. Inflection within the NP only:
      las plantas 'the plants'
   b. Other morphological support:
      (i) within the NP:
         los reyes 'the kings'
      (ii) outside the NP:
         Las plantas se mueren 'The plants are dying.'
   c. Non-morphological support:
      (i) semantic:
         un par de plantas 'a couple of plants'
         Y me dijo la (s) le(s) digo ... 'And I tell my kids ...'
      (ii) syntactic:
         Era(n) persona(s) como que abandonaba(n) 'They were persons who,
            like, told the future.'
   d. Combinations:
      Venieron gente de todas partes 'People came from all over.'

In 5a, the only possibility of disambiguation is inflectional, by adding a marker ([s] or [h]) to some element of the NP. In 5b(i), whether or not a marker is present, the vowel-changing in the determiner and the noun differentiate plural from singular. Similarly, in 5b(ii), because of number concordance rules, any realization of the verbal plural inflection ([n]) other than [n]) adequately conveys plurality. In 5c(i), the number of the noun is disambiguated in the first example by the construction un par de, understood to mean 'more than one', and in the second example by the shared knowledge that the speaker has several children. Certain rules of syntactic placement may also convey plurality, as in 5c(ii), where an unmodified noun immediately following a verb is understood as plural. Finally, combinations of these possibilities for disambiguation are given as a separate category (5d)—under the assumption that, following a functionalist hypothesis, more deletion would occur in the presence of more disambiguating factors.

Each token was also coded for its position in the NP string, and for the number and position of preceding plural markers, if any.

Coding tokens as string members automatically refines the type of disambiguating information like that in 5a, and takes account of possible interaction among adjacent items in the NP. In an NP string with three slots, or three possibilities for plural marking, e.g. 6 below, bonitas is coded as an adjective in third position in the string.
the realization of the string were like 6b, bonitas would also be coded 'SS', for two preceding plural markers. In 6c, it would be coded 'Ø', for two preceding deleted markers. Similarly, nenás is coded as a noun, with an 'S', for one preceding marker realized (6b), or with a 'Ø', for a single preceding marker deleted (6c). Unas is coded as a determiner with no code for preceding tokens, since it is in first position in the string:

(6) a. una[s/ nena[s/ bonita[s/ 'some pretty girls'
    b. una[s,h] nena[s,h] bonita...
    c. una[Ø] nena[Ø] bonita...

Since I am concerned here with plural marking, and since the aspirated variant of /s#/ cannot be said to lead to ambiguity, [s] and [h] were considered together, in order to investigate the constraints on marker deletion. I have therefore bypassed the first stage of the weakening process ([s ↔ h]), and am examining constraints on the deletion rule ([s, h ↔ Ø]). The effects of the different factors were estimated from the data, using the VARBRUL 2 program (Sankoff 1975).

5.1. RESULTS. Figures for grammatical, phonological, and stress factor groups confirm, with a few minor exceptions, the findings of other studies (Ma & Herasimchuk, Cedergren, Terrell 1975a, 1978), as can be seen in Table 3.

<table>
<thead>
<tr>
<th>GRAMMATICAL CATEGORY</th>
<th>FOLLOWING PHONOLOGICAL SEGMENT</th>
<th>FOLLOWING STRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjective</td>
<td>0.63</td>
<td>Pause 0.61</td>
</tr>
<tr>
<td>Noun</td>
<td>0.61</td>
<td>Consonant 0.51</td>
</tr>
<tr>
<td>Determiner</td>
<td>0.28</td>
<td>Vowel 0.38</td>
</tr>
</tbody>
</table>

Table 3. Contributions of grammatical category, of following phonological segment, and of following stress to the deletion of plural (s). Input probability: 0.72. Factor effects vary between 0 and 1, with figures higher than 0.5 favoring rule application, and figures lower than 0.5 inhibiting rule application. The figure 0.5 itself has no effect on the rule.

Of the grammatical factors, an adjective favors deletion while a determiner favors retention—an effect also found in other Hispanic dialects. Of the phonological factors, a following pause favors deletion the most.

Weak stress on the syllable following (s) favors deletion somewhat, whereas following heavy stress favors retention of some marker.

In the same analysis, however, the figures for the position and functional groups are somewhat unexpected; the effects of position on marker deletion are shown in Table 4 (S = [s] and [h]).

