The realizations of final "s"

in Caracas Spanish,

an experimental study.

by

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ABSTRACT

This thesis consists of six chapters, five of which deal with a particular aspect of the phonetics and phonology of Caracas (Venezuela) Spanish. They are all tied together in a concern for the experimental investigation of certain consonantal developments that are taking place in this variety of the language, specifically the weakening and deletion of /s/.

Chapter 1 gives a general outline of the segmental phonological system of Caracas Spanish. Chapter 2 provides an analysis of the syllable structure in an attempt to explain weakening and deletion whose domain seems to be circuscribed to the syllable. Chapter 3 deals in particular with the different realizations of /s/, as the result of the weakening and deletion processes. A review of the literature is also provided. Chapter 4 attempts to look into the perception of plurality. This notion is marked in the language by several means: inflectionally, semantically and syntactically.Two experiments (one of them a pilot) are reported in which listeners were asked to identify plurality in words presented both in isolation and in context. My main concern was to find out whether the listener was able to perceive the notion of plurality when presented with the different realizations of /s/ as plural markers. It was found that the inflected plural marker was more perceptually salient than other suffixal markers, also, more misperceptions occurred in isolated words than in context bound words. This supports the hypothesis that the notion of plurality is perceived when there is a good deal of phonemic/phonetic information and in its absence semantic, syntactic cues are available to the listener for his recovering of the information. In chapter 5 two experiments are reported. The first one is concerned with vowel duration and the second with vowel formant frequency. The aim of these experiments was to find out whether duration and /or formant frequency can be taken as acoustic correlates of plurality in Caracas Spanish. It was found that there is a relationship between morphological functions and both duration and formant frequency changes which seems to support the prediction of a morphological restructuring in Caracas Spanish. Chapter 6 presents the conclusions drawn from the the relevant findings of the previous chapters.

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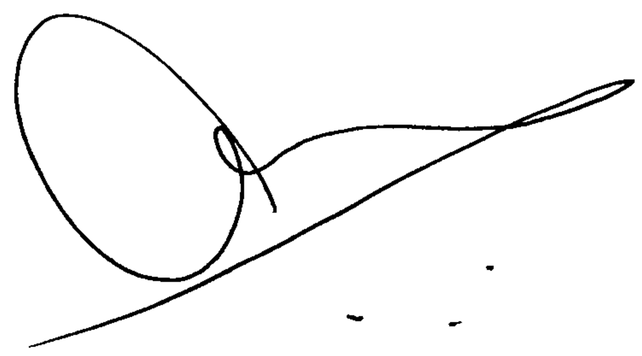
To them, my three "Grahams", I dedicate this work.

DECLARATION

I declare that this thesis is my own work, based on my own research, and that wherever I have drawn from the work of others, I have acknowledged the source.



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Introduction

In this thesis I am concerned with the study of the variety of Spanish spoken in Caracas. Caracas, Venezuela's capital is located at the north of the country. Due to its geographic position, it has been considered to fall into the Caribbean Spanish Dialectal area, together with Cuba, Puerto Rico, the Dominican Republic, Panama, the Caribbean coast of Colombia, and the Atlantic coast of Central America. The main trait all these dialects share is their treatment of final consonants, specially /s/. According to recent studies, other Spanish varieties are showing the same trends as these Caribbean dialects. In effect, weakening and deletion of /s/ has been reported for Argentine (specially the Porteño accent), Uruguayan, Ecuadorian, Chilean and Peruvian Spanish. Some of the phonetic characteristics of the Spanish varieties mentioned are explained as the result of the influence of the indigenous substratum (Malmberg, 1964; Rosenblat, 1967), or as the influence of the speech peculiarities of the first settlers (most of them came from Andalusia and the Canary Islands. cf. Boyd-Boymann, 1964), or as the result of the influence of the Africans brought by the slave trade. The Afro element is very significant in the composition of the Venezuelan population and their cultural influence very strongly felt.

As opposed to other colonial languages, English, Dutch, French and Portuguese, it has been traditionally accepted that no Spanish-based creole exists or has existed in the western hemisphere. Nevertheless, this view has been challenged by Bickerton and Escalante (1970) and Guy (1981). Also Lipski (1986) tries to link Latin-American Spanish developments to an African influence, particularly in relation to the treatment of final consonants. It is nearly impossible though, as Lipski himself found, to isolate the African factor given that reduction of final consonants, particularly "s", occurs in the Caribbean Spanish dialects and in the lowlands of South America, where the presence of both Spanish settlers (from Andalusia and the Canary Islands) and

African slaves is thought to have been the most prolonged and consequently their linguistic influence the strongest.

In present day Spanish, several phonological changes have been documented. In some varieties of the language, as in the Granada dialect (Alonso et al., 1950; Matthews, 1968), such changes seem to be established. In others like Dominican Spanish (Alba, 1981; Terrell, 1981) the processes of change are advancing very rapidly. In the case of Caracas Spanish and of many other Latin-American varieties, a great deal of fluctuation has been observed between the recognized educated norm, the transition stage and what could be called the final product of the process.

In recent years much attention has been devoted to the study of final /s/ in several Spanish varieties, mainly from a sociolinguistic viewpoint. Unfortunately there is very little available on Venezuelan Spanish; there are institutions and individuals undertaking projects geared to the analysis of these and other phenomena (Proyecto de la Norma Culta, Instituto de Filología "Andrés Bello"), but their results are not yet available. In the meantime, I hope this work will help to fill this gap in Caribbean studies. It is not my aim, however, to provide a sociolinguistic study of sound variation and change in Caracas, rather I want to concentrate on the experimental verification of a number of specifically phonetic developments which will form the basis of my discussion throughout this thesis. I am referring in particular to the various realizations of /s/ as a marker of plurality in the noun phrase in the variety of Spanish spoken in Caracas and the influence such various realizations have on the vowel system and syllable structure. I believe these developments are preparing the ground for a substantial modification of the Spanish morphological system.

"Aquel que comienza un trabajo es discípulo de quien lo termina"

R. Menéndez Pelayo

Chapter 1

Brief outline of the segmental phonological system of the variety of Spanish spoken in Caracas (Venezuela)

1. Introduction.

The description of the phonological system of the variety of Spanish spoken in Caracas is based mainly on the observations made by the author of this thesis upon her own spoken form of the language. Informally the results have been tested on other "caraqueño" subjects with the same social and cultural background. Also the Cuestionario para el estudio de la Norma Culta has been used as a general reference in this chapter.

Firstly all the phonemes (consonants and vowels) will be listed. The main descriptions will be given in terms of **three-term-labels** (Abercrombie, ,1967:52). Whenever necessary, more phonetic detail will be given in the course of this chapter. Consonants and vowels are displayed in charts given in Figs. 1.1 and 1.2.

1.1 Description of the consonant system

Consonants in Spanish show a very peculiar distribution when it comes to word-and syllable-initial and word-and syllable-final position. I am aware of this fact, but instead of offering a separate inventory for each of these positions I will give a general account of consonantal occurrence and

restrictions. All the phonological oppositions identified in the language are found in the onset whereas in rhymes most consonants oppositions are neutralized.

When giving the examples, the following convention is used throughout this thesis:

/ /	phonological transcription
[ ]	phonetic transcription
' '	orthographic representation
< >	translation

The consonant system of the variety of Spanish spoken in Venezuela consists of the following phonemes:

Stops

All stops occur freely in onsets but are neutralized in rhymes:

/pero/		'perro'	<dog>
/kopa/		'copa'	<glass>
/apto/	[akto]	'apto'	<able>

/b/ voiced bilabial stop, e.g.

/barko/		'barco'	<ship>
/tambor/		'tambor'	<drum>
/absorber/	[aksoɾβeɾ]	'absorber'	<to absorbe>

/t/ voiceless dental stop, e.g.

/tomar/		'tomar'	<to drink>
/atahar/		'atajar'	<to catch>
/atmosfera/	[akmofeɾa]	'atmósfera'	<atmosphere>

/d/ voiced dental stop, e.g.

/dehar/		'dejar'	<to leave>
/kandela/		'candela'	<fire>
/admitir/	[akmitiɾ]	'admitir'	<to admit>
/siudad/	[sjuðа]	'ciudad'	<city>

/k/ voiceless velar stop, e.g.

/kaer/	'caer'	<to fall>
/roka/	'roca'	<rock>
/pakto/	'pacto'	<pact>

/g/ voiced velar stop, e.g.

/ganar/		'ganar'	<to gain, to win>
/angustia/		'angustia'	<anguish>
/igneo/	[iknjɔ]	'ígneo'	<igneous>

All voiced plosives can be articulated as fricatives when adjacent to liquids or in intervocalic position; in the latter case deletion also occurs, e.g.

/b/

[aβɾiɾ]		'abrir'	<to open>
[aβlandaɾ]		'ablandar'	<to tenderize>
[kaβadʒo]		'caballo'	<horse>
[aɾβɔl]		'árbol'	<tree>
[aβaniko]	[aaniko]	'abanico'	<fan>

The alternation /bue/ /gue/ also occurs, as in:

[bwɛno]	[gwɛno]	'bueno'	<good>
[aβwɛla]	[aɣwɛla]	'abuela'	<grandmother>

but in Caracas is not as common as in the Venezuelan Andes and other areas of Venezuela and the Spanish speaking world.

/d/

[aðɾenalina]		'adrenalina'	<adrenaline>
[aðelante]	[alante]	'adelante'	<ahead, in front>

Particularly well known is the deletion of /d/ in the past participle of verbs, which has been documented as early as the 17th century (Zamora Vicente,

1967). e.g.

	[kansaðo]	[kansao]	'cansado'	<tired>
	[komiðo]	[komio]	'comido'	<eaten>
	[doɾmiðo]	[doɾmio]	'dormido'	<sleep>

/g/

	[aɣɔhto]	[aɣɔhto]	'agosto'	<August>
	[aɣɾaðaβle]		'agradable'	<nice>
	[aɣlutinaɾ]		'aglutinar'	<aglutinate>
	[aɣwa]	[awa]	'agua'	<water>

Fricatives

/f/ voiceless labiodental fricative, e.g.

/forsar/	'forzar'	<to force>
/kafe/	'café'	<coffee>

It is realized as [h] in many cases, especially when followed by [wɛ]:

[hwɛɾsa]	'fuerza'	<strength>
[ahwɛɾa]	'afuera'	<outside>

Very common pronunciations of the word 'profesor' <teacher> amongst students in Caracas (Monsonyi, 1972) is [pɾɔhɛsoɾ] and even [pɾoesoɾ]. This phenomenon seems more generalized in the eastern variety of Venezuelan Spanish (acento oriental).

/s/ voiceless alveolar fricative.

in Caracas /s/ is articulated with the blade of the tongue against the alveolar area. It has been referred to in the literature as (pre) dorsal or laminoalveolar (Malmberg, 1947) as opposed to the apical articulation in Peninsular Spanish, e.g:

/sabor/	'sabor'	<flavour>
/alsar/	'alzar'	<to lift>
/sisne/	'cisne'	<swan>
/alkansar/	'alcanzar'	<to achieve>

In word and syllable final position this phoneme is articulated as [h]. Although its articulation in these positions is identical to that of the phoneme /h/ there is doubt about considering it a member of the phoneme /h/ instead of calling it "modified s" or "aspirated s". The following examples illustrate the structural position in which [h] from orthographic "s" occurs, e.g.:

[kahkaða]	'cascada'	<water-fall>
[mihmo]	'mismo'	<same>
[nihoh]	'niños'	<children>

However we will discuss the variability of "s" in detail in the third chapter of this thesis.

/h/ voiceless glottal fricative, e.g.

/huego/	'juego'	<game>
/ahil/	'ágil'	<agile>
/hara/	'jarra'	<jug>
/oho/	'ojo'	<eye>

A voiced variety is found when preceded by a voiced consonant, e.g.

[fiɱβiɾ]	'fingir'	<to pretend>
[aŋɦel]	'ángel'	<angel>
[alɦeβɾa]	'álgebra'	<algebra>

There is one lexical item, 'reloj' <watch> that could have /h/ word-finally, but as has been documented (Hammond, 1978b), the most common pronunciation for such item is [relo] with deletion of /h/.

Affricates

/tʃ/ voiceless palatoalveolar affricate, e.g.

/tʃuleta/	'chuleta'	<chop>
/tʃokolate/	'chocolate'	<chocolate>
/kontʃa/	'concha'	<shell>

/dʒ/ voiced palatoalveolar affricate, e.g.

/dʒoɾar/	'llorar'	<to cry>
/kondʒugal/	'conyugal'	<conjugal>

In intervocalic position [dʒ] is realized as a glide, e.g.

/adʒuða/	[ajuða]	'ayuda'	<help>
/odʒendo/	[ojɛndo]	'oyendo'	<listening>

Nasals

As in the rest of the Spanish speaking world, Caracas system has three nasals /m,n,ɲ/. Nasals contrast in onset position and are neutralized in rhymes.

/m/ voiced bilabial nasal, e.g.

/mono/	'mono'	<monkey>
/kambio/	'cambio'	<change>
/tomo/	'tomo'	<I take>

/n/ voiced alveolar nasal, e.g.

/nada/	'nada'	<nothing>
/moneda/	'moneda'	<coin>
/kondenado/	'condenado'	<condemned>

/ɲ/ voiced palatal nasal, e.g.

/niɲo/	'niño'	<child>
/aɲo/	'año'	<year>

The alveolar nasal /n/ assimilates its point of articulation to that of the following consonant when syllable final, e.g.:

[kantaðo]	'cantado'	<sang>
[maŋgo]	'mango'	<mango>
[kontʃa]	'concha'	<shell>

This assimilation is carried across word boundaries e.g.

[umbeso]	'un beso'	<a kiss>
[uŋkaro]	'un carro'	<a car>
[undia]	'un día'	<a day>
[uŋʧaɾko]	'un charco'	<a puddle>

The alveolar nasal is also realised as velar in word final position before pause:

[koŋ]	'con'	<with>
[koɾasoŋ]	'corazón'	<heart>

This velar variant in word-final position has a wide distribution in the Spanish speaking world. For Venezuela Rosenblat comments on it as follows:

> "Por lo menos en Venezuela la gente siente la diferencia entre la -n alveolar andina, enfática, y la -n velar relajada de Caracas y el resto del país... En la zona andina de Venezuela se pronuncia una -n alveolar enfática que la gente de Caracas remeda prolongando exageradamente la "ene"". (1967:117-119)
>
> (In Venezuela people hear the difference between the Andean alveolar -n, emphatic, and the Caracas and the rest of the country's velar -n, more relaxed ... In the Andean region of Venezuela an emphatic alveolar -n is pronunced which Caracas people make fun of by prolonging it in a rather exagerated way)

It is important to observe that the velarization of the nasal, even in contexts where assimilation should occur, is progressing very fast in Caracas, as in the rest of Caribbean varieties.

Liquids

/l/ voiced alveolar lateral, e.g.

/lugar/	'lugar'	<place>
/ala/	'ala'	<wing>
/koɾonel/	'coronel'	<colonel>
/alto/	'alto'	<tall>

It is the only lateral phoneme in the Caracas system

/r/ voiced alveolar trill

/ɾ/ voiced alveolar tap

These two phonemes only contrast in intervocalic position, e.g.

/pero/	'perro'	<dog>
/peɾo/	'pero'	<but>
/koro/	'corro'	<I run>
/koɾo/	'coro'	<choir>

In other positions the contrast is neutralized, the trill occurring preferentially in word-initial position and in word-medial after /n/ and /l/, e.g.

[rosa]	'rosa'	<rose>
[enreðo]	'enredo'	<confusion>
[alreðeðor]	'alrededor'	<around>

and the flap occurring in clusters and also in final position except after /n/ and /l/

[apɾender]	'aprender'	<to learn>
[aɣɾjo]	'agrio'	<sour>
[marteh]	'martes'	<Tuesday>
[komer]	'comer'	<to eat>

The phonetic realizations of "r" and "l" are another interesting aspect of phonological variation in Venezuelan Spanish. They range from the standard previously described, to the alternation or mixing of the articulation, aitchification (cf. chapter 3), and complete loss.

The description of other varieties of Spanish shows the wide distribution of this phenomenon (Alonso, 1945; Navarro Tomás, 1963; Zamora Vicente, 1967; Vallejo Claros, 1970; Cedergren, 1973).

D'Introno and Sosa (1978) analyse 9 different variants of "r" and "l" in Caracas and find a correspondence between linguistic and social constraints

1) Weakening

2) Deletion of "r"

3) Change from "r" or "l" to intermediate variant

4) Change from "r" to "l"

5) Change from "l" to "r"

where **1** and **2** are the most widely spread socially and **3,4,5** the most restricted, found to occur mainly in the low social classes.

According to our observations there seems to be a correspondence between the behaviour of "r" and that of "s". The constraints operating in their realizations appear to be of a similar nature.

"r" weakening (aitchification, cf. chap. 3) occurs in preconsonantal position (favorable enviroment for "s" aitchification as well) e.g:

[kahne] 'carne' <meat>

This [h] realization of "r" has been well documented for Puerto Rican and Cuban Spanish; also Florián (1985) observed this realization in El Tigre Spanish (Venezuelan variety). In Sanskrit (Cf 2.4) such weakening also occurs. In the Brazilian variety of Portuguese, informal style, such change has also been documented (Camara, 1972:43-44; Guy, 1981), in syllable-final e.g:

[kahne]	'carne'	<meat>
[pahta]	'parta'	<I would leave>

"r" deletion. The most general occurrence is in the infinitive marker. The infinitive marker is predictable in Spanish due to the system of verb conjugation i.e.

ar	first conjugation ending
er	second conjugation ending
ir	third conjugation ending

If the "r" is deleted, the thematic vowel takes over. As Kiparsky (1971) put it "morphological material which is predictable in the surface tends to be more susceptible to loss than morphological material which is not predictable on the surface" (:67). The same tendency against grammatical redundancy operates for "s" (Cf Chapter 3). It is interesting to observe that also this process of final "r" deletion in the infinitive of verbs also occurs in Brazilian Portuguese at every level of society (Guy, 1981; Votre, 1978).

Fig. 1.1.- **Consonant Chart**

	Bilabial	Labiodental	Dental	Alveolar	Palatal	Velar	Glottal
Plosives	p b		t d			k g	
Fricatives		f		s			h
Nasals	m			n	ɲ		
Laterals				l			
Trill				r			
Flap				ɾ			
Affricates					tʃ dʒ		
Glides	w				j		

1.2 Description of the vowel system

Vowels in Spanish are normally voiced. However in some varieties of the language cases of partial or complete devoicing of the vowels are found, as has been attested by Malmberg (1964) for Mexican Spanish. In certain localities of the Andean region the same kind of phenomenon has been documented (cf. Monsonyi,1972). Also it has been heard in Caracas speech.

In this section, a detailed description is given of the vowels in the variety of Spanish spoken in Caracas. The descriptions made here are articulatory and auditory. The assessment of quality is made in terms of the Cardinal vowels. The distribution of allophones is also given.

As in the rest of the Spanish speaking world, five vowel phonemes can be identified in Caracas Spanish: /i/, /e/, /a/, /o/, /u/.

/i/ front close unrounded.

/e/ front half close unrounded.

/a/ front open unrounded.

/o/ back half close rounded.

/u/ back close rounded.

As has been observed for Standard Spanish (Navarro Tomás, 1963), Spanish vowels have closed and open allophones which occur in open and closed syllables respectively. All vowels may have a nasal allophone which

occurs when in contact with nasal consonants.

Closed allophones:

Closed allophones of the vowels occur in open syllables, mainly stressed; they can also be found in word-final position, unstressed.

/i/

[i] close, front vowel with the quality of Cardinal 1 though a bit lower.

[bino]	'vino'	<wine>
[misa]	'misa'	<mass>
[bitʃo]	'bicho'	<insect>
[ai]	'ahí'	<there>
[sidʒa]	'silla'	<chair>

/e/

[e] It has the same quality of cardinal 2 but a bit lower.The tongue position more retracted and lips not very spread.

[petʃo]	'pecho'	<chest>
[sedʒo]	'sello'	<seal>
[meta]	'meta'	<goal>

/o/

[o] It is lower than cardinal 7:

[pweɾto]	'puerto'	<port>
[toma]	'toma'	<take>
[amiɣo]	'amigo'	<friend>

/u/

[u] It has the quality of cardinal 8 though a little lower:

[puðe]	'pude'	<I could>
[pluma]	'pluma'	<feather>

Open allophones:

Open allophones of the vowels occur in closed syllables, mainly stressed, and also next to consonants [r] and [h].

/i/

[ɪ] The tongue position is much lower than that of cardinal 1.

[bɪhta]	'vista'	<view>
[rɪko]	'rico'	<rich>
[ɪha]	'hija'	<daughter>
[pɪnta]	'pinta'	<he/she paints>

/e/

[ɛ] The tongue position is a little more raised than that of cardinal 3. It is found to occur as the vocalic element in the diphthongs (cf.sect. 1.2.1).

[pɛrɔ]	'perro'	<dog>
[rɛkto]	'recto'	<straight>
[dɛha]	'deja'	<leave>
[pɛjne]	'peine'	<comb>
[pjɛdra]	'piedra'	<stone>
[mɛnta]	'menta'	<mint>

/o/

[ɔ] It has the quality of cardinal 6 but more raised (closer); it is found to occur as the vocalic element in diphthongs.