<table>
<thead>
<tr>
<th>POSITION OF TOKEN IN STRING</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker(s) preceding token:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ØØ</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SØ</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ø</td>
<td>0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ØS, SS</td>
<td>0.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'initial'</td>
<td>0.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.

I refer, of course, to the 's deletion rule' on the assumption that the underlying element is still present. However, evidence seems to be pointing in the direction of a re-insertion rule.
The factor group shown in Table 4 enables us to assess to what extent the redundancy characteristic of standard Spanish plural marking is present in Puerto Rican Spanish, by measuring the effect of position of the token within the string, and of place and position of preceding markers, if any. Figures for these position factors indicate that there is indeed a degree of local redundancy; however, it functions somewhat differently than one might expect.

In a study of functional constraints on (s) deletion in Cuban Spanish, Terrell (1975a:436) claimed that "Spanish speakers consistently avoid suppressing all traces of a morphological indication of number ... The /s/ which is preserved is the first plural marker encountered in surface structure." That the determiner is the most conservative grammatical category as regards (s) deletion has been corroborated by studies of other dialects (Cedergren, Ma & Herasimchuk, Guy & Braga). Although "determiner" or "first position in the string" are favorable environments for marker retention in vernacular Puerto Rican Spanish also, as seen in Tables 3 and 4, it is by no means true that retention operates categorically in these positions. In fact, an opposite effect obtains: one of local redundancy, or a tendency toward concord on the string level.

Table 4 shows that [0] or the absence of a marker on the segment preceding the token in question favors deletion on that token, whereas presence of an immediately preceding marker favors retention of a marker on the token. First position in the string is the most conservative of all. This means that, in our hypothetical example 6 above, if the string were realized with deleted markers on the first two elements (as in 6a), the contribution of the position factor to the probability of deletion of the plural marker on the third element, bonitas, would be high, at 0.76. If the string were realized with markers in both first and second position (as in 6b), the effect on (s) deletion in bonitas would be rather low, at 0.39. For the determiner usas, the first element in the string, the effect of position is lowest, at 0.33. This result is exactly the opposite from what was found in other studies; it also runs counter to any functionalist claim.

Factors in the functional group allow us to ascertain the effect of various types of disambiguating information on the elimination of redundancy. The contributions of these factors to marker deletion appear below (cf. the examples in 5a-d).

(7) Inflection in NP only: 0.29
    Other morphological support: 0.59
    Non-morphological support: 0.55
    Combinations: 0.58

This indicates that functional factors have a regular effect on marker deletion, in a direction confirming the functionalist hypothesis. Additional plural information—whether morphological, syntactic, semantic, or any combination thereof—favors marker deletion; but when the only possibility for plural marking is inflectional, within the NP itself, a marker tends to be retained. It should be emphasized that, in order to establish this effect, it was necessary to code for the possibility of non-morphological disambiguating information. Terrell 1975a found, for Cuban Spanish, that speakers consistently avoided suppressing all morphological trace of the plural. This is not the case for Puerto Rican Spanish. The data on which Tables 3-5 are based include almost 1,000 examples of strings which contain two to three elements but have no morphological marker at all.
5.2. Problems raised by the (s) results. We have here an apparent contradiction. On the one hand, Puerto Rican speakers tend to eliminate redundancy, as evidenced by the functional effects in Table 5. On the other hand, the figures for the position factors in Table 4 indicate a tendency toward redundancy in the form of concord within the NP string. One marker leads to more, but zeros lead to zeros.

In other words, if a plural is going to be realized, the tendency will be for it to be realized on the first element; if it is not, subsequent developments will not tend to compensate for this in a functional way. What follows might either be all markers or all zeros; thus cases like (00) are very rare. (Out of 136 instances of strings with the sequence 00 preceding the token, a marker was retained on the final token only eight times.)

Although the data include numerous examples of strings containing no morphological evidence of the plural, there do not seem to be any instances where the notion of the plural is absent. Communication is obviously not being hindered in present-day Puerto Rican Spanish. But if [h] follows a weakening process (i.e. \[h \rightarrow \emptyset \rightarrow \emptyset\]) similar to the one noted for [s], for which we already have ample evidence, then a time might come when Puerto Rican Spanish will reorganize its system of morphological plural marking.

In sum, Puerto Rican Spanish (s) is at a stage of synchronic variation which could well be resolved by the total deletion of this inflection. Functional consideration

This seems to tie in with Martinet's theory of least effort (1962: 55): 'Concord is redundancy, and contrary to what could be expected, redundancy results as a rule from least effort: people do not mind repeating if mental effort is thereby reduced.'

6 It would not be unreasonable to expect Puerto Rican to go the way of Modern French, limiting plural marking to the determiner alone.

The determiner, which usually occurs in first position, has the lowest deletion rate of all grammatical factors. First position is always also the most conservative environment with regard to deletion (for nouns, 0.30 deletion rate in first position, as opposed to 0.5che in all other positions). Added to this is the fact that the masc. pl. determiner undergoes a stem change (el ~ los), which indicates plurality even when (s) is deleted. Standard Spanish marks both gender and number redundantly across the NP; but instances of gender re-assignment which I have been collecting, and which are now numerous enough not to be written off as performance errors, may open the door for the masc. pl. determiner to take over as the plural marker in the NP. Occurring in such intimate environments as between determiner and noun, and between noun and adjective, examples of gender re-assignment are found within the simple NP:

(a) unos habichuelas 'some beans' (O.J. 287)
(b) charco buena 'good sausage' (P.O. 42)
(c) los peleas 'the fights' (J.T. 565)
(d) las castigas 'the punishments' (L.T. 142)

The re-assignment goes in both directions: a masculine modifier may modify a feminine noun, as in (a), and a feminine modifier may modify a masculine noun, as in (b); but of the 155 examples collected thus far, 77% go in the direction of masculine marking on feminine nouns.

This phenomenon is reminiscent of developments in Modern French. From a determiner system consisting of le (m.s.), les (m.pl.), la (f.sg.), los (f.pl.), the (s) dropped from the Old French plurals les and las; they then fell together into modern [le], which carries no gender distinction. A transitional period characterized by some variation in gender assignment would logically have existed before such a change was complete.

In Puerto Rican Spanish, of course, we can only speculate about a change which is incipient at best. It does not yet play a major role in resolving the competing tendencies toward reduction and redundancy.
tions play a regular, though not overwhelming, role in the retention of a plural marker, in that deletion is more frequent when it is possible to convey plurality in non-inflectional ways. However, no functional explanation can account for the fact that, out of 1,081 tokens of (s) in contexts in which inflection on the NP was the only source of plural/singular disambiguation, 39% of the markers were nonetheless deleted.

To understand the limited force of functional constraints on (s) deletion, we note that a frequent support of plural information is inflection on the verb. It is this type of context in which plural marking in NP's is most unstable, and in which any advancement of the change process will occur first. Verbal inflection is also variable, of course, and so a study of verbal marker deletion should help in establishing the precise mechanism of the disambiguation process.

6. Verbal (n). In studying the inflection (n), I looked at the same sorts of constraints that were operative for the plural (s):

(8) a. Did a subject NP accompany the verb in question, and if so, did it precede or follow the verb?
   b. Did any additional disambiguating information accompany the verb, and if so, did it precede, follow, or both?
   c. Was the type of disambiguating information morphological or non-morphological? (cf. 5 above.)
   d. Did the verb itself contain some morphophonemic change indicative of plurality? This occurs in the 3sg. copula es and the 3pl. son; it also occurs in the preterit plurals which are differentiated from 3sg. forms by more than affixation of (n) (cf. viene/vienen 'he comes/they come'; vino/vinieron 'he came/they came').

I also investigated the effects of following phonological segment, of following stress, and of formality of speech style on rule application.

From the taped data, 3,184 occurrences of verbal (n) were coded for these factors, each of which contributes in varying degrees to the application of the (n) deletion rule. These contributions were also estimated using the VARBRUL 2 program.