[bɔlsa]	'bolsa'	<bag>
[ɔha]	'hoja'	<leaf>
[rɔnda]	'ronda'	<shift>
[tɔrɛ]	'torre'	<tower>
[pjɔho]	'piojo'	<louse>
[ɔjɣa]	'oiga'	<listen>

/u/

[ɔ] opener and with lips less rounded than for [u]:

[gɔhto]	'gusto'	<taste>
[arɔɣa]	'arruga'	<wrinkle>
[asɔl]	'azul'	<blue>

All vowels have a shorter allophone which occurs in unstressed position. These allophones devoice mainly in word-final position although they are also devoiced and deleted in pretonic and postonic position next to voiceless consonants and in initial position before nasals.

/i/

[ɪ] It is more retracted than [ɪ̞] and also shorter.

[polɪsia]	'policía'	<policeman>
[katolɪko]	'católico'	<catholic>
[ɪmposi̞βle]	'imposible'	<impossible>
[mposi̞βle]		
[ɪmfante]	'infante'	<infant>
[ɪ̃fante]		
[ɪmportante]	'importante'	<important>
[ɪtaljano]	'italiano'	<Italian>

/e/

[ɛ] It has the same quality as [ɛ]

[kotʃɛ]	'coche'	<push chair>
[parɛsi̞ðo]	'parecido'	<similar, alike>

/a/

[ɐ] It is not a fully open vowel, lips are kept fairly neutral.

[sa̞βɐna]	'sábana'	<sheet>
[kasɐ]	'casa'	<house>

/o/

[ɔ̝] It has the same quality as [ɔ] but much shorter:

[fɔ̝hfɔ̝o]	'fósforo'	<match>
[lok ɔ̝]	'loco'	<crazy>
[kas ɔ̝]	'caso'	<case>

/u/

[^{u}] the same quality as [u] but shorter

[kapit^{u}lo]	'capítulo'	<chapter>
[^{u}ŋgwento]	'ungüento'	<ointment>

/a/ front open unrounded.

[a] The quality of this vowel is slightly more retracted than cardinal 4. According to Navarro Tomás (1963) it is very similar to the French vowel in 'part'. The lips are not very spread; it is found to occur in open and closed syllables, except those closed by [l].

[laβjo]	'labio'	<lip>
[baka]	'vaca'	<cow>
[kaktar]	'captar'	<capture>
[kaptar]		

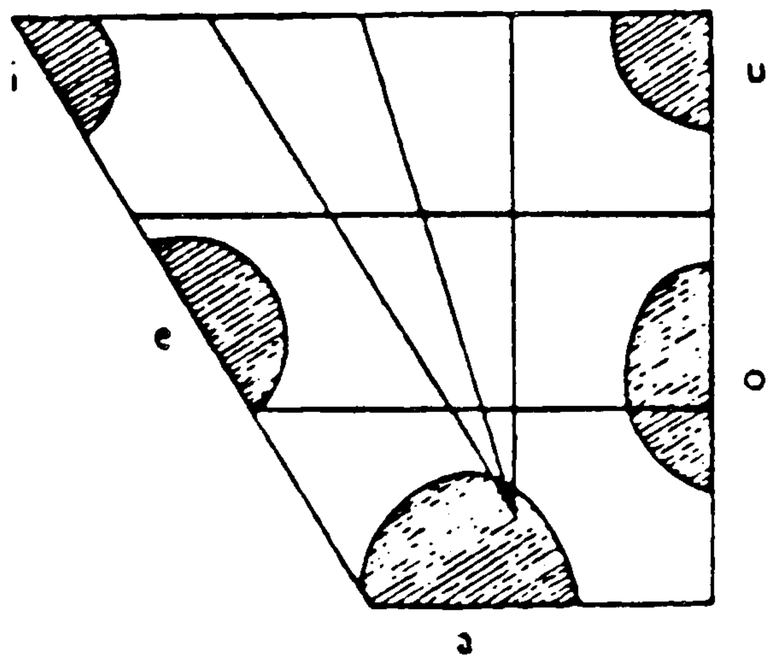
[a] slightly raised. It is found to occur before palatal consonants:

[matʃo]	'macho'	<macho>
[madʒo]	'mayo'	<may>

[ɑ] It has the quality of cardinal 5 but a little bit more advanced; it occurs in syllables closed by [l] and in open syllables before [o], [u], and [h].

[ehpɑlda]	'espalda'	<back>
[bakalɑo]	'bacalao'	<cod fish>
[kɑoh]	'caos'	<chaos>
[pɑha]	'paja'	<straw>

Fig. 1.2.- **Vowel space for Spanish**



1.2.1 Vowel Combinations

Spanish has complex syllable nuclei, formed by a vowel accompanied by a glide. Theoretically, a glide is described as the "incidental transitory sound produced when the organs of speech are passing from the position for one speech sound to that of another" (D.Jones 1976:2; cf. also Fant, 1973).

The combination of vowel plus glide is what traditionally has been called diphthong and there are two types in Spanish: rising and falling diphthong, depending on whether the glide precedes or follows the vowel as in [kwɛnto] 'cuento' <I count> and [kajkara] 'Caicara' <name of a town> (Fig. 1.3)

Fig. 1.3.- **Spanish diphthongs**

Rising				Falling			
[ja]	[sjanuɾo]	'cianuro'	<cyanoid>	[aj]	[kajɣo]	'caigo'	<I fall>
[jɛ]	[sjɛlo]	'cielo'	<sky>	[ɛj]	[pɛjne]	'peine'	<comb>
[jɔ]	[pjɔhɔ]	'piojo'	<liee>	[ɔj]	[ɔjɣa]	'oiga'	<listen>
[wa]	[kwatɾo]	'cuatro'	<four>	[aw]	[kawtʃo]	'caucho'	<tyre>
[wɛ]	[kwɛɾpo]	'cuerpo'	<body>	[ɛw]	[fɛwð̞o]	'feudo'	<feud>
[wo]	[kwota]	'cuota'	<quota>	[ow]	[bow]	'bou'	<kind of boat>
[wi]	[kwiðaðo]	'cuidado'	<care>	[ju]	[sjuða]	'ciudad	<city>

The phonological interpretation and therefore the phonemic representation of the so called semivowels, semiconsonants or glides, has been a matter of controversy for Spanish phonologists (Bowen and Stockwell, 1955, 1956; Saporta, 1956). It also seems to be the case in Portuguese phonology (Camara, 1953, 1972).

The Hispanic tradition (Navarro Tomás, 1946; Alarcos 1965) has for long considered [j] and [w] as functional allophones of the vowels /i/ and /u/ respectively.

Cressey (1978) considers that not all phonetic glides are represented by the same phoneme. Also Alarcos (1965) and Harris (1969) analyse some instances of [j] as /i/ and others as /dʒ/. To Cressey there are in Spanish glides derived from vowel phonemes and glides derived from glide phonemes; the main difference between the two is that in the former there is the alternation vowel[+syllabic]/glide[-syllabic] e.g. [miamoɾ]/ [mjamoɾ] 'mi amor' <my love> (Cressey 1978:78,79), whereas in the latter such alternation does not take place.

If two glides are involved, the combination is called triphthong, as in:

[koŋfjajs]	'confiáis'	<trust>
[oðjejs]	'odiéis'	<hate, 2nd person subj.>
[gwajkajpuro]	'Guaicaipuro'	<name of an indian chief>
[bwej]	'buey'	<ox>

The problem concerning the status of these sounds and whether to consider them consonants, vowels, glides or anything else remains an open question in Spanish Phonology and it is outside the scope of this thesis. For the purpose of our transcription they are going to be represented

phonologically as /i/ and /u/, and phonetically as [j] and [w] to indicate that they are not syllabic.

There is a kind of vowel combination called hiatus in which two contiguous, both syllabic vowels belong to different syllables, examples:

/kaer/ 'caer' <to fall>

/poema/ 'poema' <poem>

There is in Spanish, as documented by Navarro Tomás (1963), a tendency against hiatus, the result being that these groups end up being reduced to vowel + glide or glide + vowel (diphthong). Geckeler and Ocampo (1973) observed the following types of reduction in the Andean area of Venezuela:

```
/ae/ --> [aj]:[kajn]     for [kaen]     'caen'      <they fall>
/ea/ --> [ja]:[rjal]     for [real]     'real'      <royal>
/eo/ --> [jɔ]:[pjɔr]     for [peor]     'peor'      <worse>
/oa/ --> [wa]:[almwaða]  for [almoaða]  'almohada'  <pillow>
/oe/ --> [wɛ]:[kwɛte]    for [koete]    'cohete'    <rocket>
                                                    (1973:71)
```

Also in Caracas, we have noticed that across word boundaries reduction of the following types occur:

'qué hubo'	<what's up>	/keubo/	[kjuβo]
'la estación'	<the station>	/laestasjon/	[lehtasjoɲ]
'está en casa'	<is at home>	/estaenkasa/	[teŋkasa]
'la urgencia'	<the urgency>	/laurhensja/	[luɾhensja]

If we observe the following words:

					st.1		st.2
a)	<each>	'cada'	[kaðа]	->	[kaa]	->	[ka]
	<nothing>	'nada'	[naða]	->	[naa]	->	[na]
	<everything>	'todo'	[toðo]	->	[too]	->	[to]
	<he can>	'puede'	[pwɛðe]	->	[pwɛɛ]	->	[pwɛ]
b)	<bit>	'pedazo'	[peðaso]	->	[peaso]	->	[pjaso]
	<all that>	'todo eso'	[toðoeso]	->	[toeso]	->	[tweso]
	<still yet>	'todavía'	[toðaβia]	->	[toaβia]	->	[twaβia]

we can observe that a hiatus is created by the loss of an intervocalic consonant (stage 1). When the vowels are the same as in **a)** the hiatus undergoes simplification and a single vowel remains (stage 2). When the vowels are different as in **b)** a glide formation is on the way and a diphthong if formed (stage 2). This process of glide and diphthong formation has some effect in the syllable structure, as it triggers resyllabification. In any case, the contracted or simplified form seems to be preferred by "caraqueño" speakers.

Chapter 2

Spanish Syllable Structure.

2. Introduction.

The fact that certain consonant combinations are permissible in Spanish and others are not, means that there are in the language phonological rules which constrain the way segments are related syntagmatically.

Spanish syllable structure will be considered in detail in order to describe some phonological processes that seem to operate within the domain of the syllable and also to account for the distribution of segments and their variation according to syllable environments.

The analysis of the data will follow the principles stated in the research of Harris (1983). Harris' division of the syllable into Onset (O) and Rhyme (R) will be assumed throughout this chapter, just as his rules for the formation of onsets and rhymes and his rules for (re)syllabification.

It has been said (Navarro Tomás, 1946; Malmberg, 1964; Hooper, 1976) that Spanish has a preference for syllables of the type CV and that processes of vowel contraction, consonant cluster simplification and consonant deletion, are all natural processes for the language to achieve this ideal syllable shape CV. It is possible, though, to find complex syllable types in Spanish. The following are the possible vowel/consonant combinations in any Spanish syllable. It is assumed that C stands for consonant and V stands for vowel:

CV	/ka.ba.dʒo/	'caballo'	<horse>
CVC	/kal.kar/	'calcar'	<to copy>
CCV	/pro.te.her/	'proteger'	<to protect>
CCVC	/tron.ko/	'tronco'	<trunk>
CCVCC	/trans.por.te/	'transporte'	<transport>
CVCC	/kons.ta/	'consta'	<to consist>
VCC	/eks.tra.er/	'extraer'	<to extract>
VC	/al.tar/	'altar'	<altar>
V	/a.gua/	'agua'	<water>

From these syllable types certain rules for the wellformedness of the syllable in Spanish can be derived

-Every syllable in Spanish must have one vowel (V)

-Every V must be related to one syllable

-The maximum occurrence is of two C's in the onset and two C's in the rhyme

In this chapter it is intended to describe as well as to discuss the distribution of the segments in the syllable structure of Spanish and the restrictions derived from it. Special attention will be given to distributional patterns of consonant combinations in Caracas Spanish.

Any consonant of Spanish might initiate a syllable. Hooper (1976) provides a "universal hierarchy" of suitability of segments for syllable initial and final positions, as follows:

Optimal syllable initials		Optimal syllable finals
	obstruents	
	nasals	
	liquids	
	glides	
	vowels	

(Hooper, 1976:196)

It is interesting, as Hooper herself observed, that the syllable initial hierarchy is the exact reverse of the syllable final hierarchy.

In this chapter a consonant strength scale for the variety of Spanish under study will be presented in section 2.3.3 together with a discussion of the scales already suggested for the Spanish language. In this way more information will be added about the processes of weakening of fricatives, namely aitchification (cf.chapter 3) and deletion, and the relationship between segment and position in the syllable and word will be captured.

2.1 Consonant Combinations

By the term consonant combination both "consonant sequence" and "consonant cluster" are covered. A distinction needs to be drawn between the two. Following Pulgram (1965) a series of consonants will be considered as a cluster if they occur in the same syllable and as a sequence if in two consecutive syllables.

The language variety to be analysed here is educated standard Caracas Spanish. The consonant combinations presented here are all extracted from recordings of my own speech and of five other native speakers.

In Spanish there are sequences and clusters whose occurrence is confined only to very careful pronunciation; as we will see the general tendency is towards their simplification.

2.1.1 Consonant Sequences

There are certain words in Spanish where it is possible to find, orthographically, sequences of two, three, and sometimes four consecutive consonants distributed in two different syllables. Most of these words are "learned words".

Sequences of two consonants are the most common in occurrence. When the first consonant of such sequences is a plosive, it is often found that no matter what the plosive might be, it is normally realized as [k] and in very few cases as [g]; in any case as a velar, e.g.

'apto'	[akto]		<able>
'obtener'	[oktenɛɾ]		<to obtain>
'abdicar'	[akdicaɾ]		<to abdicate>
'étnico'	[ekniko]		<ethnic>
'absorber'	[aksoɾβeɾ]		<to absorb>
'objetar'	[okhɛtaɾ]		<to object>
'opción'	[oksjɔŋ]		<option>
'admitir'	[akmitiɾ]	[aɣmitiɾ]	<to admit>
'cápsula'	[kaksula]	[kawsula]	<capsule>

In some instances, the plosive is replaced by a vowel as for example in 'cápsula' [kawsula], though [kaksula] is more common. This vocalization of the plosive resembles historical changes:

Latin		Spanish
captivu	>	cautivo
baptizare	>	bautizar.

It may also be the case that when the plosive is followed by a nasal, the plosive assimilates the nasality but still adopting a velar gesture, e.g.

/b$n/	[ŋ$n]	[aŋneɣasjɔŋ]	'abnegación'	<self-denial>
/t$n/	[ŋ$n]	[eŋniko]	'étnico'	<ethnic>
/t$m/	[ŋ$m]	[aŋmofeɾa]	'atmósfera'	<atmosphere>
/k$n/	[ŋ$n]	[aŋne]	'acné'	<acne>
/g$n/	[ŋ$n]	[maŋno]	'magno'	<great>
/g$m/	[ŋ$m]	[maŋma]	'magma'	<magma>

In sequences of two nasals, the same velar gesture applies to the first nasal of the sequence, e.g.

/m$n/	[ŋ$n]	[aŋnesja]	'amnesia'	<amnesia>
/n$m/	[ŋ$m]	[iŋmoβil]	'inmóvil'	<inmovable>
/n$n/	[ŋ$n]	[iŋnoβaɾ]	'innovar'	<innovate>

In sequences in which the first consonant is a fricative, the tendency is towards the aitchification of the fricative although assimilation also may occur e.g.

/f$t/	[h$t]	[ahtosa]	'aftosa'	<aphthous>
/s$p/	[h$p]	[ahpa]	'aspa'	<sail>
/s$f/	[f$f] [f]	[efeɾa]	'esfera'	<sphere>

These facts seem to confirm the tendency observed in Caracas and in Caribbean Spanish in general towards the backing of consonants in rhymes.

In the cases where there is a sequence of three orthographic consonants, the medial one being "s", the tendency seems to be towards the simplification of the cluster in the rhyme, by deleting the first consonant of the cluster. This mechanism leaves the 's' followed by a consonant, which is the context for aitchification (cf chapter 3) to take place, e.g.

'obstáculo'	[ostakulo]	[ohtakulo]	<obstacle>
'experto'	[espeɾto]	[ehpeɾto]	<expert>

When the consonant preceding "s" is a nasal the same principle stated above holds but, in addition, the following alternations have been observed, e.g.

'transporte'	[trahporte]	[tramporte]	<transport>
'instituto '	[ihtituto]	[ĩtituto]	<institute>

Sequences of four orthographic consonants in a word are not very common in Spanish, e.g.

'inscripción'	[iŋkɾiksjɔŋ]	<inscription>
'instrucción'	[inɾuksjɔŋ]	<instruction>
'abstracción'	[ahtɾaksjɔŋ]	<abstraction>

These sequences invariably involve a syllable-final "s" which intervenes between a preceding consonant and a following cluster. The four consonants may be articulated but only in very careful pronunciation; what happens most of the time is that the two consonants in the onset are unaffected whereas in the rhyme the same simplification procedure already mentioned for sequences of three consonants takes place.

2.1.2 Consonant Clusters

When two or more consonants occur in the same syllable, there is said to be a cluster. In Spanish there are clusters of no more than two consonants the second of which is very often a liquid /ɾ,l/ or in some instances /s/ . On the whole, the number of permissible clusters is very limited. The nature of the consonants that form the cluster constrains its occurrence in certain positions. The table below shows the generally expected clustering pattern for Caracas Spanish:

Table 2.1.- **Expected clustering pattern for Caracas Spanish**

	/r/	/l/	/s/
/p/	prado aprender	placa aplicar	
/b/	bronze abrazar	blusa hablar	abstracto
/t/	trabajo atravesar	atlas	
/d/	drama adrenalina		adscribir
/k/	creer acrecentar	clavo aclarar	extraño
/g/	gracia agradable	glosa aglutinar	
/n/			instituto
/f/	afrenta franela	aflojar flojo	

Onset Clusters

Out of the 17 consonantal phonemes of Spanish only 7 may initiate an onset cluster. They are the plosives and the labiodental fricative. An onset cluster, then, consists of a single obstruent followed by a liquid /l/ or /ɾ/.

/p/	/l,ɾ/	[plato]	'plato'	<plate,	[pɾonto]	'pronto'	<soon>
		[kopla]	'copla'	<verse>	[apɾende]	'aprende'	<learn>
/b/	/l,ɾ/	[blaŋko]	'blanco'	<white>,	[bɾaβo]	'bravo'	<angry>
		[aβlo]	'hablo'	<I talk>	[aβɾiɾ]	'abrir'	<to open>
/t/	/l,ɾ/				[tɾapo]	'trapo'	<cloth>
		[atlas]	'atlas'	<athlas>	[patɾja]	'patria'	<country>
/d/	/ɾ/				[dɾama]	'drama'	<drama>
					[maðɾe]	'madre'	<mother>
/k/	/l,ɾ/	[klaɾo]	'claro'	<clear>	[kɾeo]	'creo'	<believe>
		[siklonŋ]	'ciclón'	<cyclon>	[akɾe]	'acre'	<acre>
/g/	/l,ɾ/	[glosa]	'glosa'	<gloss>	[gɾano]	'grano'	<grane>
		[rɛɣla]	'regla'	<ruler>	[oχɾo]	'ogro'	<ogre>

/f/	/l,ɾ/	[flako]	'flaco'	<skiny>	[frio]	'frío'	<cold>
		[rɪfle]	'rifle'	<rifle>	[sufre]	'sufre'	<suffer>

From the inventory above, the following generalizations can be made concerning Spanish onset cluster formation:

1. Only clusters of obstruent plus liquid are allowed.
2. In word-initial t and d do not cluster with l at all.
3. In syllable-initial tl is permissible in some varieties but not in others; dl is not allowed at all.
4. tr and dr are permissible in all Spanish varieties.

According to Harris (1983) dialects that allow /tl/ as well as /tr/ and /dr/ but exclude /dl/ have a filter by which they mark constituents as deviants under specified conditions (:32, 33). He looks at the feature specification of the segments in question in order to assess the distribution of these clusters.

Rhyme clusters

In spite of the fact that Spanish has syllable-final clusters, it is impossible to find any in word-final position. Furthermore, it is not possible to find clusters of more than two consonants in syllable-final position, their combination being very restricted. Only /s/ can possibly be the second element in the cluster. The first consonant of the cluster can either be an alveolar nasal /n/, or a plosive which is the product of an earlier neutralization (cf.chapter 1). However, these clusters are very seldom actualized in the language and their occurrence is limited to very careful pronunciation. What happens is very similar to what we have already pointed out for consonant sequences, that is, the consonant preceding /s/ is deleted and the remaining /s/ subjected to aitchification. When the consonant preceding /s/ is /ɾ/, the inverse occurs, the liquid is kept and the /s/ is deleted.

	/s/				
/b/	'abstracto'		[astɾakto]	[ahtɾakto]	<abstract>
/d/	'adstrato'		[astɾato]	[ahtɾato]	<adstratum>
/k/	'extraño'		[ɛstɾaɲo]	[ɛhtɾaɲo]	<strange>
/n/	'instituto'	[ĩntituto]	[ɪstituto]	[ɪhtituto]	<institute>
/r/	'perspectiva'	[peɾpektiβa]			<perspective>

2.2 Weakening and Strengthening in relation to Syllabification.

The term weakening has been widely used in phonology, specially in relation to sound changes. According to Vennemann (as cited in Hyman 1975:165) *"a segment X is said to be weaker than a segment Y if Y goes through an X stage on its way to zero"*. In many cases, processes of weakening as well as processes of strengthening seem to be environmentally controlled and syllable position is considered to be a conditioning factor for these processes to take place (Cf. Foley, 1977).