6.1. Results. The data indicate that most of the verbs studied (63%) are not accompanied by a surface-structure subject NP. Person and number here must be marked inflectionally on the verb. If a subject NP is present in surface structure, the tendency is for it to appear in preverbal position (26%). A much smaller percentage of subject NP's (11%) appears in postverbal position. However, of the sentences which contain both a surface subject NP and a VP, 85% of the verbs are

* Careful and casual speech were distinguished as follows. Casual speech included narratives of personal experience; discussions of kids' games or other childhood activity from a child's point of view; tangents, where the speaker went off in a different direction from the interviewer's first push; and group interaction. Careful speech included direct response to the interviewer's questions; discussions of language or other formal institutions, 'soapbox' style; oratorical opinions; and a general body of formal speech not subsumed under any of the above. This general framework was developed by the Project on Linguistic Change and Variation.
accompanied by NPs with no morphological trace of the plural. In these sentences, the only remaining possibility of morphological marking is to affix a variant of (n) onto the verb.

The distribution of the variants of inflectional (n) in the corpus is given in Table 6.

<table>
<thead>
<tr>
<th>VARIANT</th>
<th>% OF OCCURRENCE (n = 3,184)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[N]</td>
<td>32</td>
</tr>
<tr>
<td>[n]</td>
<td>5</td>
</tr>
<tr>
<td>[ŋ]</td>
<td>32</td>
</tr>
<tr>
<td>[Ṽ]</td>
<td>22</td>
</tr>
<tr>
<td>[Ø]</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 6.

Distribution of variants is rather equally divided among velar nasal, homorganic realization with following consonant, and deleted nasal. In other studies of Caribbean dialects (Cedergren, Cedergren & Sankoff 1975, Terrell 1975b), the latter type of realization has been subsumed under the category of deleted variant. In the present study they were coded into two categories, one in which the vowel preceding the deleted nasal retains a nasal quality (thus effectively conveying plural information), and one in which no trace of phonetic nasalization remains on the surface (i.e. phonetic zero). Although the zero variants account for only 9% of the corpus, this is a significant enough proportion to merit further investigation, given the possibility described earlier of total plural (s) deletion from the NP. It is precisely this area, in which the possibility arises of deleting all plural information from the surface of the sentence, which is most crucial to our understanding of deletion and disambiguation.

The results of a variable-rule analysis of deleted plural (n) appear in Tables 7a-b.

<table>
<thead>
<tr>
<th>SPEECH STYLE</th>
<th>FOLLOWING PHONOLOGICAL SEGMENT</th>
<th>FOLLOWING STRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal</td>
<td>Pause</td>
<td>Weak</td>
</tr>
<tr>
<td>Formal</td>
<td>Consonant</td>
<td>Heavy</td>
</tr>
<tr>
<td></td>
<td>Vowel</td>
<td></td>
</tr>
</tbody>
</table>

Table 7a. Contribution of speech style, of following phonological segment, and of following stress to deletion of verbal (n). Input probability: 0.50.

<table>
<thead>
<tr>
<th>TYPE OF 3PL INFECTION</th>
<th>PRESENCE AND PLACE OF NP</th>
<th>PLACE OF DISAMBIGUATING INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Regular’ 0.73</td>
<td>After verb 0.60</td>
<td>After verb 0.58</td>
</tr>
<tr>
<td>‘Irregular’ 0.27</td>
<td>Before verb 0.48</td>
<td>Before verb 0.46</td>
</tr>
<tr>
<td>None</td>
<td>0.42</td>
<td>Before and after 0.46</td>
</tr>
<tr>
<td></td>
<td>0.42</td>
<td>None 0.46</td>
</tr>
</tbody>
</table>

Table 7b. Contribution of type of 3pl. inflection, presence and place of NP, and presence and place of disambiguating information to deletion of verbal (n).

Although informality of speech style favors (n) deletion very slightly, the nature of the following phonological segment and following stress do not appear to affect deletion at all. A striking contrast is the fact that the following phonological
segment was found to have one of the strongest effects on plural (s) deletion. The behavior of these constraints will be clarified as we proceed to examine the effect of functional factors on verbal (n) deletion.

In Table 7b, the factor 'regular' refers to those verbs in which the 3pl. form simply adds (n) to the 3sg. form (e.g. hablaba/hablaba 'he was speaking / they were speaking'). 'Irregular' refers to those verbs in which singular and plural are morphophonemically differentiated by more than the simple addition of (n) (e.g. esfison 'he is / they are'; habló/hablaron 'he spoke / they spoke'). Although deletion on 'irregular' verbs would entail no ambiguity, these verbs show a low probability of deletion (0.27). However, the 'regular' plural verbs, on which deletion entails the most potential ambiguity with the 3sg. form, are precisely those for which probability of deletion is highest (0.73).

Marker deletion in precisely those environments where most information is lost seems counter-functional. However, an identical effect was found by Lemile & Naro and by Guy & Braga for Brazilian Portuguese, which marks plurality on the NP and VP in much the same way as Spanish.

As seen in Table 7b, presence and place of the NP in the string also appear to affect deletion. There is more deletion when the NP follows the verb than when it precedes it, but total absence of an NP appears to disfavor deletion. The factor which has the greatest effect on the operation of the deletion rule in plural verbs, however, is the presence and place of the additional disambiguating information. The place of this information does not necessarily correspond to the place of the NP (as in deleted nominal plurals with no vowel change—cf. 6c, una[0] unha[0]); hence these two categories were treated separately.

No additional disambiguating information of any sort ('none' in Table 7b) is the single factor which disfavors deletion of verbal (n) more than any other factor studied. This means that, if plurality has not somehow been conveyed before the verb is uttered—inflectionally, morphologically, or semantically within the NP, or within the larger context of discourse, or through syntactic arrangement of noun and verb—the verbal marker is retained. (The factor 'none' is a knockout: there were no tokens of this type.) If the disambiguating information either precedes the verb, or both precedes and follows it, then the probability of deletion is the same (contribution 0.46). (As Table 5 showed, accumulation of additional information does not contribute more to the probability of deletion.) The greatest probability of deletion occurs when the disambiguating information follows the verb. It is of interest that Guy & Braga also found that marker retention was rare with postposed subjects in Brazilian Portuguese. I suggest that higher probability of deletion when the disambiguating information follows the verb indicates the operation of a 'repair mechanism' on the part of vernacular Puerto Rican speakers. As we have seen above, if an NP is to appear at all in the surface structure of the sentence, its canonical position is before the verb. Table 7b provides striking evidence that deletion in the verb is avoided if the plural marker is the only means of conveying plural information in the sentence. The higher probability of deletion when plural information follows the verb seems to indicate that insertion of information after the verb may be used as a 'last resort' to avoid producing a sentence which is ambiguous as to number.
Let us turn now to the nature of the disambiguating information—which, as 7a–d indicate, can be inflectional, morphological, syntactic, or semantic. My corpus contained 158 verbs accompanied by NP's with none of these types of disambiguating information. This is the area where we might expect ambiguity if the verbal plural marker was also deleted. These verbs were necessarily marked; otherwise the speaker would have failed to convey plurality.

In any case, the 158 verbs represent only 5% of the data. By rule, the plural verb in vernacular Puerto Rican Spanish is accompanied by some disambiguating information. However, the overwhelming tendency is that this information is not inflectional (i.e., [s] or [b] realization somewhere in the NP). Only 15% of the verbs studied were accompanied by a preceding or following nominal inflection. In fact, the tendency with regard to plural marking in the sentence is to mark plurality on the verb itself, through realization of one or another of the phonetic variants of (n) listed in Table 6 above—all of which (except [b]) effectively convey plurality.

7. Velarization of verbal (n) The deletion of verbal (n) is the final stage in a weakening process which first involves a reduction through velarization (Foley; Cedergren & Sankoff 1975). It is revealing to compare the constraints on this process with those on deletion. Table 8 shows the contribution of some of the factors mentioned above to velarization of verbal (n) (input probability = 0.67).

<table>
<thead>
<tr>
<th>Following phonological segment</th>
<th>Type of 3pl. inflection</th>
<th>Place of NP</th>
<th>Place of disambiguating information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowel</td>
<td>‘Regular’</td>
<td>Before</td>
<td>Before</td>
</tr>
<tr>
<td>Pause</td>
<td>‘Irregular’</td>
<td>After</td>
<td>After</td>
</tr>
<tr>
<td>Consonant</td>
<td></td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Table 8.

When Table 8 is compared with Tables 7a–7b above, the results are striking. When we are dealing with a phonological rule, such as velarization, whose output may have social consequences (if it is a stigmatized variant) but no linguistic consequences (i.e., no loss of information), we find a striking reversal in the contribution of the factors to the implementation of the two rules. Precisely those factors which had the greatest effect on inhibiting deletion (i.e., the functional factors) show little if any effect on the process of velarization. And just those factors which showed no effect on deletion (following phonological segment) have the greatest effect on velarization: either a following vowel or pause is very favorable to velarization of (n), whereas a following consonant (other than [k g]), which were included under the category of ‘homorganic realization with the following consonant’) inhibits it. This phonological effect ties in quite well with what has been found for velarization of (n) in Cuban, formal Puerto Rican (Terrell 1975b), and Panamanian Spanish (Cedergren & Sankoff 1975).