Alonso (1945) and Malmberg (1965) agree that syllable-final consonants are unstable in Spanish and there seems to be enough evidence from all varieties of Spanish to show that indeed, the number of consonantal phonemes occurring in final position (word/syllable) is very small. All consonants of Spanish may occur in syllable-initial position; thus all contrasts are possible in that position. Syllable-final position has a much smaller inventory. Initial position is considered a position of strengthening whereas final position is regarded as a weakening position, and there seems to be a great deal of phonological evidence to suggest that syllable-initial position is universally stronger than syllable-final position (Lass and Anderson, 1975).

Diachronic evidence also attests the relative weakness of syllable-final position. The loss of consonants in syllable-final position is extremely common in the evolution from Latin to Romance, e.g.

Lat.	It.	Sp.	Port.	Fr.
sĕptĕm	sette	siete	sete	sept
sŭnt	sono	son	saõ	sont

In Modern Spanish we can see very clearly this tendency towards the weakening of consonants in syllable-final position and hence a neutralization of a series of oppositions which are otherwise preserved in word-initial position.

The voiced/voiceless distinction is neutralized in syllable-final position (Malmberg, 1971), as it has been already pictured in the treatment of plosives (Cf. Chapter 1).

The opposition /r/ vs. /ɾ/ is also neutralized in word/syllable-final position, as well as in word-initial, whereas it is maintained in syllable-initial (intervocalic) position.

To Guitart (1974) the loss of the distinction between /f/ /θ/ /s/ that he notices in Cuban Spanish, all three being realized as [h] in syllable-final position, is a question of phonetic neutralization as opposed to phonemic neutralization. Guitart refers to it as the exclusion of a surface-phonetic segment from a given environment but without any loss of systematic phonemic contrast.

As shown by Alonso (1945) regarding nasals in Spanish, the different nasal articulations are not distinctive in syllable-final position, "lo que vale fonológicamente en la nasal final de sílaba es la resonancia nasal" (what counts phonologically in the syllable-final nasals is the nasal resonance) (:95). When in syllable-final position, the nasal assimilates its point of articulation to that of the following consonant; however, it is becoming common for the velar nasal to be extensively used in syllable-final position even when rules of assimilation indicate that other particular articulation should be realized:

<to change> 'cambiar' /kambjar/ [kaŋbjaɾ]

<hymn> 'himno' /imno/ [iŋno]

Across word boundaries it is interesting to observe how the velar nasal is used as a demarcative device to signal the end of a word:

'un anciano' <an old man> [uŋansjano]

'son huevos' <are eggs> [soŋwɛβɔh] vs. 'son nuevos' <they are new> [sonwɐβo]

'esta noche' <tonight> [tanotʃe] vs. 'están ocho' <they are eight> [taŋotʃo]

'enagua' <skirt> [enaɣwa] vs. 'en agua' <in water> [eŋaɣwa]

It has to be pointed out that in Spanish, syllable boundaries do not necessarily coincide with word boundaries. In the examples above we can observe that although the velar nasal signals the end of a word, it is, by means of resyllabification, assigned to the next syllable. In the examples above and below we also observe this tendency to resyllabify by assigning an intervocalic consonant to the following syllable even if such consonants belong to the preceding word:

[u$nombɾe] 'un hombre' <a man>

[do$sombɾe] 'dos hombres' <two men>

This tendency was also present in Latin when it came to double consonant simplification or to the reduction of a combination of consonants:

the group **mb** ---> **m**

lu**mb**u ---> lomo

The same group **mb** in present day Spanish follows the same path

'también' ---> [tamjɛŋ] <also>

These changes can be interpreted then as the tendency of Spanish to resyllabify in order to maintain a syllabic principle by which the structure of the syllable strongly tends to be **CV**.

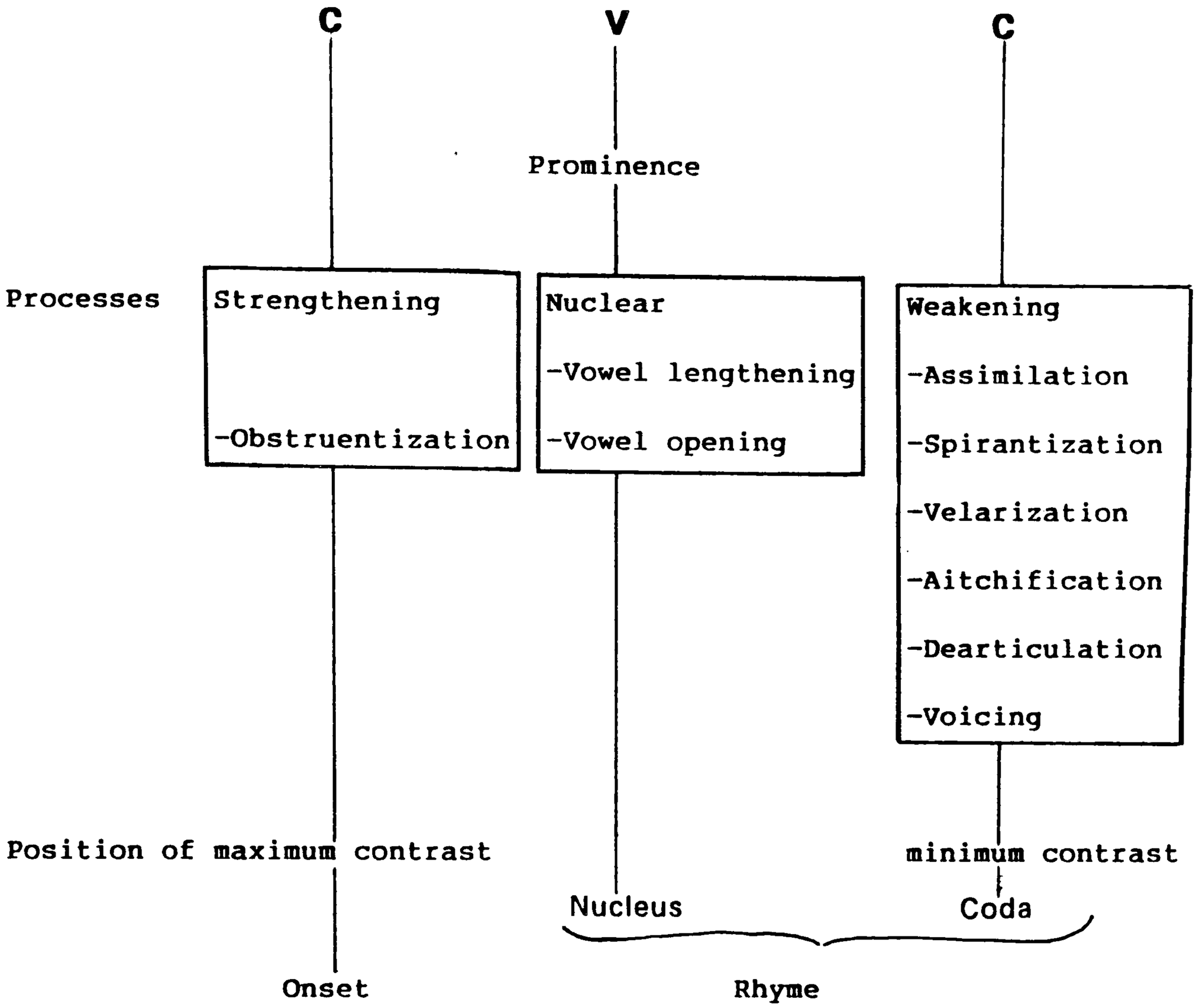
Navarro Tomás (1946) gives the percentage of different syllable types for Spanish where **CV** shows by far the highest percentage, therefore the preferred syllable structure:

ba	**58.45%**	**bba**	**4.70%**
bab	**27.35%**	**ab**	**3.31%**
a	**5.07%**	**bbab**	**1.12%**

*(b=C; a=V) (As in Navarro T., 1946:47)

Table 2.2 represents the relationship between syllable structure and preferential positions for phonological processes to take place.

Table 2.2 Phonological processes and syllable structure



Syllable rhyme position is considered a prime weakening environment and the processes that progress in that part of the structure will advance and consolidate in such a way that syllable final consonants will most surely disappear and with it the **CV** syllable shape will increase.

Nevertheless some consonants undergo weakening processes in initial position. Harris's (1969: 37-40) example of spirantization of voiced consonants in Spanish which may occur in syllable-initial position:

[paðɾe] 'padre' <father>

[aɣo] 'hago' <I do>

shows that although the internal structure of the syllable is a very important factor conditioning phonological processes, contact between segments belonging to different but contiguous syllables is also important and both aspects might determine phonological rules.

2.3 Consonantal strength hierarchies and syllable structure.

The idea of ranking elements in a hierarchical order has been referred to by scholars as early as Jespersen (1913) and Saussure (1915) (as cited in Hooper, 1976:197,198, and briefly discussed in Drachman, 1976:87) with their classification and ranking of sequences according to their degree of sonority (Jespersen) and aperture (Saussure).

The notion of phonological strength has been used recently by many phonologists in the interest of setting up models of consonantal hierarchies expressed in terms of scales. The definition of strength is associated with a high value on a scale, set according to certain parameters whether abstract, articulatory, or acoustic. These scales take the form

```
X        Y        Z
---------------------->
1        2        3
```

where the first string X,Y,Z represents the phonological elements or segment-classes. The second string 1,2,3 refers to the increasing strength value of the elements. Both strings are connected in the sense that given their correspondence it reflects an internal relationship between the segments in respect to one another. So then X is relatively weaker than Y and Y is relatively weaker than Z.

This notion of phonological arrangement or scaling of phonological segments has been extended to the ranking of phonological environments, so that a given environment can be characterized as relatively weak or relatively strong according to the degree to which it conditions phonological processes,

especially those characterized as weakening or strengthening processes.

In this section I will focus on two aspects: first a review of the literature concerning the issue, in particular that which deals with the Spanish language in detail (Hooper, 1976; Foley, 1977), and second the building of a strength hierarchy for Venezuelan Spanish consonants. The fact that the building of such a scale for this variety of Spanish is attempted, specifically stems from the fact that, as has been observed in the works of Bauer (1983), Hooper (1976), Vennemann (1972), Árnasson (1980) and also indicated by Lass and Anderson (1975), there is not enough evidence to claim that strength hierarchies are universal. Moreover, different dialects of the same language may use different versions of a given hierarchy, as has been shown by Bauer (1983) in his analysis of Danish.

Vennemann (1972) and Hooper (1976) attempt to develop an explanation of phonotactic constraints by correlating the strength of a consonant with the strength of its position in a syllable, so that syllabification rules and syllable structure processes, they claim, operate in accordance with general conditions that are expressed in phonological strength hierarchies. Árnasson (1980) applies Vennemann's and Hooper's scales to the problem of vowel quantity and stress in modern Icelandic, to find examples of assimilatory processes which go counter to these scales, and consequently prefers to concentrate on the distributional behaviour of segments.

I wish now to give careful consideration to two particular models of phonological strength which have some significance for the Spanish language. I am referring in particular to Hooper's (1976) and Foley's (1977) scales of phonological strength.

2.3.1 Foley's scale of phonological strength.

One of Foley's (1977) main arguments is that "phonology is not the study of sounds but the study of rules. Phonological elements are thus properly defined not in terms of their acoustic or articulatory properties but in terms of the rules they participate in" (:5,6). The relations amongst elements in his scales are intended to be abstract relations determined by the propensity of the elements to undergo certain phonological processes specially those associated with weakening or strengthening. The internal structure of these processes is governed by The Inertial Development Principle. Following this principle (notice the circularity), strong elements strengthen first and preferentially in strong environments and likewise weak elements weaken first and preferentially in weak environments. Foley classifies strong and weak environments as follows:

Strong	**Weak**
- initial	- final
- postnasal	- intervocalic
- postonic	- postatonic

(As in Foley, 1977:107,109)

Foley's scales then are internal systems of abstract relations in which the elements have no phonetic motivation. Nevertheless when he classifies the elements in his scales he uses traditional phonetic denominations which correspond to phonetic articulatory and acoustic parameters, although he denies that this has any significance, arguing that those denominations are meant to be abstract representations of classes of sounds, just convenient labels, *whose phonetic realization does not bear any significance at the phonological level.* This somewhat extreme position has deservedly brought

him considerable criticism from his fellow scholars e.g. Smith, (1981) who, at the other extreme claim that any theory should have some sort of external justification and that labels such as the ones used by Foley should contain some sort of empirical information derived from observable facts, i.e. in terms of phonetic data (cf. Ohala, 1974). As Lass and Anderson (1975) put it, "these facts will always..... be strictly 'phonetic' ..... the anatomy of the vocal tract, the mode of formation of various segments, their feature composition" etc.

Having made these observations we can consider Foley's scales of phonological strength. According to Foley consonants are ordered along two scales of relative strength. The first scale, the $-\alpha$ scale, seems to correspond to the phonetic articulatory parameter place of articulation, and it looks like

```
g          d          b
---------------------->
1          2          3
```

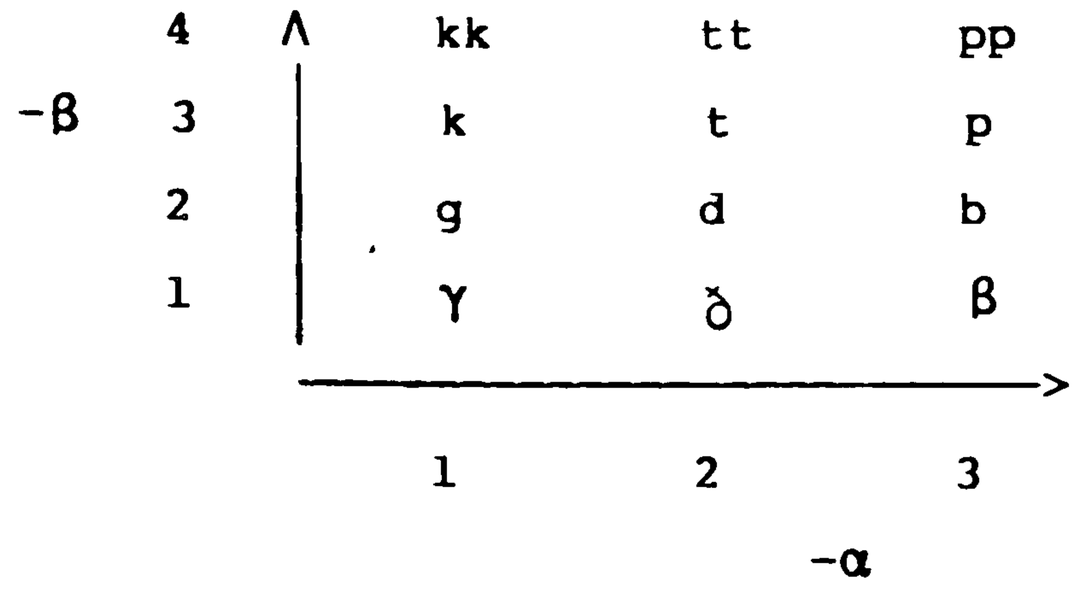
In this scale, velars are ranked as the weakest elements, labials as the strongest and dentals somewhere in between.

The second scale, the $-\beta$ scale, corresponds to the phonetic parameter manner of articulation and it looks like:

```
4    ↑    kk    tt    pp
3    |    k     t     p
2    |    g     d     b
1    |    ɣ     ð     β
```

(Foley 1977:34)

Combining both the $-\alpha$ and $-\beta$ scales, Foley gives the following display:



(Foley 1977:34)

Foley asserts that he knows of no evidence contradicting the order of elements on the $-\beta$ scale. On the $-\alpha$ scale, on the other hand, he mentions that velars are always the weakest but the dental/labial order may be reversed, therefore admitting its lack of universal validity.

Foley finds justification for his universal strength hierarchies in historical changes and draws evidence from a number of languages including Spanish.

Latin	**Spanish**
lĕgĕre	leer
crēdĕre	creer
habēre	haber

(Foley 1977 : 32)

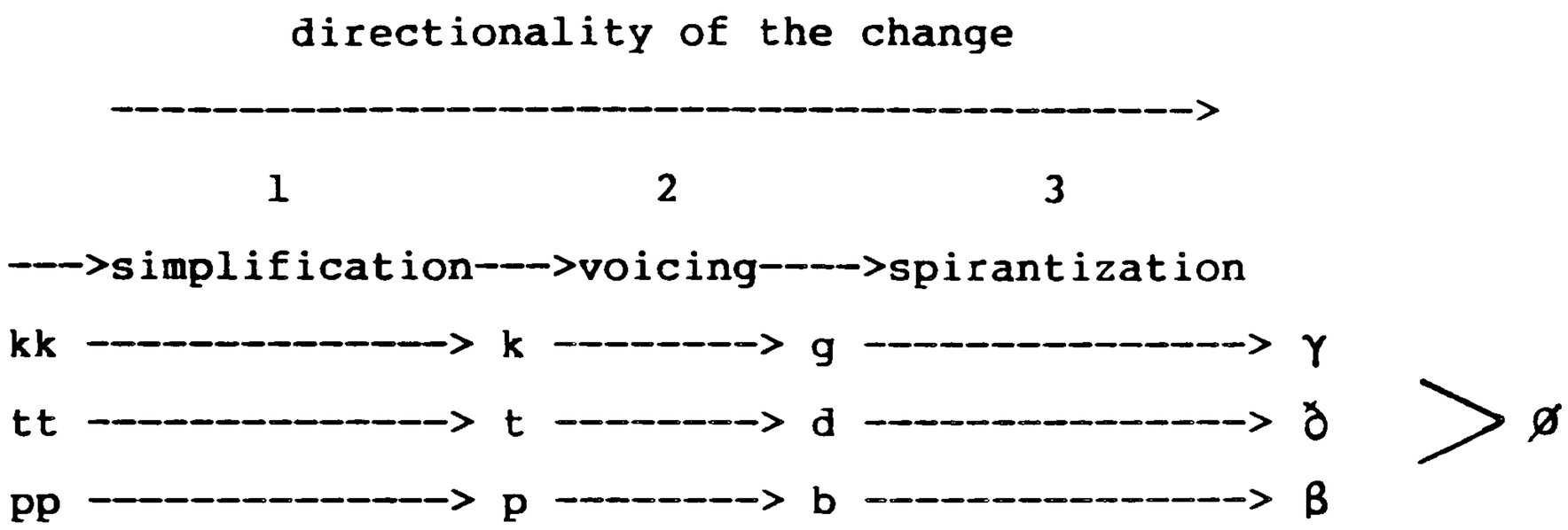
Where in intervocalic position, the velar and dental drop whereas the labial remains. This is considered enough reason to conclude that labials are the strongest on the scale. Nevertheless there are historical changes attested in Spanish and other Romance languages which do not seem to support Foley's claims.

In Italian for example velars are kept and even strengthened in some cases whereas some labials undergo spirantization.

Latin	**Italian**
amica	amica
lĕgĕre	leggere
vita	vita
crēdĕre	credere
ripa	ripa
habēre	avere

The following shift is well documented in Western Romance:

Table 2.3 Western Romance consonant shift

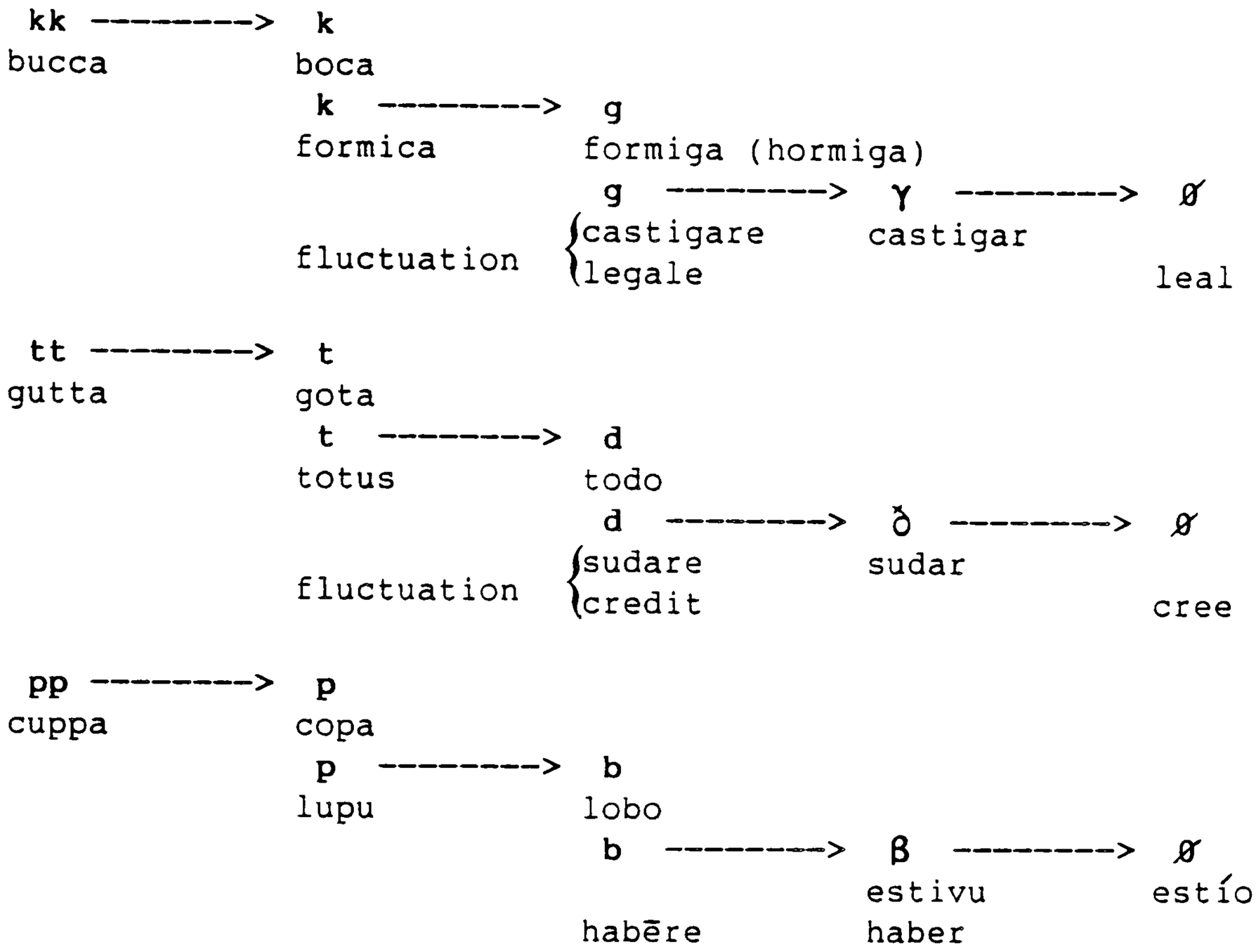


Examples

Latin	Italian	Spanish	Port.	French
cuppa	coppa	copa	copa	coupe
gutta	gotta	gota	gota	goutte
saccu	sacco	saco	saco	sac
sapere	sapere	saber	saber	savoir
vita	vita	vida	vida	vie

With regard to Spanish, spirantization took place at the same time as or before the loss of the voiced plosive; spirantization and loss of the voiced plosive occurred before the voicing of the voiceless plosives; and voicing occurred before the simplification of the double consonants (Menéndez Pidal, 1973).

Table 2.4 Spanish consonant shift



As can be seen from the examples above there was fluctuation of the voiced plosives. Sometimes they were maintained and sometimes they were lost; even labials, although considered the strongest by Foley, exhibit the same behaviour. Only voiced plosives derived from voiceless plosives were always maintained. The fact that labials were lost in some cases confirms the fact that Foley's claim needs further investigation.

2.3.2 Hooper's scale of consonantal strength.

Hooper (1976) proposes a scale for American Spanish; although it is not clear which variety of Spanish she refers to, it seems to correspond to a Mexican variety. Her scale is as follows:

							f			
			m		β	ŷ	b	p		
y			n	s	ð	ɾ(r)	d	t	c(tʃ)	
w	r(ɾ)	l	ñ(ɲ)	x	ɣ	ɣw	g	k		
---------->										
1	2	3	4	5	6		7	8		

*( )=IPA simbols (as in Hooper 1976:208)

It is not explained, however, what the status of the elements is. If they are phonological elements then [β,ð,ɣ] should not be included; if on the other hand they were phonetic then there is no reason why [ɲ] should not be included in the scale.

Hooper relates strength to ability to cluster and on those grounds tries to explain the difference of strength between lateral and non-lateral liquids, taking into account that syllable initial clusters of /tɾ/ and /dɾ/ are allowed in the system whereas /dl/ and /tl/ are not. Nevertheless it is a well known fact that the /tl/ cluster exists in Latin American varieties of Spanish (Navarro Tomás, 1963; Malmberg, 1965; Saporta, 1965; Harris, 1983) as in:

'atlas'	[atlas]	<atlas>
'atlántico'	[atlantiko]	<atlantic>

Weakening, for Hooper, is accounted for by a condition which reads *"if a consonant is syllable-final, its strength may not exceed 5"* (Cf Hooper's scale). Plosives then, to which Hooper assigns values 7 and 8 will have to weaken or drop to conform to Hooper's principle. In fact Hooper draws evidence (:216) from Spanish which supports her views. It is a well known fact that plosives fluctuate in respect to their articulations. First of all the distinction voiced/voiceless is lost and at least for Caracas, there is a tendency for all weakened stops to be realized as [k] or [g], preferably the former. This fact is very interesting as velarization is considered to reflect a weakening process often leading to deletion but somehow in this case the velar acts as a delaying factor, preventing the stop from being lost and at the same time putting pressure against the CV shape tendency which is progressing in the language, eg:

'étnico'	[ekniko] [egniko]	<ethnic>

Strengthening, on the other hand is accounted for by another condition of Hooper which requires that *"a syllable-initial C be stronger than the immediately preceding syllable-final C"*, as in her examples:

alrededor	<around>
honra	<honour>
Israel	<Israel>

where according to Hooper the /r/ has to strengthen because of the pressure from this condition.

In Hooper's view, weakening and loss does not apply to glides, liquids and nasals. Data from Caracas and El Tigre (Florián, 1985) show the opposite.

Liquids and to a greater extent nasals undergo weakening as well as deletion (cf section 2.3.3).

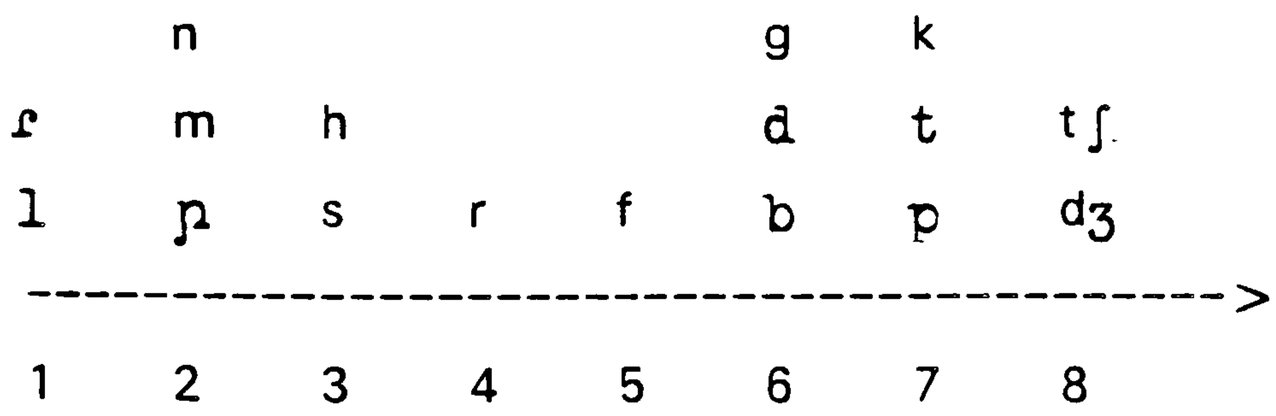
In spite of the points just made, we find Hooper's scale quite suitable and found it necessary to make few adjustments to fit the variety of Spanish under study.

2.3.3 Consonantal strength scale for Venezuelan (Caracas) Spanish

It has been shown that in Venezuelan Spanish and in the Caribbean varieties in general, there is a preference for the backing of consonants in final positions. In Caracas this tendency is expressed both by velarization and aitchification, which may both be considered weakening processes as they often lead to deletion.

In syllable-final position, most plosives have amongst their frequent realizations [k] and Ø, with deletion more common in intervocalic position. Except for the palatal, nasals also have amongst their preferred realizations [ŋ] and in few cases Ø. /f,s,ɾ/ may all be realized as [h], this [h] being considered to be an intermediate stage or path way to deletion (Lass, 1976) and hence a weakening process. The complexity of the [h] in the Spanish final consonant weakening process is revealed by the fact that linguists do not seem to agree in their interpretation of what [h] is and we think it is the reason why this area is one of the most complicated in Spanish Phonology.

I tentatively propose a scale in which certain facts, i.e. distributional criteria and susceptibility to undergo phonological processes can be regarded as determining the order of elements in the hierarchy. The elements on the scale have phonological status but for the assessment of distribution and processes they undergo, phonetic allophones have been considered. Our scale then is as follows:



There is a ranking within each strength level on the vertical axis, the top element being considered of lesser strength than the element at the bottom.

Apart from affricates, voiceless plosives have been assigned the highest value on the scale considering their distribution, ability to cluster and resistance to weakening. Compared with the other voiceless plosives, the voiceless dental is placed in the middle due to its more restricted distribution in clusters.

/d/ is the only plosive that could potentially appear in word-final position however it is always deleted or weakened not only in word-final position but in intervocalic position as well.

[kansaðo]	[kansao]	'cansado'	<tired>
[berða]		'verdad'	<truth>

According to the data from the Spanish of Merida (Longmire, 1976:162) and the Spanish of El Tigre (Florián, 1985:149), both Venezuelan varieties, there is more deletion of d than b and more deletion of b than g, an observation which agrees with the Caracas data discussed here. As described earlier, all plosives can be realized as velars. This backing of articulation has been understood as a weakening, as it often leads to deletion. Following the

definition of weakening adopted earlier, we then have to considere velars as the weakest of all plosives.

For Lass and Anderson (1975) the following sequences of changes:

voiceless fricatives -----> [h]

[h] -----> ø

(1975:150)

constitute a very common pattern which tends to repeat itself in the history of many languages.

If we consider the Spanish "f" which we have described as labiodental, we will notice that its realization as [h] is very common in all Latin American varieties of the language. In Caracas we have encountered it and think it is becoming very generalized for certain lexical items. A words like <profesor> 'teacher', is commonly heard as [prɔhɛsoɾ] and even as [pɾoesoɾ]; <cafecito> 'small cup of coffee' has also been heard as [kahɛsito] and [kaesito]. Henríquez Ureña (1930, 1931) gives the alternation [fw] [hw] as very common in Mexico even among educated speakers. Lisandro Alvarado (1955) attests the same alternation as very common in Venezuela too.

The fact that /f/, /s/ and sometimes /ɾ/ undergo similar weakening process (change to [h]), would make us think of them being of equal strength. One reason to rank /f/ separately from the other fricatives in the system is the fact that we believe them to be of different strength. /f/ is considered stronger than /s/ and /h/. /f/ has similar distributional properties to the plosives. It does not occur in syllable- and word-final position and

is the only fricative that clusters both with /r/ and /l/. Therefore we have placed it next to the voiced plosives but with one degree less of strength. Because ~~The fact that~~ /h/ has very limited distribution, and ~~that~~ it is always deleted in word-final position, we have considered it weaker than any other fricative.

In their discussion on Indo-European, Lass and Anderson (1975) take "s" to be often weakened to "h" in prevocalic position:

Sanskrit	'sánah'	<old>	Avestan	'hanō'	
Armenian	'hin'		Greek	'hēne'	(:163)

Whitney (1896) groups 'h' with other consonant sounds. This 'h' or visarga as it was called by Panini and other Indian grammarians, is described as a *"surd breathing, a final 'h' sound"*. This visarga is always a substitute for 's' or 'r' which are meant to be inter-changeable in final position.

In Latin, initial "s" before vowels remains but in Greek becomes "h" (rough breathing) e.g.

(gr) 'ἡμι	(lat) semi
(gr) 'επτα	(lat) septem

According to Buck(1933) intervocalic "s" was lost in Greek, the change being first to "h" as in initial position. In Latin the intervocalic "s" changes to "r"; this change is believed to have been completed in 4th century BC (Buck 1933:132-3). The Greek "rough breathing" can be traced back to an I.E."s" or I.E."y".

Final "s" was not affected in Latin except by analogy as in **honor** for **honōs** under the influence of the genitive **honoris**.

In French the loss of "s" is documented and believed to have gone first through aitchification, finally resulting in compensatory lengthening of the vowel as illustrated in Joos (1952) where the development of the French 'paste' / pastə/ [pɑṣtə] is explained. Because of the retracted [s] it changed phonetically to [pɑhtə] with [ɑ] coloured [h]. This [h] became voiced with that same vocalic colour and finally its function was lost leaving behind a prolongation of the original [a], so that then the word was [pɑːtə] (in Joos, 1966:376).

In the case of **testa --> tête**; **schola --> école** this lengthening is expressed graphically by means of the accent (circumflex or acute above the 'e'). According to Politzer (1947) the loss of final "s" in the Roman world can only be understood as a consequence of the breakdown of the Latin morphological system. This topic has been of so much interest to Romance Linguistics because of the morphological implications of this loss. To Politzer, the retention of final "s" in Sardinia and Spain was due to the necessity of distinguishing a plural case from its singular due to the reduction to a single case that was progressing without any opposition. On the other hand wherever final /s/ in Spanish is in process of disappearing we can see it first loses its apical quality and becomes predorsal (Politzer, 1947; Navarro Tomás, 1963; cf. also Straka, 1964).

Distributionally /s/ is considered to be strong in the sense that it appears in all positions and furthermore it is the only consonant that may occupy the second position in a rhyme cluster.

'perspectiva'	<perspective>
'instituto'	<institute>
'abstracto'	<abstract>
'adstrato'	<adstratum>

Nevertheless as we have mentioned before, these clusters are very seldom realized except in very careful pronunciation, the tendency being towards reduction; whenever /s/ is in final position it is either weakened to aitchification or lost. According to Hooper (1976) the weakening and loss of /s/ in rhymes is only evidence of the weakness of the position; it would be so if it wasn't also weakened and also lost in onsets, as in:

<lady>	'señora'	[seɲoɾa]	[hɛɲoɾa]	
<the Mrs>	'la señora'	[laseɲoɾa]	[lahɛɲoɾa]	[laeɲoɾa]
<we>	'nosotros'	[nosotɾo]	[nɔhɔtɾo]	[no:tɾo]

This aitchification of /s/ in onsets is not so common in Caracas as it is in the Andean region of Venezuela and also in some Colombian states (Flórez, 1964). It would seem as if more evidence is needed both diachronically and synchronically about the weakening of /s/ in order to establish whether its strength or weakness is inherent or otherwise acquired by the position in the syllable or if it is the result of the combination of both factors

Due to its wide distribution we would have thought of /n/ as the strongest of all nasals, however /n/ assimilates to any following consonant even across word boundaries and also weakens to a velar [ŋ] in syllable- and word-final position. According to Lipski (1983b) [ŋ] is the preferred realization of /n/, regardless of the following environment, in Venezuela, Puerto Rico and Dominican Republic. We consider the change of /n/ to [ŋ] as a weakening process. Articulatory effort has been considerably reduced, for [ŋ] the raising

of the apex of the tongue to touch the alveolar area is no longer needed, instead only a velar gesture is required.

According to Hooper (1976:212) /l/ is stronger than /ɾ/. The evidence she cites is that of the sequences /l$ɾ/, /n$ɾ/ and /s$ɾ/ as in 'alrededor' <around>; 'enredo' <mess>; 'Israel' <Israel>; where /ɾ/ strengthen to /r/, whereas in the inverse sequences such strengthening doesn't take place.

In Venezuelan informal speech it is possible to find the alternation of /ɾ/----> [l] or /l/----> [ɾ] (lambdacism and rhotacism respectively), and also the Ø realization of /ɾ/ in final positions. According to Núñez Cedeño (1981) there is no strength difference between /ɾ/ and /l/. In Dominican Spanish (Núñez Cedeño, 1978), as in Venezuelan, it is equally possible to change from /l/ to /ɾ/ as from /ɾ/ to /l/. Being as it is, this process poses questions to the strength scales previously discussed. Considering Hooper's scale in which /l/ is stronger than /ɾ/, the change of /ɾ/ to /l/ would be considered a strengthening process which is contrary to what Hooper says when suggesting that processes which occur in final positions are considered weakening processes. If the order of the elements in the hierarchy were to change as Florián (1985) suggests, ranking /ɾ/ as stronger than /l/, then the change of /l/ to /ɾ/, also attested in Venezuela and the Dominican Republic (Núñez Cedeño, 1978, 1981), would be interpreted again as a strengthening process contradicting once more Hooper's hierarchy for the same reason argued earlier. It seems one way of getting rid of all these complications would be to suscribe to Núñez Cedeño (1978) in assigning both /ɾ/ and /l/ the same strength. In our Caracas data, however, we observed weakening and loss of the /ɾ/ in the infinitive of verbs as very regular, the same holds for words like 'porque' <because>; 'por' <for, by>; 'para' <to>. Curiously enough, deletion in this context is more socially acceptable than the change

of /ɾ/ for /l/ or viceversa. Cases of /l/ deletion are not all that common which is the basis for D'Introno and Sosa's (1978) ranking of /l/ as stronger whereas /ɾ/ because of not being as stable as /l/, is considered of lesser strength.

The setting up as well as the interpretation of hierarchies still remains a problem. Depending on the parameters chosen, one can arrive at a different hierarchy. What is more, the evidence suggested here poses problems with the general theory behind the hierarchies; we can't escape the circularity of the arguments: we have been asserting that certain processes are weakening processes using that claim to set up a strength hierarchy and then using that strength hierarchy to assess whether certain processes are stengthening or weakening processes. I would have much preferred to attempt another kind of hierarchichal model in which weakening chains, of the sort evident in Caracas Spanish, would have been described and accounted for more adequately but it would have certainly been ~~out~~ beyond of the scope of this thesis.

Chapter 3

Syllable-final "s" in Caracas Spanish

3. Introduction.

One often hears it said that in Spanish one "drops the s", "swallows the s", "aspirates the s" or "does not pronounce the s at all". I therefore intend to review the literature to find out what has been understood by "aspiration" and to what extent this term, as it has been used, is the most convenient to describe the phenomenon which is taking place in the Spanish language today.

The "puff of air" that may be perceived after the release of a stop is the kind of definition we find in the literature to refer to the phenomenon of aspiration. A description like this can be found in Sweet (1877). The term "aspiration", then, has been used to imply "something" that occurs either when releasing the stop (fricative) stricture or prior to their articulation, these being called "aspiration" and "preaspiration" respectively. The latter is considered to be a very well known phenomenon in Icelandic (cf. Petursson,1975) and Gaelic, and according to Catford (1977) also common in the north Caucasian languages Chechen and Ingush.

In the Hispanic linguistic tradition, the term has been widely used to describe a kind of phenomenon in which a "puff of air" takes the place of a particular sound, rather than occurring before the articulation or after the release of a sound. Thus the term 'aspiración' in Spanish refers to a breathiness which represents the word initial 'h' derived from the Latin initial

'f', a very special pronunciation of the 'jota' (orthographic 'j'), the breathiness of final "s" and also "r".

Spanish, like all the Romance languages does not have aspirated consonants (though Rodríguez de Montes, 1972, argues that for the voiceless plosives there are aspirated allophones in Colombian Spanish), as compared with Germanic languages. I think it is due to this fact that in Spanish dialectology the adoption of the term "aspiración" does not give rise to any ambiguity whereas in English to call the phenomenon under discussion "aspiration" is not only ambiguous, but inadequate to describe the weakening of fricatives, and I would be inclined to use "aitchification" as a more convenient term to explain this phenomenon, where [h] totally replaces [s].

The phenomenon of "weakening" and loss of "s" has been found to take place not only in Caracas and to a larger extent in the rest of Venezuela, but it has also been recorded in other varieties of Spanish. In fact the weakening and loss of "s" has a long history in Romance linguistics.

3.1 Review of the literature.

The following references will serve to illustrate what kind of issues have been predominant in previous research according to the literature accessible to us. Other relevant and more recent bibliographical sources have been quoted in other chapters of the thesis where reference has been judged to be more appropriate.

Navarro Tomás (1966) considers "s" aspiration a generalized phenomenon in Puerto Rico, as in the rest of Hispanic America. He draws

attention to the fact that the deletion process is more advanced in word final than it is in syllable final position. Ma and Herasimchuck in their study of Puerto Ricans in New York City (1968), revealed the systematicity of "aspiration and deletion of "s"" by taking into account both linguistic and extralinguistic constraints. Like Navarro Tomás they stress the fact that word final position seems to be the most favourable environment for the realization of zero (Ø) variants in general.

Cedergren (1973) considers that the linguistic constraints affecting the variability of "s" are quite regular and are the same wherever "s" is aspirated or deleted in Spanish. In her study of the Spanish of Panama City and surrounding areas Cedergren demonstrated that the process of aitchification and deletion of /s/ exhibited constraints similar to those identified by Ma and Herasimchuck for Puerto Ricans. Cedergren formalizes the description of "s" aspiration and deletion as a process of two related but separate rules:

(Rule 1.3) s.....(h)/.....(#)

(Rule 1.4) s.....(Ø)/.....(#)

(as in Cedergren 1973:47)

Although this is not very well specified, Cedergren considers "s" as the input of both rules. Longmire (1976) considers that to describe the deletion process in the way Cedergren does, ties deletion only indirectly to "s", making it more difficult to show the true factors motivating deletion. On the other hand, to formulate the rules as

s.....(h)

h.....(Ø)

obscures the fact that [h] constitutes a path to deletion. As Hammond (1981) observes, the precise formulation of the rules is still very problematic.

In his 1974 paper "The interaction of Phonological and Grammatical constraints on aspiration and deletion in Cuban Spanish", Terrell suggests, like Cedergren, that "aspiration and elision are two related but separate rules ... aspiration is generally unaffected by grammatical constraints ... elision on the other hand, is primarily correlated with morphological classes and grammatical functions" (1974:14). According to Poplack (1984) the main constraints on /s/ deletion are phonological and syntactic. In the case of the nominal plural marker /s/, she also found that its deletion never occurred if it would result in ambiguity.