8. Discussion. Given that the plural is one of the most concrete of all inflections, and therefore usually the most intact, its behavior in Puerto Rican Spanish might at first seem unusual. Languages may follow several different strategies to indicate plurality. The evolution of both French and English, for example, shows that they
have retained the plural inflection in the NP, whereas the verb carries much less information. In Puerto Rican Spanish, however, the opposite occurs. We have seen above that Spanish verbs are usually not accompanied by surface-structure subject NP's, except in instances of special emphasis. Such constructions are possible precisely because more information as to person and number is carried within the verb than in either French or English.

These findings confirm a functionalist hypothesis for vernacular Puerto Rican Spanish: there is a tendency for semantically relevant information to be retained in surface structure. However, in contrast with Terrell's findings for Cuban Spanish, the place of surface plural marking will tend to be in the VP, not in the NP. Functional factors show no greater effect on deletion of (s) from the NP than other factor categories studied. The behavior of the verb shows an opposite effect: functional factors inhibit verbal (n) deletion the most.

These findings seem to indicate that final (s) deletion in Puerto Rican Spanish is a sound change which has advanced so far that, rather than being treated as a morphological marker, Puerto Rican (s) is now mainly a phonological entity, undergoing well-defined rules of weakening and elision in certain environments and being retained in others (e.g. word-initial position)—and capable of being re-introduced through learned channels, as by upper-class speakers in formal speech.

Final (n) deletion, however, is a process which depends more on non-phonological considerations, viz. retention of plural information. This evidence suggests that deletion of verbal (n) is not a surface phonological deletion rule, like deletion of (s), but rather a grammatical rule.

Additional evidence for this hypothesis comes from the velarization of verbal (n). If deletion were merely part of a generalized phonological weakening of syllable-final (n), we might expect it to show conditioning like that of velarization. This is clearly not the case.

These results demonstrate clearly how functional factors come into play to inhibit loss of information when inflections are deleted. They might also explain the behavior of different Caribbean dialects with regard to these variables. Vernacular Puerto Rican Spanish has more plural (s) deletion (65%) than either Panamanian (48%, cf. Cedergren) or Cuban (50%, Terrell 1975b). However, it appears to be less advanced in the process of nasal deletion (31%, including [O] variants) than either Panamanian (68%; cf. Cedergren) or Cuban (38%; Terrell 1975a). This study has demonstrated how the operation of functional factors inhibits loss of information in just those environments in which ambiguity is most likely to result. It is conceivable that the same factors are operating in dialects which have high rates of (n) deletion but lower rates of (s) deletion.

Perhaps the most striking of these results is that, while vernacular Puerto Rican Spanish is eliminating redundancy from the surface structure of sentences, it appears to be re-organizing its system of plural marking. The data suggests that what appears to be a surface phonological variation is in fact an-going grammatical change in the underlying rule for plural marking—which implies variability in the syntactic derivation of the sentence. This would explain variation between the standard Spanish plural-marking rule, which copies the plural onto every nominal and verbal element with the same referent, and the vernacular Puerto Rican rule,
which does not require concord. The Puerto Rican Spanish rule appears to require only that the plural be marked somewhere in the sentence. The findings in this study indicate that the verbal inflection (n) is the most favorable environment for conveying information as to person and number.10

It is no surprise that plural marker deletion in Puerto Rican Spanish does not hinder communication. Languages accommodate to phonological reduction processes through a variety of changes in morphology and higher levels of grammar. Though my corpus contained entire sentences with no morphological trace of the plural, there was no case in which ambiguity as to number resulted from marker deletion. It was possible to trace how Puerto Rican Spanish accomplished this by studying the complex interplay of semantic, syntactic, and morphological processes of disambiguation.

REFERENCES


10 Rigorous confirmation of these patterns is expected from an on-going integrated analysis of plural marking on the sentence level, rather than separate analyses of nominal and verbal inflections.


[Received 3 April 1979.]