Both Cedergren and Terrell began their discussion with an indication of what the statistical norm was (i.e. retention, aspiration and deletion of "s") for syllable final and word final "s" in the language varieties they investigated. In order to do so, they looked at all the variants of "s" in these positions and divided them into three major categories, i.e. "s", "h", "Ø". They differ in their coding procedures, for Terrell includes in "h" not only anything with aitchification but also such things as geminate consonants and glottal stop while Cedergren includes them as instances of deletion.

To Vallejo Claros (1970) the retention, aspiration or deletion of "s" depends on the social situation in which the speaker finds himself. We do not know whether by social situation he is referring to status, style, or some other factor. The retention of the sibilant is considered by him to be the prestige form while deletion is taken as to be the stigmatized form. Also Lipski (1983a) found that the variants [h] and Ø carried a sociolinguistic stigma. To Lafford (1982) the two extremes of the process denote social class: sibilant use, in Cartagena, is associated with upper class and deletion with lower classes; as for [h] it is considered neutral with regard to social class. As Terrell (1979) points out, the sibilant is not the statistical norm for the Caribbean where the

chain s >h >Ø is in different stages of development. Some dialects, however are more conservative than others (Guitart, 1979) and according to Lafford that is the case for Cartagena Spanish.

Vázquez (1953) considers that the various word/syllable final consonants in Uruguayan Spanish are undergoing a process of weakening/deletion. He considers "s" "responsible for causing a radical change in the vowel system" (cf. Saporta, 1965).

Longmire (1976) using a sample of Merida speakers finds that the "s" aspiration and deletion process seems to proceed in the same way it did historically. She stresses the importance of keeping the process of "s" deletion and "h" deletion separate because there is evidence of it being very similar to other cases in Latin and the Romance languages.

Alonso (1962) notices the contrast between the coast of Peru, Ecuador Colombia and Mexico, where "s" is weakened to aitchification, and the highlands of the same countries, where final "-s" is preserved. Rosenblat (1965) also points out that in the Spanish of the lowlands of Latin America the final "s" tends to weaken whereas in the highlands not only is it preserved but its articulation gets reinforced as well as the articulation of all the other consonants in the system. This reinforcement is nothing else but the strengthening of a sound by means of adding an extra syllable. In his study of the Spanish spoken in Peru, Hundley (1983) reports the existence of this phonetic division between coast and mountains mentioned above, with weakening and deletion of "s" but not the vowels in the coastal dialects, and weakening and deletion of vowels but not "s" in the Andean dialects. Menéndez Pidal (1956) also affirms very categorically that in the Andean provinces of Venezuela the "s" is never aspirated or deleted. To Geckeler and

Ocampo (1973) the aitchification of "s" in certain areas of Merida State is due to the interference of the phonetic peculiarities of the neighbouring lowlands.

Esteban Emilio Monsonyi (1972) regards aitchification as a very common feature in Caracas speech. According to him the tendency is towards deletion in the less privileged strata of society, which is very much the same kind of remark Ricord (1971, as cited in Cedergren, 1973) made for Panamanian Spanish, where the upper classes of the community favour aspiration while deletion is generally associated with "el español vulgar".

However, aitchification and deletion are used by every Caraqueño in his daily discourse. But even naive speakers are aware of the "correcta forma de hablar" (proper way of speaking) and try to prevent themselves from using forms they recognize as being "stigmatized". This fact renders their speech somewhat inconsistent, showing therefore a great deal of variation.

3.2. Descriptive analysis of the data.

In the following sections an auditory analysis of the Caracas data is carried out. The data consists of a list of words uttered in isolation and also nominal phrases and sentences which have been extracted from recorded interviews obtained from six native speakers (including myself), born in Caracas, who have spent most of their lives in the city and who have also had formal education. (Three of the interviews were recorded as part of the Proyecto Coordinado para el estudio de la Norma Culta en Caracas). Five of the subjects were recorded informally and with no set format; therefore the samples from each of them are distinct in content. The interviews were carried out in the home of the informants or in their places of work or study.

In section 3.2.1., those words in which "s" is found to occur in preconsonantal position are analyzed. In section 3.2.2., attention is given to final "s", which encompasses various instances of "s" in word final position, i.e. -"s" as part of a lexical item (monomorphemic), and -"s" plural marker.

It is important to note that social factors such as sex, age, social status, are not considered for the purpose of the present auditory analysis.

3.2.1. Syllable Final "s".

In this section we will be talking exclusively of word internal/medial, syllable final /s/ which always appears in preconsonantal position. The consonant following it can be a stop, a fricative, a nasal or a liquid, e.g.

'espía'	<spy>
'desdén'	<disdain>
'esfera'	<sphere>
'esmeralda'	<emerald>
'aislar	<to isolate>

We have tried to assess all the occurrences of syllable final /s/ in preconsonantal environment and have found the following variants:

[s] which indicates the retention of the sibilant.

[h] under "h" we group any instance of weakening because we consider [h] to be an intermediate stage between retention of /s/ and deletion which indicates the loss of /s/.

[ø] the [ø] indicates loss of /s/. It could represent a particular vowel quality or lengthening (cf chap 5)

These variants correspond to two different phonological processes i.e. aitchification and deletion. Table 3.1 indicates the different realizations of syllable final [s] and their distribution. As can be seen from the percentages shown in Table 3.1 it seems that aitchification is the preferred realization of /s/ in syllable final position. Retention of the sibilant /s/ and deletion are not very frequent realizations of /s/ in this particular position. These tendencies in Caracas Spanish (Table 3.1) correspond to those shown in previous studies (cf Cedergren, 1973; Terrell, 1975; Poplack, 1979).

Table 3.1.- **Syllable final /s/.**

Variant	No	%
[s]	18	6.8
[h]	234	88.3
ø	12	3.5
Total	264	

Longmire (1976) discovered a very interesting fact about [s] retention in Merida Spanish, namely the high rate of retention of the sibilant before the voiceless dental stop /t/. Terrell encountered the same phenomenon operating in Caracas (1977b) and also in Buenos Aires (1978a). We did not come across it in our data. On the whole, data from other Spanish varieties: Cuba (Terrell, 1979; Hammond, 1981), Puerto Rico (Ma and Herasimchuck, 1968; Terrell, 1978e; Poplack, 1979), Panama (Cedergren 1973), Colombia (Lafford 1982), etc., seem to coincide in the fact that the occurrence of [h] is more frequent in preconsonantal position than in any other position.

3.2.2 Word final /s/.

The variability of /s/ in word final position is very complex, due to the high functional load it carries. It can be part of a lexical item, as in 'mes' <month>; 'cruz' <cross>; 'dos' <two>. It can also be a verbal morpheme of the second person singular, as in 'tú tienes' <you have>; 'tú cantas' <you sing>, or part of a verbal morpheme in the first person plural, as in 'nosotros cantamos' <we sing>. It also realizes the plural morpheme in nouns, adjectives and pronouns, as in 'niños' <children>; 'tranquilos' <quiet>; 'ellos' <they>, respectively.

Table 3.2 indicates the different realizations of /s/ in word final position. It seems, judging from the figures, that aitchification and deletion are the preferred realizations of /s/ in this particular position.

Table 3.2.- **Realizations of word final /s/.**

Variants	No	%
[s]	193	14.17
[h]	749	54.99
ø	420	30.83
TOTAL	1362	

For the purpose of our study we will analyse word final /s/ in monomorphemic words separately from word final /s/ in polymorphemic words.

3.2.2.1 Lexical "s".

This "s" appears in word final position where the word consists of a single morpheme (Terrell, 1978a). The data referred to in these sections are my own

'más'	<more>
'menos'	<less>
'pues'	<then>
'entonces'	<so>
'dos'	<two>
'tres'	<three>
'raiz'	<root>
'cruz'	<cross>

It has been suggested that the /s/ of certain high frequency monomorphemes, like the first four presented above, is usually realized as zero (Ø), (Terrell, 1978a,d). Poplack (1979), gives the deletion rate for several categories of monomorphemes and her results can be seen in the Table 3.3 below.

Table 3.3.- **"s" deletion rates for high frequency monomorphemes.**

(As in Poplack, 1979:74)

Monomorpheme	Gloss	% deleted forms	No. of forms
entonces	then	99	711
pues	so	65	511
numbers		37	591
más	more	17	540
all others		57	1497
TOTAL			3850

According to our data the /s/ of 'entonces' is almost always deleted, whereas in 'más', 'menos', 'pues' and the numbers there is always the alternation between aitchification and deletion with a very low incidence of sibilant retention. Table 3.4 shows the general score for the realizations of Lexical /s/. Once again aitchification stands out as the preferred realization.

Table 3.4.- **Lexical /s/.**

Variant	No	%
[s]	46	20.35
[h]	121	53.53
ø	59	26.10
TOTAL	226	

Several factors have been considered to have a potential effect on the weakening and deletion of monomorphemic /s/, e.g. the following phonological segment, following stress, word length (Terrell, 1977a; Poplack ,1979).

A following consonant favours aitchification, as when /s/ occurs in word medial syllable final position (Cf 3.2.1.). There were a few cases of retention of the sibilant when it was followed by a vowel, specially if the vowel was stressed, eg:

<three hours>	'tres horas'	[tɬesoɾa]
<two eyes>	'dos ojos'	[dosɔhɔ]
<more leaves>	'más hojas'	[masɔha]
<less children>	'menos hijos'	[menosɹhɔ]

In cases where /s/ was followed by a pause a great deal of variation was observed, alternating from retention to deletion. One phenomenon interesting to look at was that when a word was said in isolation or emphatically and also before pause there was a tendency towards the nasalization of the [h] variant plus the addition of a velar nasal [ŋ] immediately after [h], as in:

<root>	'raiz'	[raihŋ]
<country>	'país'	[paihŋ]
<month>	'mes'	[mehŋ]
<fish>	'pez'	[pehŋ]
<peace>	'paz'	[pahŋ]
<face>	'faz'	[fahŋ]
<cross>	'cruz'	[kruhŋ]
<light>	'luz'	[luhŋ]
<pencil>	'lápiz'	[lapihŋ]

It is interesting to observe that the addition of the velar nasal [ŋ], implies also the addition of an extra syllable.

Evidence of a nasal resonance after final -s is found in the Spanish of Jalisco. Daniel Cárdenas (1955) gives us an account of what has been said by some scholars working in the field, like Semeleder (1890), who stated "se reconoce a los habitantes de Jalisco en que añaden a las palabras arbitrariamente, una resonancia nasal" and continues, "la añaden principalmente después de la "s" final" (one recognizes Jalisco inhabitants because they add, arbitrarily a nasal resonance to the words ... it is added, mainly, after a final -s). Similarly, Marden wrote:

> "A striking characteristic of Guadalajara (in the state of Jalisco, Mexico) is the adding of an -n glide after a final -s, 'arroz'.
>
> This nasal glide is caused by lowering the velum before the "s" sound is completed; the tongue position remains the same and the stream of breath continues its passage through the nose, thus producing the nasal glide" (1896:133)

Nykl (1930) does not seem to argue with Marden in his regarding the "nasal glide" as a continuation of a nasalized "s". To him forms like **arrosn** could be read as **arrosu** which we interpret as an attempt to record either an [n] or V. Esteban E. Monsonyi (1972) registers in Caracas a similar kind of phenomenon; and this seems to agree partially with our data-base findings. To Monsonyi *"consiste en una aspiración nasalizada y muchas veces reforzada con una nasal velar, ej.: 'Carlos'* [kaɾlɔhŋ]". (It consists of a voiced and nasalized aspiration which very often is reinforced by a velar nasal e.g., 'Carlos' [kaɾlɔhŋ]). Interestingly enough for the Panare of Piñaguero who use Spanish as a trade language Riley (1952) observed that all the words that end in [s] in local Venezuelan, have an allophone [θn] in the Spanish spoken by the Panare, which refers to the same kind of nasal resonance cited by Marden,

Nykl and Semeleder for Mexican Spanish. Also Luis Flórez (1964) reports a nasal glide after -s in the comarcas of Hula and Tolima (Colombia).

Poplack (1979) found that word length has little effect on weakening / aitchification, while it seems to be very significant where deletion is concerned. According to her, /s/ is deleted more frequently from polysyllabic forms than from monosyllabic forms. Her results seem to agree with Terrell's (1977b, 1977c, 1978c,d).

3.2.2.2 Polymorphemic words.

a) Plural marker:

The plural in Spanish is expressed by adding the suffix -es or -s to the stem of nouns, adjectives and determiners.

'casa'	'casas'	<house(s)>
'libro'	'libros'	<book(s)>
'pan'	'panes'	<bread (pl)>
'mantel'	'manteles'	<tablecloth>
'maravedí'	'maravedís'	<old Spanish coin>
'café'	'cafés'	<coffee(s)>
'lápiz'	'lápices'	<pencil(s)>
'cosa'	'cosas'	<thing(s)>
'piso'	'pisos'	<floor(s)>
'flor'	'flores'	<flower(s)>
'ají'	'ajíes'	<chilli(es)>
'tabú'	'tabúes'	<taboo(s)>
'crisis'	'crisis'	<crisis(crises)>

As formulated by Saporta (1965):

(a)

$$pl \rightarrow \begin{Bmatrix} s/\begin{Bmatrix} \breve{V} \\ é \end{Bmatrix} - \\ \emptyset/\ \breve{V}s - \\ es \end{Bmatrix}$$

(b)

$$\begin{Bmatrix} \theta \\ s \end{Bmatrix} \rightarrow [s]$$

where the plural is represented by /s/ in the environment after all unstressed vowels and after stressed /e/, by Ø after unstressed vowels followed by /s/, and by /es/ elsewhere. An extra rule (b) is added to account for Latin American Spanish /s/ in words that in Castilian Spanish are pronounced /θ/. These will add /es/ in the plural. Another rule of Modern Standard Spanish states that all modifiers (determiners, adjectives, pronouns, etc.) must agree in gender and number with their governing nouns, e.g.

Las casas blancas

The application of these rules leads to inflectionally redundant marking of number. This redundancy is even greater at the sentence level where non-inflectional indicators of plurality (morphological, syntactic, etc) are also found.

In the data below we can see that either aitchification takes place to express plurality or deletion occurs and with it the marker of plurality disappears.

'casas'	[kasah]	[kasa:]	<houses>
'cosas'	[kosah]	[kosa:]	<things>
'libros'	[liβɾɔh]	[liβɾo:]	<books>
'pisos'	[pisɔh]	[piso:]	<floors>
'panes'	[panɛh]	[pane:]	<bread(pl)>
'flores'	[floɾɛh]	[floɾe:]	<flowers>
'manteles'	[mantelɛh]	[mantele:]	<tablecloths>

When the sibilant is deleted it would seem as if there are certain changes taking place in the vowel preceding the weakening. It looks as if there is a tendency for the vowels to be elongated. Thus the plural morpheme, in cases like 'casa/casas'; 'libro/libros'; 'flor/flores', would then be expressed as [a:], [o:], [e:], respectively. Taking this idea, we decided to test these facts experimentally and accordingly we designed an experiment directed towards the investigation of the status of length and quality in the vowel system of Caracas Spanish /the description and results of the experiments are presented in chapter 5.

Our data consists of nominal phrases where the noun is accompanied by different kinds of modifiers which can be placed either before or after the noun. This is the reason why we make a distinction between Prenominal and Postnominal modifiers (I have used Terrell 1977a, as a general reference for this section).

In the category of Prenominal modifiers a classification has been made according to their position in relation to the noun:

1st. position modifiers:

- Article
  - definite
  - indefinite
- determinative
- Adjective
  - possessive
  - indefinite
  - numeral
  - qualifying
  - quantifying

2nd. position modifiers

- Adjective
  - numeral
  - qualifying
  - quantifying

3rd. position modifiers:

- Adjective
  - numeral
  - qualifying

First Position Modifiers:

Article (definite/indefinite):

'las horas'	[lasoɾa]	<the hours>
'unas horas'	[unasoɾa]	<unas horas>
'las teclas'	[lahtekla]	<the keys>
'las máquinas'	[lahmakina]	<the machines>
'las manos'	[lahmano]	<the hands>
'las claves'	[lahklaβɛ]	<the keys>
'las letras'	[lahletɾa]	<the letters>
'las tarjetas'	[lahtaɾhɛta]	<the cards>
'las cosas'	[lahkosa]/[lahkosa:]	<the things>
'las notas'	[lahnota:]	<the notes>
'los errores'	[lɔhɛroɾe]	<the errors>
'los días'	[lɔhðia]	<the days>
'los ojos'	[losɔhɔ]	<the eyes>
'los amigos'	[lɔhamiɣo]	<the friends>
'los años'	[losaɲo]	<the years>

Because the noun is the head of the noun phrase one would think it would be primary in conveying plurality, but as we can see in this data it is not the case. Such information is rendered by the determiner. The choice between [s] or [h] to convey the information of plurality seems to be determined by phonological context: [h] is the choice in any environment except before stressed vowel and the /s/ of the article (las, los) is retained when it precedes a word beginning with stressed vowel (V́), e.g.

'los años'	[losaɲo]	<the years>
'las horas'	[lasoɾa]	<the hours>
'los ojos'	[losɔhɔ]	<the eyes>

Terrell (1977a,b; 1978a,b; 1981), also found that sibilant retention was extremely high in this context of determiner plus V, whereas very low when the modifier followed the noun. According to Cedergren (1973), the determiner which usually occurs in first position has the lowest deletion rate for /s/ of all grammatical factors. Observing our data we can see that there is no deletion of the /s/ of the first position modifier. The choice seems to be between aitchification and retention of the sibilant. Ma and Herasimchuck (1968), also found that determiners showed a high incidence of /s/ retention in prevocalic position. They explained this fact by saying that the "s" morpheme is retained more before vowels because its initial position in the noun phrase would make it the first element to transmit the information of plurality. According to Cedergren (1973) and also to us, it is not only due to the presence of the vowel but to the presence of a stressed vowel. Alba (1981) assigns more importance to stress than to position or grammatical category so to him the sibilant is retained in the determiner before a stressed vowel only because of the unstressed nature of the determiner itself.

As regards the nouns after the modifiers, a great deal of variation has been observed in relation to the realization of this plural morpheme. In some cases aitchification took place, in others deletion, which sometimes produced certain changes in the vowel but sometimes did not affect it at all.

There are many ways in which the language establishes the number distinction but what seems to be constant is that when it is present, the modifier carries the information of plurality; therefore it is not necessary to assign the plural marker also to the following noun. Already Oroz (1966) noticed the same kind of phenomenon operating in Chilean Spanish, where only the article makes the distinction between singular and plural, nouns being kept invariable, as we can see from his examples: 'los cafe', 'los pie'

(1966:212).

If we look at other first position modifiers we can see that what has been said for the articles, works in the same way for any kind of first position modifier:

Demonstr.	'estos momentos'	[ɛhtɔhmomentɔh]	<these moments>
	'esos veinte años'	[esɔhβentjaɲo]	<those twenty years>
	'esas cosas'	[esahkosa]	<those things>
	'esos dígitos'	[esɔhðɪhɪto]	<those digits>
	'estos ojos'	[ɛhtosɔhɔ]	<these eyes>
Possess.	'mis hijos'	[mɪsɪhɔ]	<my children>
	'mis manos'	[mi:manos]	<my hands>
	'mis estudios'	[mɪhɛhtuðjo]	<my studies>
	'mis ideas'	[mɪhɪðea]	<my ideas>
	'tus hijos'	[tusɔhɔ]	<your children>
	'tus manos'	[tɷhmano]	<your hands>
	'tus tarjetas'	[tɷhtaɾhɛta]	<your cards>
	'tus estudios'	[tɷhɛhtuðjo]	<your studies>
	'tus olores'	[tɷhɔloɾe]	<your smells>
	'sus hijos'	[susɪhɔ]	<his/her children>
	'sus ojos'	[susɔhɔ]	<his/her eyes>
Indefin.	'algunos días'	[alɣunɔhðia]	<some days>
	'algunas veces'	[alɣunahβese]	<some times>
Qualif.	'puras claves'	[puɾahklaβe]	<all keys>
	'mejores servicios'	[mɛhɔreserβisjo]	<better services>
	'buenos pacientes'	[bwɛnɔhpasjɛnte]	<good patients>
Cardinal	'tres claves'	[tɾɛhklaβe]	<three keys>
	'seis meses'	[sejmesɛh]	<six months>
	'dos años'	[dosaɲo]	<two years>
	'dos veces'	[dɔhβese]	<twice>
Ordinal	'primeras canciones'	[pɾimeɾahkansjɔne]	<first songs>

	'últimos tiempos'	[ultimɔhtjɛmpɔh]	
Quantif.	'muchos lados'	[mutʃɔhlaðo]	<many sides>
	'muchas entradas'	[mutʃahɛntɾaða]	<many entries>
	'pocas palabras'	[pokahpalaβɾa]	<a few words>
Comparat.	'más conocidas'	[mahkonosiða]	<most known>
	'más profundas'	[mahpɾofunda]	<most profound>

Second position modifiers

'los tres días'	[lɔhtɾɛhðia]	<the three days>
'los dos caminos'	[lɔhðɔhkamino]	<the two ways>
'los últimos tiempos'	[losultimɔhtjɛmpo]	<the last decades>
'mis tres hijos'	[mɪhtɾesɪhɔ]	<my three children<
'unos tantos años'	[unɔhtantosaɲo]	<a few years>
'las largas horas'	[lahlaɾɣasoɾa]	<the long hours>
'unas cuantas veces'	[unahkwantahβese]	<a few times>
'los muchos libros'	[lɔhmutʃɔhliβɾo]	<the very many books>
'unas tantas cosas'	[unahtantahkosa]	<a few things>
'los mismos caminos'	[lo:mihmɔhkamino]	<the same paths>
'las pocas veces'	[lahpokaβese]	<the few occasions>
'unas tantas obras'	[unahtantasoβɾa]	<a few compositions>
'unas pocas palabras'	[unhpokahpalaβɾa]	<a few words>
'tus bellos ojos'	[tʊhβedʒosɔhɔ]	<your beautiful eyes>
'los demás días'	[lɔhðemahðia]	<the rest of the days>

The process seems to repeat itself again and again. As we have already noticed before, there is a strong tendency for the plural morpheme to be absent in the noun once it has been marked (either by [s] or [h]) in the first and/or second prenominal modifier(s). Up to now it could be said according to our observations from the data, that the noun, when accompanied by modifiers, carries no information of plurality. It is up to the modifiers to render such information.

The same observations apply to third position modifiers.

Third position modifiers:

'las dos primeras veces'	[lahðɔhpɾimeɾahβese]	<the first two times>
'los tres últimos años'	[lɔhtɾeultimosaɲo]	<the last three years>
'las tres mismas caras'	[lahtɾɛhmɪhmahkaɾa]	<the same three faces>

Postnominal modifiers:

'clases particulares'	[klasɛhpaɾtikulaɾe]	<private lessons>
'familias enteras'	[familjahɛnteɾa]	<whole families>
'actividades continuas'	[aktiβiðaðɛhkontinwa]	<continuous activities>
'obras clásicas'	[oβɾahklasika]	<classic pieces>
'compositores nuevos'	[kompositoɾɛhnwɛβo]	<new composers>
'estudios musicales'	[ɛhtuðjɔhmusikale]	<music studies>

When accompanied by prenominal modifiers, as already mentioned, the noun was never marked for plurality; instead it is up to the modifiers to carry such information. In the case of postnominal modifiers the opposite occurs: the noun is marked and the modifier is not. Once again it seems that the position in the phrase strongly conditions number marking. The last element in the noun phrase is unmarked for plurality whereas non final items convey plurality by means of [h] preconsonantally.

Although a great deal of variation has been observed, certain tendencies seem to emerge as regarding the speakers' choice for plural marking. These tendencies clearly parallel processes of similar nature in related languages: Italian, French and Brazilian Portuguese.

Plurality is conveyed not only inflectionally, as derived from rules in the Standard language, but also semantically, morphologically and syntactically. Inflectional marking is closely related to position of the word in

the noun phrase (NP). There is almost always a plural marker in the first word of a noun phrase and very often there is a determiner in that position. In some varieties of Brazilian Portuguese the same tendency has been observed, Guy (1981) and Scherre (1978, 1981) document it for Rio de Janeiro, Azevedo (1983) for Caipira and Braga (1977) for Minas and adjacent areas. The selective choice between [s] or [h] will very much depend on the nature of the following segment; if it is a stressed vowel, retention of the sibilant [s], will be the prefered choice, in any other environment aitchification or deletion (in order of preference) will be the choice.

This tendency to retain [s] in prenominal determiners before a stressed vowel seems to hold for other varieties of Spanish. Terrell documents it for Cuba and Puerto Rico (1977a) and the Dominican Republic (1981); Poplack (1981) and López Morales (1981) for Puerto Rico; Lafford (1982) for Colombia; Hundley (1983) for Peru. It has also been found analogous to liaison in French. Terrell and Tranel (1978d) found that similar factors such as prevocalic environment and the monosyllabic nature of the lexeme containing [s], condition the retention of final /s/ as [z] in French and as [s] or [h] in Spanish. Accordingly, the environments in which liaison is optional or prohibited in French are precisely those in which Spanish [s] is often deleted.

Chapter 4

Plural Perception Tests

4. Introduction

A considerable amount of research effort has been devoted to understanding the processes involved in the perception of minimal speech sounds in contextual isolation. However, to the best of our knowledge (or ignorance) there has not been as great an attempt to identify the perceptual dimensions by which listeners recognize higher-level linguistic units, i.e. words and sentences. Even less has been the concern for the study of the perception of morphological categories. It is to this last aspect that we would like to address ourselves in the present chapter.

The variability of syllable-and word-final /s/ in Spanish is a very well known phenomenon in Spanish Linguistics and as already described in the previous chapter, this fact acquires great importance because of the high functional load of the segment in question, e.g.

/s/ is indicator of plurality

/s/ is a verb-ending marker for the second person singular of the present indicative and subjunctive.

The functional aspect of /s/ to be analysed in this chapter is the one regarding /s/ as a marker of plurality. Plurality in Spanish is mainly conveyed inflectionally (-s/-es), but due to the variability of /s/, the inflected marker can be realized as [h] or [hŋ] or not at all (Ø). Taking into account what was inferred from the analysis of the data in chapter 3, it was decided to elaborate

a test on **perception of the plural**, to investigate if the listener was able to identify the notion of plurality in cases where the plural marker was absent from the surface phonetic materials and, whether or not this was the case, attempt to identify the parameters involved in the listener's decision-making mechanisms. Two tests are described in this chapter, the first of which is a pilot; the items from the pilot test have been analysed and the outcome of this analysis has permitted the elaboration of the final instrument which has been called "Plural perception test", discussion of which will follow in section 4.2.3.. They are strongly related to the rest of the experiments to follow, as they are all concerned with the variability of /s/.

Previous experiments worth mentioning are the ones performed by Poplack (1979) and Uber (1981) using Puerto Rican subjects. The aim of Poplack's experiment was to find out whether Puerto Rican Spanish speakers would be able to identify the various realizations of /s/ as plural indicators. Poplack concluded that there was not one respondent who could consistently identify them. Uber reached a similar conclusion showing that deletion and weakening of syllable-final and word-final /s/ can cause perceptual problems for other Puerto Ricans when words containing weakened or deleted [s] are heard out of context. Also Hammond (1978) concluded that the % of discrimination attained by his Cuban subjects was too low to be considered of any significance.

It was predicted that the listener would identify plurality more readily, both in isolated and context bound words, in cases where enough phonemic/phonetic, semantic or syntactic information was provided than in cases where there were no clues at any of the levels just mentioned.

4.1 Pilot Test (First Experiment)

The application of this pilot test is intended to measure the instrument itself, its internal consistency and its validity.

4.1.1 Method

The design used in this experiment is the one called "within-subjects" design, where all subjects appear under the same experimental conditions.

Operational definition of the variables:

a) Independent variables:

-110 stimuli:

-62 isolated words (14 singular and 48 plural).

-48 phrases (3 singular and 45 plural).

-4 different phonetic variants of the plural marker, i.e. [s], [h], [hn] and the elided form Ø.

-4 different experimental conditions. By experimental condition we mean 4 different voices each with its own phonetic characteristics (Table 4.1).

b) Dependent variable:

-Number of correct answers.

Subjects

(a)–in relation to the elaboration of the test:

The test was designed using speech samples obtained from recorded interviews of four speakers, including myself, all natives of Caracas, 2 males and 2 females and with an age range between 16 and 70.

(b)–in relation to the administration of the test:

The test was administered to 50 first year University students, all volunteers, aged between 19 and 37 years, both male and female, 25 born and bred in Caracas and 25 born somewhere else in the country.

Material used

82 isolated words and phrases drawn from recorded interviews and 28 extracted from a word–list reading, also recorded for this purpose, were made into a list of 110 items. They comprised 'singular' and 'plural' forms. The plural forms contained the different phonetic variants of the plural marker. From the 110 stimuli, 62 were isolated words and 48 phrases; 28 of the isolated plural words were taken from bigger contexts which were also presented in the test to the respondents, in order to see whether the recognition of such words as plurals could be done in isolation, without any reference to their context (see appendix 4.1). In view of the fact that the sample was taken from spontaneous conversational texts and recorded in informal settings, it was felt necessary to introduce a number of **control items**. By **control items** we mean those that were uttered by the **control subject**, namely myself, under recording studio conditions and read in isolation i.e., 11 isolated singular words, 12 isolated plural words, 3 singular phrases and 3 plural phrases, to a total of 29 items. One of the reasons why they were

included was to determine if the respondents would indeed perceive an "s" if it was present. The recordings were transcribed phonetically by me and the transcriptions were checked by an experienced phonetician. It was on the basis of these transcriptions that the stimuli were assigned to [s], [h], [hj] and Ø realizations. The words and the phrases, as well as the speakers from whom they were taken, were randomized and recorded on a new tape which constituted the "Pilot Test Tape". The words and phrases were recorded at regular intervals and one repetition of each was allowed. The word/phrases and their repetition were not randomized, so each word/phrase was followed by its repetition. They were presented at regular intervals with a pause of approximately 7 seconds between pairs. Each pair was numbered to a total of 110 items-stimuli (see appendix 4.2). Typed written instructions (appendix 4.3) and a numbered answer sheet (appendix 4.4) were provided.

Apparatus

The 110 words/phrases were selected from the interview tapes and segmented with the aid of a speech segmenter at Edinburgh University's Linguistics Department's Laboratory. The segmenter was used to ensure the maximum accuracy when determining the word boundaries. The signal from the interview tapes was used to feed a system consisting of a loop, the speech segmenter and the oscilloscope. In this way the segmented signal from the loop could be associated with the wave description on the oscilloscope screen. Once the segmentation was clearly established the loop was played back and the signal was recorded on a tape recorder.

Procedure

The test was carried out, following a prearranged programme, in a language laboratory (of approximately 40m2) in the Instituto Pedagógico de Caracas. All the respondents were students at the Instituto and volunteered for the test. A set of instructions was imparted verbally by me and they were also repeated by me in the recording at the beginning of the "Pilot test tape". Each respondent was asked to wear earphones to ensure maximum control in the perception of the signal. A sheet numbered from 1 to 110 was given to each one of the respondents. Each number corresponded to one stimulus (with its repetition). The answer was given by writing "S" where 'singular' was perceived and "P" where 'plural', leaving a "blank" for 'don't know'. On the sheet some personal information was required: age, sex, and place of birth. The total duration of the test was 40 minutes. The responses given by each individual respondent to each stimulus can be seen in appendix 4.5. The environment was a language laboratory, spacious, with good light and ventilation. The number of people sitting at one time was limited by the size and capacity of the laboratory. The test was administered in two sessions with 25 respondents in each session. The first session was held at 11am and the second at 4pm (after the coffee break to ensure relaxation and control fatigue).

4.1.2 Results

The data were analysed using FREQUENCIES and CROSSTABS, both procedures of the Statistical Package for Social Sciences (SPSSX). FREQUENCIES gives measures of Central Tendency, like the mean; CROSSTABS builds tables that are the joint distribution of two or more variables. The unique combination of values for two variables defines a **cell** which is the basic element of all tables. As is conventional, the row variable is the dependent variable and the column variable the independent. CROSSTABS can also calculate chi-square and other measures of association.

Table 4.1 shows the internal structure of the test, that is, the number of tokens uttered by each speaker together with the reference number under which they appear in the test (in brackets). Also the items have been subdivided according to the category under which they appear in the test: isolated singular nouns; isolated plural nouns: with a plural marker (+mark) or without (-mark); vowel portion of the plural morpheme (-e); plural phrases including some potentially ambiguous and others contextually disambiguated; singular phrases.

Table 4.1.- **Internal Structure of the Test**

ITEMS	I S O L A T E D W O R D S				I N C O N T E X T				
		P L U R A L			P L U R A L				
SPK	SING	+mark	-mark	(-e)	disamb	ambiguous	other	SING	TOT
1		(8,12,17 45,49)	(4,25,28 55)		(94)	(61,68,71 74,79,85 90,104)			18
2		(3,7,16 21,24,30 40,48,57 60)	(32,43,52 54)	(11)	(64,67 76,82 86,102 105)	(62,69,73 80,83,89 91,95,97 100,110)			33
3	(5,13,36)	(26,41,44 106)	(9,18,29 38,46,51 53)	(59)	(72,78, 96,98 101)	(56,63,66 81,84,88 92,93,103 109)			30
4	(1,2,6 14,19 20,27 35,39 107,108)	(10,15,22 23,31,33, 34,37,42, 47,50,58)					(77,87,99)	(65,70 75)	29
TOTAL	14	31	15	2	13	29	3	3	110

Table 4.2 shows the percentage of correct and incorrect answers made by the 50 respondents on the entire perception test. As can be seen in the Table only 56.3% of the 50 subjects responded correctly to the entire test. According to the results of chi-square ($p=0.207$) the distinction Caracas/NonCaracas is not significant. It can also be observed in the table that when the items are separated according to the experimental condition, those uttered by the control subject are identified at a rate of 81.9% whereas those items uttered by the other speakers only attained 47.1% of correct discrimination.

Table 4.2.- General score

	Total No. or responses	No. of correct responses	No. of incorrect responses	No. of don't know responses
Caracas	2750	1570 (57.1%)	1105 (40.2%)	75 (2.7%)
NonCaracas	2750	1524 (55.4%)	1132 (41.2%)	94 (3.4%)
All	5500	3094 (56.3%)	2237 (40.7%)	169 (3.1%)

Chi-square	D.F	Significance
3.14588	2	p=0.207

	Total No. or items	No. of correct responses	No. of incorrect responses	No. of don't know responses
Control speaker	1450	1118 (81.9%)	258 (17.8%)	4 (0.3%)
Other speakers	4050	1906 (47.1%)	1979 (48.9%)	165 (4.1%)

For the purpose of analysis, the plural words and phrases under study were arranged into four subsets, as follows:

Subset 1. Isolated words and phrases in which there are disambiguating factors present, for instance:

(i)-verbal agreement (noun and verb agreement) e.g. son bonitas

(ii)-quantifiers (either a number or any other form: dos, varios, ambos,etc.)

(iii)-stem change in masc. plural determiner (it undergoes a vowel stem change: i.e. el/los which conveys plurality even when /s/is deleted)

(iv)-vowel section of plural morpheme (nouns and adjectives that end in a consonant form the plural adding "**es**"; even if the "s" is lost, they will preserve the vowel which was part of the plural morpheme) e.g. mujer/mujeres.

Subset 2. Isolated words in which the different variants of the plural marker are present, e.g. **[s], [h], [hn]**.

Subset 3.Potentially ambiguous plural phrases in which most plural markers

are absent and there are no disambiguating clues from the type described in subset 1.

Subset 4. Isolated plural words with no marker at all.

Table 4.3 displays the overall percentage of correct, incorrect and don't know answers made by the 50 subjects on each subset of the plural data. In analyzing these results, two things became apparent: the relatively high percentage of correct responses for subset 1 and the high percentage of incorrect responses for subset 4. The subjects responded correctly to 73.6% of the items relevant to subset 1, which showed the subjects ability to discriminate plurality more effectively only when disambiguating factors are at play. The responses for subsets 2 and 3 appear to be due to chance.

Table 4.3.- **Overall results concerning the subsets**

	Total No. of responses	No. of correct responses	No. of incorrect responses	No. of don't know responses
Subset 1	750	552 (73.6%)	168 (22.4%)	30 (4.0%)
Subset 2	1550	758 (48.9%)	744 (48.0%)	48 (3.1%)
Subset 3	1450	842 (58.1%)	573 (39.5%)	35 (2.4%)
Subset 4	700	105 (15.0%)	550 (78.6%)	45 (6.4%)

Table 4.4 shows the results concerning subset 1 with the data broken down further into smaller subsets. As can be seen in the Table, there appears to be a hierarchy amongst the disambiguating factors, as far as recognizability of the plural is concerned. According to our results, Verbal agreement seems

to be the major disambiguating clue for the identification of the plural, followed by modifier stem change, -e associated with plural, quantifiers. The significance of chi-square ($p<0.0001$) indicates that there is an association between the disambiguating factor and the answer.

Table 4.4.- **Disambiguating factors discriminated**

DISAMBIGUATING FACTORS

COUNT %	VERB 1	-E 2	-O 3	NUMERAL 4	ROW TOTAL
ANSWERS YES 1	90 90.0%	149 74.5%	215 86.0%	98 49.0%	552 73.6%
NO 2	7 7.0%	45 22.5%	33 13.2%	83 41.5%	168 22.4%
? 3	3 3.0%	6 3.0%	2 .8%	19 9.5%	30 4.0%
COLUMN TOTAL	100 13.3%	200 26.7%	250 33.3%	200 26.7%	750 100%

CHI-SQUARE	DF	SIGNIFICANCE
100.22589	6	P<0.0001

Tables 4.5 to 4.8 present an item-by-item analysis of the correct responses made on each subset of the plural data.

Table 4.5.-**Analysis of items** (subset 1)

Item No	Key Word	No. of Correct Answers (out of 50 respondents)	%
11	populares	33	66
59	existenciales	32	64
64	40 y pico de años	34	68
67	algunos discípulos	40	80
72	dos carreras	30	60
76	unos aplausos larguísimos	45	90
78	por esas dos carreras	15	30
82	los mismos caminos	44	88
86	actividades continuas	43	86
94	los idiomas	43	86
96	son problemas más que nada psicológicos	47	94
98	hay corrientes que son casi místicas o religiosas	43	86
101	las dos carreras	19	38
102	compositores bien preparados	41	82
105	los lugares más chiquitos	43	86

As can be seen in Table 4.5, with the exception of items 78 and 101, which were correctly identified below 38%, the rest of the items were correctly discriminated above 60%. It is very curious that although items 78 and 101 contain a numeral that indicates plurality by itself, their correct identification was very poor. One possible explanation is that both items were uttered at a very fast rate of speech, characteristic of speaker 3, which no doubt made the task very difficult for the respondents. The total percentage of discrimination for this subset was 73.6%, which seems to indicate that the subjects can with certain amount of success identify the plural notion in situations where disambiguating factors are at play.

Table 4.6.-**Analysis of items** (subset 2)

Item No	Key Word	Variant	No. of Correct Answers (out of 50 respondents)	%
3	larguísimos	h	9	18
7	manos	h	8	16
8	tarjeta/	s	38	76
10	carreras	s	49	98
12	entradas	h	14	28
15	problemas	s	49	98
16	interesantes	s	31	62
17	claves	h	10	20
21	distintos	h	4	8
22	tarjetas	s	48	96
23	cafés	s	48	96
24	palabras	h	18	36
26	carreras	h	14	28
30	cosas	h	4	8
31	manos	s	49	98
33	drogas	s	47	94
34	amigos	s	50	100
37	pinturas	s	50	100
40	clásicas	h	1	2
41	psicológicos	h	7	14
42	capas	hŋ	36	72
44	pacientes	s	31	62
45	hijos	h	22	44
47	libros	h	7	14
48	años	h	5	10
49	estudios	h	13	26
50	papás	hŋ	30	60
57	realistas	h	11	22
58	clases	h	10	20
60	caminos	h	34	68
106	novelas	h	17	34

In Table 4.6 the items correctly identified above 76% correspond to those in which the plural marker was realized as a sibilant /s/. Only one case with [s] was identified below this % (item 44 at 62%). The rest of the words, mainly with the [h] variant were discriminated correctly at a low percentage rate, except for item 60, identified correctly 68% of the time. The two items with variant [hŋ], 42 and 50, were identified at 72% and 60% respectively. These facts seems to reveal that respondents tend to look for the sibilant [s] and next for the variant [hŋ] as the most perceptually salient plural markers. If neither of them is present, the respondents tend to identify the target as a singular word.

Table 4.7.-**Analysis of items** (subset 3)

Item No	Key Word	No. of Correct Answers (out of 50 respondents)	%
56	ciencias físicas	12	24
61	muchas entradas	44	88
62	esas cosas	27	54
63	novelas de vanguardia	13	26
66	las carreras	27	54
68	puros símbolos	19	38
69	lados distintos	14	28
71	mis hijos	9	18
73	muchos lados distintos	46	92
74	cosas electrónicas	39	78
79	mis hijos	46	92
80	estudios bastante interesantes	28	56
81	las novelas de Sabato	6	12
83	aplausos larguísimos	43	86
84	propios problemas	33	66
85	unas tarjetas	41	82
87	dime qué libros	14	28
88	folleto de estudios	7	14
89	pocas palabras	43	86
90	puras claves	41	82
91	obras clásicas	42	84
92	pinturas de Dali	21	42
93	sus propios problemas	42	84
95	las arepitas	34	68
97	los conocemos todos	42	84
100	con las manos	11	22
103	las escuelas místicas o religiosas	47	94
104	mis estudios	43	86
109	las novelas de Sabato	12	24
110	bien preparados	10	20

It can be seen in Table 4.7, that the subjects responded to these contextually ambiguous phrases correctly at a percentage rate of 58.1%. However as can be seen in the table, the percentage score for the items vary a great deal and there doesn't seem to be any consistency in that variation. Whether the overall result of 58.1% could be considered high enough above chance to be taken as significant, is open to question. It could just represent successful guessing on the respondents' part.

Table 4.8.-Analysis of items (subset 4)

Item No	Key Word	No. of Correct Answers (out of 50 respondents)	%
4	adultos	1	2
9*	pinturas	7	14
18	estudios	5	10
25*	idiomas	9	18
28*	tarjetas	14	28
29*	carreras	11	22
32*	chiquitos	7	14
38*	carreras	15	30
43	preparados	11	22
46*	problemas	4	8
51*	físicas	3	6
52*	continuas	3	6
53*	místicas	1	2
54	habitantes	15	30
55*	electrónicas	0	0

Out of the 15 items from subset 4 (Table 4.8), 11 (marked with *) were extracted from bigger contexts which were also presented in the test (see appendix 4.1, for a complete listing of these cases of isolated words and the context they were taken from). When presented in context, the results were quite different from when they were presented in isolation, e.g.: The word in item 25 was identified 9 times in isolation but 43 times in context; the word in item 52 was identified once in isolation but 43 times in context. All this seems to suggest the subjects inability to discriminate plurality in isolated words which contain Ø as the realization of the plural marker.

Table 4.9 shows an analysis of those items in the test that were highly discriminated and Table 4.10 presents an analysis of those which were highly mistaken. The asterisk at the right of the item No. indicates a control item.

Table 4.9.- **Analysis of items** (highly discriminated)

Item No	Key Word	No. of Correct Answers (out of 50 respondents)	%
1*	carrera	49	98
2*	papá	49	98
5	problema	50	100
6*	clase	49	98
10*	carreras	49	98
14*	capa	45	90
15*	problemas	49	98
19*	ciencia	49	98
20*	café	50	100
22*	tarjetas	46	92
23*	cafés	48	96
27*	libro	50	100
31*	manos	49	98
65*	dime qué libro	47	94
67	algunos discípulos	40	80
70*	dime qué clave	47	94
73	muchos lados distintos	46	92
75*	dime que seña	45	90
76	unos aplausos larguísimos	45	90
79	mis hijos	46	92
82	los mismos caminos	44	88
83	aplausos larguísimos	43	86
85	unas tarjets	41	82
86	actividas continuas	43	86
90	puras claves	41	82
91	obras clásicas	42	84
93	sus propios problemas	42	84
94	los idiomas	43	86
96	son problemas más que nada psicológicos	47	94
97	los conocemos todos	42	84
98	hay corrientes que son casi místicas o religiosas	43	86
102	compositores bien preparados	41	82
104	mis estudios	43	86
105	los lugares más chiquitos	43	86

With the exception of items 10, 15, 31, which were correctly identified 98% of the time and items 22, 23, 96% of the time, the items that resulted in the highest number of correct responses were 5, 20, 27, correctly identified 100% of the time and 1, 2, 6, 19, 98% of the time all of which correspond to singular nouns.

Table 4.10.- **Analysis of items** (highly mistaken)

Item No	Key Word	No. of Incorrect Answers (out of 50 respondents)	%
4	adultos	46	92
7	manos	39	78
17	claves	40	80
18	estudios	41	82
21	distintos	40	80
25	idiomas	40	80
30	cosas	45	90
32	chiquitos	42	84
40	clasicas	49	98
41	psicológicos	43	86
51	fisicas	47	94
53	místicas	48	96
55	electrónicas	50	100
58	clases	40	80
81	las novelas de Sabato	44	88
88	folleto de estudios	42	84
108	idioma	49	98
110	bien preparados	39	78

With the exception of three items given in context, most of the mistaken items corresponded to isolated words which suggests that respondents found it very difficult to get enough information from isolated words alone in order to succesfully perform the task of discriminating plurality.

4.1.3. Discussion

As can be seen in Table 4.2, the general results are not always consistent with the hypothesis put forward in this experiment. Perhaps the most obvious explanation for this finding is the fact that the listener needs to hear particular clues in order to be able to perceive the plural notion. We have considered [h] as a clue, given the fact that it is extensively used as plural marker at the production level, but apparently it wasn't active for the listener at the perception level.

However, there are other possible explanations that also require consideration. The general score (Table 4.2) of 56.3% can be considered near chance or contaminated by the lack of adequate controls in several aspects of the experimental design. Some of the items, for example, were often unrecognized or wrongly answered by a high percentage of the respondents and in looking for possible sources of error, those particular items were examined and it was found that some of them corresponded to cases in which a very bad acoustic signal was present (recall that three of the recordings were done informally). This kind of constant error, however, was controlled for in the subsequent experiment by eliminating those particular items and replacing them by others with a better signal. Another possibility worth looking at concerns whether or not the experimental condition was having an effect on the respondents performance, as suggested by the difference in the % of correct responses under each condition (Table 4.2). Three of the speakers from whom the majority of the stimuli were taken, were recorded in informal settings, therefore the background noise factor could not be controlled. In order to balance this experimental effect, one more condition was introduced in the second experiment i. e. another speaker recorded under studio conditions.

4.2. Plural Perception Test (Second Experiment)

4.2.1 Method

The design used in this second experiment is also the "within-subjects" design.

Operational definition of the variables:

a) Independent variable:

-104 items:

-60 isolated words (9 singular and 51 plural).

-44 plural phrases.

-4 different phonetic variants of the plural marker (as in the Pilot).

-5 experimental conditions (one more speaker has been added to the previous 4 presented in the Pilot test).

b) Dependent variable:

-Number of correct answers.

Subjects

-in relation to the elaboration of the test:

The test was designed using the material already available from the Pilot test. Only 16 of the items were taken from an extra recorded interview, made in studio conditions, from a male speaker also native of Caracas and within the age range considered in the Pilot i.e. 16 - 70 years of age.

-in relation to the administration of the test:

The test was administered to 155 University students and lecturers; 71 males (36 from Caracas and 35 from somewhere else in the country) and 84 females (51 from Caracas and 33 from -Caracas). Information on the respondents is given in Table 4.11 below. As can be noticed, the sample size was increased from 50 subjects in the pilot study to 155 subjects in the final test. It was done in order to increase the sensitivity of the test. This increase makes the experiment more sensitive because the effect of the experimental variable will add together over subjects and the random errors will tend to cancel each other out as some will be in one direction and some in the other. The variable "origin" (Caracas-NonCaracas) was repeated (although it was found no meaningful in the pilot) to verify if, despite the larger sample, the same trends would appear. It was found that, as in the pilot, the variable Caracas/NonCaracas was irrelevant.

Table 4.11.- **Information on the subject-respondents**

	Male		Female		Total
Age	Caracas	-Caracas	Caracas	-Caracas	
< 20	6	9	10	7	32
20-30	21	21	28	21	91
> 30	9	5	13	5	32
	36	35	51	33	
Total	71		84		155

Material used:

Given the results of the **Pilot Test** and the analysis of the items performed, a number of isolated words and phrases were selected from the Pilot and made into a list. This list comprised plural and singular forms. To this list 16 words and phrases, taken from an extra recording, were added.

The final list (Appendix 4.6) consisted of 60 isolated words (9 of which were singular forms), and 44 plural phrases. Twenty six of the isolated plural words were extracted from amongst the 44 noun phrases (Appendix 4.7). The number of items in this test amounts to 104. The words, phrases and speakers were randomly ordered and this new randomization used in editing the final Plural Perception Test tape.

The words and noun phrases were recorded, and a repetition of each was allowed. The pairs were not randomized, so each word/phrase was followed by its repetition with a pause of approximately 5 seconds in between. Each pair was numbered to a total of 104 items-stimuli. Between each pair there was a blank of approximately 7 seconds. The test tape was played without interruption.

The instructions were typed and a copy was given to each respondent (appendix 4.8), they were also given verbally by me and again repeated at the beginning of the test tape. The answer sheet format used in the Pilot was modified and its design improved (Appendix 4.9). The respondents didn't have to write anything this time, they were only asked to tick the box that matched their perception. As for the test answers, the same procedure as for the Pilot was encouraged.

The new material from the extra interview was segmented using the same experimental devices as for the Pilot test, already described in section 4.2.

Procedure:

The test was administered in 12 sessions with a different group, chosen at random, in each session. The same procedure as already described for the pilot was followed, i.e. the subjects were asked to record whether they heard singular, plural or were uncertain which. Emphasis was placed on the fact that recognizability of the word was irrelevant and that only the notion of plurality was important. The responses given by each individual respondent to each stimulus can be seen in Appendix 4.10.

4.2.2 Results

Crosstabs, a procedure of SPSSX, already described in section 4.1.2 was used for the analysis of the data.

Table 4.12 shows the structure of the test, number of tokens both per speaker and per category under which they appear in the test. The same convention as for Table 4.1 (referring to the pilot) was used to indicate the word/phrases categories.

Table 4.12.- **Internal Structure of the Test**

ITEMS	I S O L A T E D W O R D S				I N C O N T E X T		
		P L U R A L			P L U R A L		
SPK	SING	+mark	-mark	(-e)	disamb	ambiguous	TOTAL
1		(7,20,26 40,103)	(5,17,30 43)		(12,24,51 56,64,66 102)	(34)	17
2		(2,8,15,21 62,67,86 89,96,99)	(33,44,50 60)	(31)	(19,28,55 57,65,73 77,80,85 88,93,95)	(11,25,38 52,70,91)	33
3	(6)	(16,45,47)	(83,101)	(39)	(35,54,61 69,72,76 78)	(27,81)	16
4	(3,9,14 42,59 75,87 94)	(23,29,36 46,48,68 71,79,92 98,100 104)	(84)				21
5		(10,22,37 49,58,82)	(4,41)		(18,53,63 90,97)	(1,13,32 74)	17
TOTAL	9	36	13	2	31	13	104

The plural data has been grouped into subsets, just as in the pilot. Table 4.13 displays the total number of expected responses, the number of correct answers given by the 155 subjects, and the %, for each subset of data relevant to plural items. A total for the plural items as a whole, a total for the singular items and a total for the entire test is also given. As can be seer there was only 53.4% of correct answers to the entire test. From the figures provided in the Table, we can observe that there is no difference from the trends observed in the Pilot: regarding the plural data, subset 1 has the highest % of correct responses whereas subset 4 has the lowest.

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Table 4.13.-**Overall results concerning the subsets and the entire test**

	Total No of responses	No. of correct responses	No. of incorrect responses	No. of don't knc responses
Subset 1	2480	1739 (70.1%)	516 (20.8%)	225 (9.1%)
Subset 2	5580	2550 (45.7%)	2681 (48.0%)	349 (6.3%)
Subset 3	4650	2702 (58.1%)	1662 (35.7%)	286 (6.2%)
Subset 4	2015	232 (11.5%)	1651 (81.9%)	132 (6.6%)
Total plural data	14725	7223 (49.1%)	6510 (44.2%)	992 (6.7%)
Total singular	1395	1380 (98.9%)	11 (0.8%)	4 (0.3%)
Total entire test	16120	8603 (53.4%)	6521 (40.5%)	996 (6.2%)

Tables 4.14 to 4.17 presents an analysis of items for each subset of data relevant to plural items. The phonetic realizations of -/s/ are indicated under each word/phrase.

As can be seen in Table 4.14, the items that caused the greatest number of subject errors were numbers 27, 34 and 52 which were correctly identified below 36%. These items were also part of the pilot and it is interesting to observe the different % attached to them in each test: item 34 was correctly identified in the pilot at 86% whereas in the second test it only attained 36.1%; similarly, item 52 was correctly identified in the pilot at 82%, whereas in this second test it only scored 26.5%. What happened for this difference to occur, is not clear. The remaining items were all correctly identified above 69% of the time.

Table 4.14.- **Analysis of items** (subset 1)

Item No	Key Word	No. of Correct Answers (out of 155 respondents)	%
1	las capas reales [h] Ø Ø	137	88.4
11	actividades continuas Ø Ø	111	71.6
13	los cafés africanos [h] [h] Ø	131	84.5
25	los mismos caminos Ø Ø Ø	127	81.9
27	las dos carreras Ø Ø Ø	35	23.2
31	populares Ø	120	77.4
32	los lápices amarillos Ø [h] Ø	146	94.2
34	los idiomas [h] Ø	56	36.1
38	los lugares más chiquitos [h] Ø Ø	91	58.7
39	existenciales Ø	107	69.0
52	compositores bien preparados [s] Ø	41	26.5
70	unos aplausos larguísimos [h] Ø [h]	138	89.0
74	las frutas tropicales Ø Ø [s]	151	97.4
81	corrientes que son casi Ø místicas o religiosas Ø Ø	121	78.1
91	algunos discípulos [h] Ø	119	76.8
95	40 y pico de años Ø	107	69.0

The percentage of correct responses (45.7%) for subset 2 (Table 4.15), which contains isolated words, represents extremely little ability on the part of these 155 subjects to correctly discriminate plurality in these words. Those isolated words which contained the [h] variant of the plural marker were correctly identified below 36% (except for items 103, 71, 21, and 49, which were correctly discriminated 41%, 43.9%, 68.4% and 70.1% respectively); those with [hŋ] were correctly identified between 67% and 71%; and those with [s]

between 85% and 99% (except for items 20, 47 and 99 which were identified 19.4%, 51.6% and 58.1% respectively). This indicates, apparently, that subjects tended to listen specifically for [s] or [hɪ̯] as the most salient markers of plurality.

Table 4.15.- **Analysis of items** (subset 2)

Item No.	Key word	Var.	No. of Correct Answers (out of 155 respondents)	%
2	larguísimos	h	13	8.4
7	tarjetas	s	137	88.4
8	manos	h	12	7.7
10	ácidas	s	132	85.2
15	clásicas	h	4	2.6
16	carreras	h	10	6.5
20	tarjetas	s	30	19.4
21	caminos	h	106	68.4
22	frutas	h	36	23.2
23	clases	h	12	7.7
26	estudios	h	22	14.2
29	papás	hŋ	120	77.4
36	capas	hŋ	108	69.7
37	amarillos	h	45	29.0
40	entradas	h	29	18.7
45	psicológicos	h	33	21.3
46	drogas	s	152	98.1
47	pacientes	s	80	51.6
48	problemas	h	38	24.5
49	abiertas	h	111	71.6
58	cartas	h	9	5.8
62	realistas	h	13	8.4
67	cosas	h	25	16.1
68	drogas	s	152	98.1
71	libros	h	68	43.9
79	tarjetas	s	154	99.4
82	frutas	h	47	30.3
86	distintos	h	24	15.5
89	manos	s	153	98.7
92	amigos	s	152	97.4
96	años	h	55	35.5
98	pinturas	s	154	99.4
99	interesantes	s	90	58.1
100	manos	h	56	36.1
103	hijos	h	64	41.3
104	problemas	hŋ	105	67.7

As can be seen in Table 4.16, the 155 subjects responded correctly to the contextually ambiguous phrases at a percentage rate of 58.1%. Whether this rate is high enough above 50% to be taken as significant is open to question. Probably it only represents, just as in the pilot, a relative degree of succesful guessing on the part of the respondents.

Table 4.16.- Analysis of items (subset 3)

Item Nb	Key Word	No. of Correct Answers (out of 155 respondents)	%
12	cosas electronicas [h] 0	81	52.3
18	las frutas acidas 0 0 [s]	140	90.3
19	las arepitas [s] 0	116	74.8
24	mis hijos [s] 0	147	94.8
28	con las manos 0 0	5	3.2
35	novelas de vanguardia 0	43	27.7
51	mis estudios [h] 0	72	46.5
53	las cartas abiertas 0 [h] [h]	146	94.2
54	las escuelas misticas o religiosas [h] 0 0 0	61	39.4
55	obras clasicas [h] 0	109	70.3
56	unas tarjetas [h] [s]	44	28.4
57	aplausos larguisimos 0 [h]	81	52.3
61	ciencias fisicas 0 0	35	22.6
63	las cartas [h] 0	133	85.8
64	muchas entradas [h] 0	142	91.6
65	esas cosas [h] [h]	101	65.2
66	pura claves [h] 0	119	76.8
69	las novelas de Sabato 0 [h]	26	16.8
72	pinturas de Dali 0 [deh]	28	18.1
73	estudios bastante interesantes [h] [s]	71	45.8
76	propios problemas [h] 0	89	57.4
77	pocas palabras [h] 0	141	91.0
78	sus propios problemas [h] [h] 0	127	81.9
80	lados distintos 0 [h]	20	12.9
85	muchos lados distintos 0 0 [h]	124	80.0
88	bien preparados 0 0	10	6.5
90	las frutas [s] 0	110	71.0
93	estudios bastante interesantes [h] [s]	98	63.9
97	las frutas acidas [h] 0 [s]	141	91.0
102	mis hijos [s] 0	141	91.0

The low score (11.5%) for the subset of items in Table 4.17, which contains isolated words with no plural marker, shows no ability on the part of the subjects to discriminate plurality in the absence of a marker.

Table 4.17.- **Analysis of items** (subset 4)

Item	Key Word	No. of Correct Answers (out of 155 respondents)	%
4	capas	28	18.1
5	adultos	3	1.9
17	electrónicas	4	2.6
30	hijos	50	32.3
33	preparados	47	30.3
41	africanos	23	14.8
43	idiomas	16	10.3
44	chiquitos	14	9.0
60	continuas	6	3.9
83	físicas	16	10.3
84	manos	3	1.9
101	místicas	10	6.5

As mentioned above, the origin of the respondents does not seem to trigger a significant discrimination. The distinction Caracas vs. nonCaracas alone does not seem to play an important role in what plural discrimination is concerned for any of the subsets, as can be seen in appendix 4.11.

There are other variables, however, that seem to be linked with the percentage of correct discrimination: sex, for example; the results in Table 4.18 seems to indicate that there is a slight tendency for women to perform better than men

Table 4.18.- **% of responses by subjects male versus female**

COUNT %	SEX MALE 1	 FEMALE 2	ROW TOTAL
ANSWER 1 RIGHT	3672 51.2%	4931 55.1%	8603 53.4%
2 WRONG	2945 41.0%	3576 40.0%	6521 40.5%
3 DON'T KNOW	559 7.8%	437 4.9%	996 6.2%
COLUMN TOTAL	7176 44.5%	8944 55.5%	16120 100%

CHI-SQUARE	DF	SIGNIFICANCE
67.14747	2	P<0.0001

LAMBDA = 0.00000
CRAMER'S V = 0.06454

Age also seems to be an important factor (Table 4.19), people over thirty (>30) seem to get the highest percentage of discrimination. However, between age of the speakers and age of the respondents, there doesn't seem to be any connection of the kind put forward by Janson (1979, 1983) in his perception studies on Swedish. He indicates the existence of a dialectal difference of perception between young and old natives of Stockholm, a trend which wasn't evident in our data.

Table 4.19.-% of responses by subjects according to their age

	AGE			
COUNT %	<20 YRS 1	20-30 YRS 2	>30 YRS 3	ROW TOTAL
ANSWER 1 RIGHT	1743 52.4%	4906 51.8%	1954 58.7%	8603 53.4%
2 WRONG	1332 40.0%	4009 42.4%	1180 35.5%	6521 40.5%
3 DON'T KNOW	253 7.6%	549 5.8%	194 5.8%	996 6.2%
COLUMN TOTAL	3328 20.6%	9464 58.7%	3328 20.6%	16120 100%

CHI-SQUARE	DF	SIGNIFICANCE
65.54399	4	P<0.0001

LAMBDA = 0.00000
CRAMER'S V = 0.04509

In relation to the variant type, [s] exhibits the highest percentage of recognizability, just as it was expected, being the main indicator of plurality. Also [hɲ] showed a relatively high score. According to the value of chi-square ($p<0.0001$), there also seems to be an association between answer and plural variant (Table 4.20).

Table 4.20.- **% of responses by subjects according to type**

COUNT %	TYPE s 1	 h 2	 hŋ 3	 ø 4	ROW TOTAL
ANSWER 1 RIGHT	1385 81.2%	832 24.4%	333 71.6%	447 20.6%	2997 38.7
2 WRONG	283 16.6%	2283 67.0%	115 24.7%	1602 73.8%	4283 55.3%
3 DON'T KNOW	37 2.2%	295 8.7%	17 3.7%	121 5.6%	470 6.1%
COLUMN TOTAL	1705 22.0%	3410 44.0%	465 6.0%	2170 28.0%	7750 100%

CHI-SQUARE	DF	SIGNIFICANCE
2136.80278	6	P<0.0001

LAMBDA = 0.38073
CRAMER'S V = 0.37129

In relation to the speakers, the items spoken by 4 and 5 are highly discriminated in comparison to those of the other 3, and we think it might be explained by the quality of the recordings.

Table 4.21.-**% of correct responses by subjects according to speaker**

	Total No of responses	No of correct responses	% of correct reponses
Speaker 1	2480	1107	44.6%
Speaker 2	4960	2152	43.4%
Speaker 3	2635	1023	38.8%
Speaker 4	3410	2655	77.9%
Speaker 5	2635	1666	63.2%
TOTAL	16120	8603	53.4%

We decided to recode the experimental conditions into two: (1) Nostudio, which groups the speakers 1, 2 and 3 whose recordings were made in informal settings and (2) Instudio, which groups speakers 4, 5, whose recordings were made in recording studios, background noise being perfectly controlled under the last condition. Table 4.22 shows the results under the two conditions. As can be appreciated from the Table, there is a striking difference in the level of performance exhibited by the 155 subjects under the two conditions. The value of chi-square ($p<0.0001$) indicates that there is also a relationship between the experimental condition and the answer given by the subject-respondents. The significant results ($p<.001$) of the correlation analysis (Table 4.23), stresses once more the association between the dependent and the independent variables.

Table 4.22.- **% of correct responses by subjects under the different E.C.**

COUNT / %	EXPERIMENTAL CONDITION NOSTUDIO 1	INSTUDIO 2	ROW TOTAL
ANSWER 1 RIGHT	4282 42.5%	4321 71.5%	8603 53.4%
2 WRONG	4883 48.5%	1638 27.1%	6521 40.5%
3 DON'T KNOW	910 9.0%	86 1.4%	996 6.2%
COLUMN TOTAL	10075 62.5%	6045 37.5%	16120 100%

CHI-SQUARE	DF	SIGNIFICANCE
1375.11046	2	P<0.0001

Table 4.23.- **Pearson correlation coefficients**

Variable pair	Coefficient	Significance
Answer with age	-.0427	p<.001
Answer with sex	-.0559	p<.001
Answer with type	.2923	p<.001
Answer with expcond	-.2901	p<.001

The size of the coefficient indicates the strength of the correlation whether positive or negative.

4.2.3 Discussion

Several attempts were made to try to find a test which would suit the perception data for analysis, including Hierarchichal Log-linear, Probit and Regression Analysis. However they proved to be not suitable given the complexity of the experimental design. Multidimensional Scaling was thought to be a possibility as it has been used succesfully in the past for the analysis of perceptual data (Terbeek, 1977). Nevertheless, several complications arose in the sense that first the data had to be transformed and secondly the process of running the programme for the analysis was not economical in terms of computer time and consultancy resources.

An analysis of the responses for the different subsets of data relevant to the plural items, revealed a number of trends: -identification rates declined when sentence context was removed, i.e., there was a high percentage of errors in the discrimination of plural words, especially in those with no plural marker (Ø variant). All these trends were accentuated according to the way the stimuli were presented. I am referring in particular to the five subjects from whom the data were taken. The subject respondent didn't have time to adjust to these different subjects. Somehow the listener has to develop certain perceptual strategies to take account of variability amongst these speakers. This fact made the plural discrimination test more difficult for the subject-respondents.

Regarding the stimulus data we observed that words which had been segmented from carrier phrases were generally much less well discriminated for plurality than when they were heard in their original context. Partially responsible for the low scores in these particular words are the distortions in the signal caused by the process of segmentation itself. No matter how

careful one tries to be when segmenting, there will be coarticulated cues that will be interrupted or removed. Another problem also lies in the fact that segmentation will introduce artificial or unnatural onsets and offsets which in our particular case could assume particular importance as one of the segments involved in our segmentations is [h].

As mentioned in chapter 3, it has been commonly accepted that for Caracas and the Caribbean Spanish varieties in general, the norm for the plural marker is [h] at the production level. However, when it comes to perception, even when [h] is pronounced it is not a sufficient plural marker. Uber (1981) also found that Puerto Rican speakers who normally produce [h] in place of [s], were unable to identify plurality based on the presence of [h] alone in tape recorded utterances, which had been taken out of context to eliminate other number markers. It appears then that even in cases where [h] is retained, it doesn't convey any distinctive morphological function for the listeners who seem to be strongly influenced by prescriptive attitudes at the perceptual level.

The variables age, sex and experimental condition proved to have an effect in the percentage of correct answers given by the subjects-respondents. The values of chi-square associated with these variables ($p<0.0001$) indicate that there is an association between them and the dependent variable which is not likely to be due to chance. This fact is also confirmed by the correlation analysis (Table 4.23). However chi-square doesn't tell us how strong the association is. We have used statistics based upon chi-square that do give measures of strength only to find that because our data are nominal and our tables are not squared -that is, the number of

rows (categories for the dependent variable) and the number of columns (categories in the independent variable) are not equal- the choice of the measures of association is very limited: **lambda** and **Cramer's V**.

The values of lambda range between 0.0 and 1.0. A value of 0 means that knowledge of the independent variable doesn't help at all in predicting the dependent variable following the prediction rules of lambda. Although there is an association it is difficult to interpret the strength of such association because given that the tables are not squared (cf. supra), lambda can't attain its maximum. As seen in tables 4.18 to 4.20 the associations **answer/sex** and **answer/age** are nil in terms of the prediction rules of lambda and to a certain extent also in terms of the magnitude of Cramer's V; the association **answer/type** shows as weak. When looked under the two different experimental conditions (Instudio vs Nostudio) the value of lambda increases (λ=0.43314) for the association **answer/type** which seems to indicate some sort of interaction between the experimental condition and the other two variables (answer//type).

Although there is some support here for the experimental hypothesis (in so far as the listeners identified plurality more readily both in isolated and context bound words, in cases where they contained enough phonemic/phonetic, semantic or syntactic information than in cases where they didn't), the difficulties for measuring the strength of the associations here reported, makes unequivocal interpretation of these data difficult. It must also be borne in mind that the number of singular items and plural items was not held constant as to test more reliably whether the subjects were guessing or not. One way round this problem might be to perform further experiments in which the design will be balanced for singular and plural items. It may well also be that the fact that identification of the lexical item was discouraged

(due to the quality of the recordings) had a negative effect on the listeners. Another aspect worth looking into is the speaker. It is not possible, to unequivocally attribute the correct responses to the Experimental condition. However, it remains possible, of course, that it indeed was the Instudio condition as opposed to the Nostudio condition that led to correct plural discrimination. If this is shown to be so, further research might then be expanded on attempting to establish which linguistic aspects of the performance of the speakers are active in facilitating a correct perceptual discrimination. The isolation of such aspects might shed light on the mechanisms that trigger listeners' perceptual judgements.

Chapter 5

Status of Length and Quality in some Caracas Spanish Vowels.

5. Introduction.

The process of deletion of word final "s" in some areas of the Spanish speaking world has been thought to be the cause of certain changes that take place in the vowels when preceding a weakened or deleted segment. These changes have been considered to be compensatory (Vázquez, 1953; Matthews, 1968; Hooper, 1972, 1974).

When doing the auditory analysis of the data (Chap3), certain variations were detected in the articulation of the vowels, especially when they were preceding a weakened or deleted segment. In some cases the vowels appeared to be longer and in some cases they were heard with a different quality than expected.

In this chapter two experiments are described. In both experiments the same data and apparatus were used and the same procedure was followed.

The first experiment was designed to determine whether durational differences amongst the vowels analysed, namely /a,e,o/, were conditioned by the vowel itself, or by the morphological characteristics of the word from which the vowel was originally extracted, or by any other factor. For this experiment, duration measurements of the vowels under study were taken and the results are given in the relevant section.

The second experiment is intended to describe the changes in the formant frequencies of the vowels analysed and whether they correspond to the compensatory changes that have been thought to occur in some Spanish vowels in order to express the plural notion. For this experiment, formant frequency measurements of the vowels /a,e,o/ were taken and the results discussed in the relevant section.

The ultimate aim of these experiments is, then, to try to find out whether durational differences and/or formant frequency changes could be considered acoustic correlates of morphological functions (singular/plural).

5.1. Review of the literature.

According to Navarro Tomás (1963), there is a tendency for Spanish vowels to have closer and opener allophones. The general conditioning factor for this allophonic variation is considered to be the shape of the syllable, i.e. the opener allophones occur in closed syllables and the closer allophones occur in open syllables.

In some varieties of Spanish (Andalusian and many Latin-American varieties), word final "s" undergoes processes of weakening and /or complete loss. As has been stated before, this deletion process has great significance for the morphology of the language, since there are several distinctions that are only established in Spanish by means of this final "s" (cf.chap3).

To many scholars, there are compensatory changes that take place in the vowels; such changes are related to the notions of vowel quality (open,close,back,front) and vowel quantity (relative duration). According to different opinions regarding this matter, there should be 7, 8, or more Spanish vowels instead of the five traditionally known and commonly accepted.

Vázquez (1953) gives examples from Uruguayan Spanish, a variety in which certain changes in the timbre and length of the vowel are being morphologized in order to express the singular vs plural distinction, e.g.:

	<the house> 'la casa'		<the houses> 'las casas'
	/la kasa/		/la:kasa:/
<book>	'libro'	<books>	'libros'
	/libro/		/librɔ/
<tooth>	'diente'	<teeth>	'dientes'
	/diente/		/dientɛ/

(As in Vázquez, 1953:91,92)

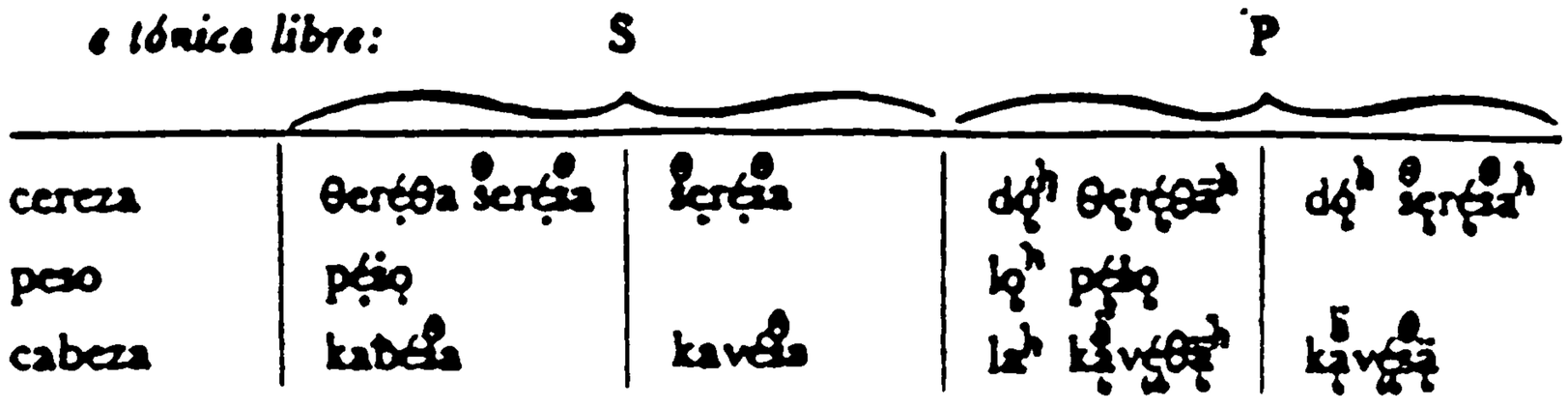
In his analysis, Vázquez implies a restructuring of the Uruguayan vowel system and proposes to add three more items to the inventory, i.e. /a:/, /ɛ/ and /ɔ/. Saporta (1965) agrees on incorporating /ɛ/ and /ɔ/ in the Uruguayan system, "with maximum contrast only in final position and neutralization elsewhere" (:223).

In their study of the vowels of Eastern Andalusia, Alonso et al. (1950), presented and analyzed data from the Granada dialect and showed clearly that the shape of the syllable has no significance at all in the quality of the vowel, unlike for Castilian, as discussed by Navarro Tomás (1963). In the Granada dialect the distinction between open and close vowels is morphologically motivated.

> "aparecen vocales cuyo valor fonológico es precisamente el indicar el plural. Existen por lo menos 8 vocales, es decir, tres más de las acostumbradas en Castellano medio: o̩, o̬, e̩, e̬, a, a̤̤, i, u."
>
> (As in Alonso et al., 1950:230)
>
> (there appear vowels whose phonological value is precisely to indicate plurality. There are at least 8 vowels, that is, three more than what is normally accepted in Standard Castilian:o̩, o̬, e̩, e̬, a̤̤, a, i, u.)

In both nouns and adjectives the singular has closed vowels and the plural has open vowels (see Table 5.1.)

Table 5.1.- **Andalusian vowels** (Alonso et al.,1950:230)



Hooper agrees with Alonso et al.'s findings regarding the morphologization of the open/close distinction in the vowels and using their data, she shows the development of a vowel harmony system as an attempt to maximally differentiate between singular and plural pairs (see table 5.2.).

Table 5.2.- **Vowel harmony in Andalusian** (As in Hooper, 1976:36)

Orthography	Singular	Plural	Gloss
pedazo	[peðáθo]	[pęđąθǫ]	'piece'
alto	[álto]	[ą́ltǫʰ]	'tall'
cabeza	[kaβéθa]	[kąβę́θą]	'head'
selva	[sélva]	[sę́lvą]	'forest'
lobo	[lóβo]	[lǫ́βǫʰ]	'wolf'
tonto	[tónto]	[tǫ́ntǫ]	'stupid'
piso	[píso]	[pi̯sǫʰ]	'floor'
fin	[fíŋ]	[fi̯nę̆ʰ]	'end'
grupo	[grúpo]	[gru̯pǫʰ]	'group'

In these descriptive studies physiological dimensions such as position and degree of constriction of the tongue and overall opening of the vocal tract have been used for the characterization of the vowels. Also, these parameters have been correlated with vowel duration. It has been shown, for instance, that open vowels tend to be longer than close vowels. In English, for example, this has been noted by Peterson and Lehiste (1960) and House (1961). Alonso et al. (1950) also establish the same correlation. Another factor considered of great relevance in the duration of the vowels is the consonantal environment. The effect of postvocalic consonants appears to be of great significance as revealed by many investigations so far made. It has been shown that voiced consonants have a lengthening effect on the preceding vowel. According to Delattre (1962), this factor is physiologically conditioned and is therefore of crosslinguistic validity. Keating (1985) contradicts this position, claiming that vowel duration as a function of voicing of a following consonant must be language specific; she supports her claim

with evidence from several languages. The influence of preceding consonants on vowel duration has also been a subject of study and has been shown to be not as significant.

Much of the research in acoustic phonetics agrees on the basic significance of the formant frequencies in the characterization of the vowels, particularly the first two formants (Joos, 1948). According to Delattre (1951) there seems to be a relationship between the articulatory mechanism and the acoustic parameters of formant frequencies and their positions in the vowel spectrum. Delattre describes these relations as follows: "there is a direct relation between formant 1 rising and overall opening of the vocal tract. The higher the frequency of F1 the wider the overall opening; and inversely...There is a direct relation between back and up tongue retracting and formant 2 frequency lowering. The more the tongue is retracted, the more the frequency of formant 2 is lowered: and inversely."

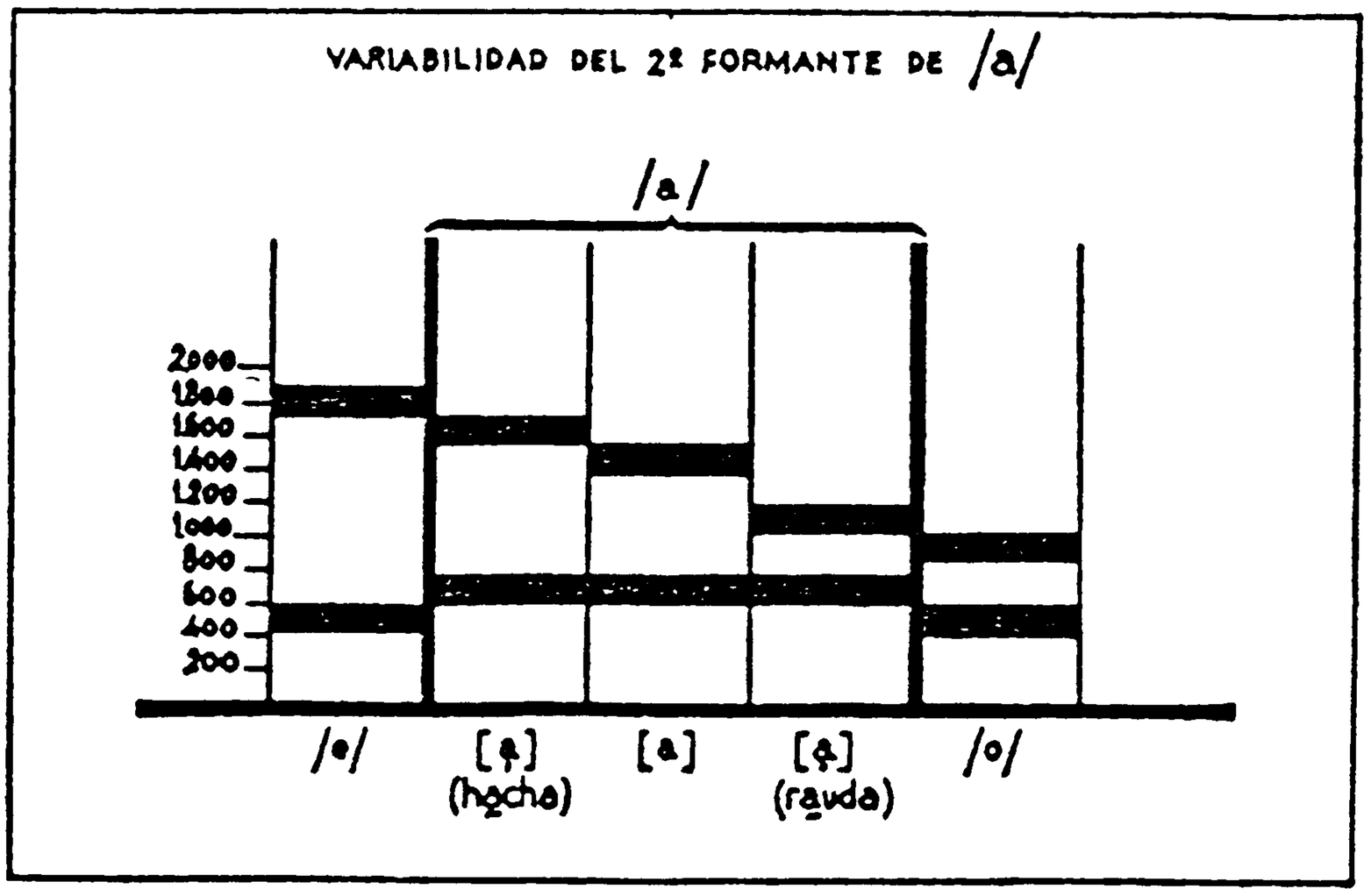
According to Quilis (1981) of all the formants, the first three are the most important, the rest of the higher formants, also called by him "individual formants" are considered less indispensable and are mostly associated with the individual's configuration of the vocal tract and with a particular language. In Table 5.3. relative formant values for Castilian Spanish are given, after Alarcos (1965).

Table 5.3.- **F1 and F2 values for Spanish vowels** (Alarcos 1965)

	F1	F2
/a/	700	1500
/e/	500	1800
/i/	400	2000
/o/	500	1000
/u/	400	700

The five Spanish vowel phonemes generally show articulatory variation according to their position in the word and the phonetic environment (cf.chap1) and spectrographic analysis done by Alarcos shows how in these cases the variation in the second formant is apparent as we can see in Figure 5.1.

Fig. 5.1.- **Variations of F2** (Alarcos, 1965: 148)



Additional acoustic features, notably F0 and F3 have been suggested as determinants of vowel quality. However, F0 is associated with suprasegmental features and therefore lies beyond the scope of this study; moreover, there doesn't seem to be any language in which the effect of F0 on vowel quality plays a distinctive role (Maddieson, 1977).

Peterson and Barney (1952), suggest that formant amplitudes, fundamental frequency, in addition to formant frequencies, all appear to have

an influence upon the perception of vowel quality. For the purpose of our experiment and due to the time available to carry it out, we have limited ourselves to the analysis of the first 3 formants.

5.2. Method.

Subjects

Three male subjects, native speakers from Caracas were recorded using a predetermined corpus. All subjects have had formal education up to University level.

Material

The raw data from where the vowels were elicited were obtained from a list (see Appendix 5.1) consisting of:

-6 singular nouns with lexical "s" ending plus their plural counterparts

-12 singular nouns without lexical "s" ending plus their plural counterparts

-52 noun phrases: 18 Determiner + noun and 34 Det. + noun + adjective.

-11 verbal forms showing the contrast between 2nd. and 3rd.person singular in present indicative and present subjunctive.

As a convenience for the analysis, the environments and word categories above have been recoded as SP[1 to 10] (cf. section 5.3.2).

The raw data amounts to a total of 218 words per speaker. The raw vowel data from the list amounts to a total of:

-101 cases of vowel /a/

- 69 cases of vowel /e/

- 45 cases of vowel /o/

- 1 case of vowel /i/

- 2 cases of vowel /u/

The number of vowels elicited and analysed for each of the experiments to follow is fewer than the number of vowels given as raw data. This is explained by the fact that some words were very short and it was very difficult to set the boundaries in relation to the neighbouring consonants. In other cases, there were "noise effects" on the part of the subjects that could not be controlled.

Table 5.4.-**Distribution of vowel data according to word category**.

	Sing Noun	Pl.Noun	Determiners	Pl.Adject.	Verb forms	TOTAL
/a/	7	24	33	15	22	101
/e/	4	35	0	8	22	69
/o/	4	11	19	11	0	45

Apparatus

Data obtained from three subjects was recorded in Venezuela, using an UHER 4000 Report L at a speed of 7 1/2ips (19cps) and sampled on a Digital Equipment Corporation PDP11/40 computer at a rate of 10000Hz., using a Barr and Stroud Butterworth filter at 5000Hz. An LPSAD-12 module was used to digitise the data. The analysis of the waveforms was done on the Department's Digital Equipment Corporation VAX/VMS 11/750 computer system using the Interactive Laboratory System (ILS) computer package, produced by Signal Technology Inc. The Statistical analysis of the data was carried out on Emas-a (Edinburgh University Computer System) using the Statistical Package for the Social Sciences (SPSSX).

Procedure

The three subjects were interviewed separately and informally, trying to avoid background noise as much as possible. Their speech was sampled on the PDP under ILS control, with the context set to 100 points per frame (1 frame=1centisecond). The speech waveforms were displayed on the terminal screen and the vowels were segmented by visual inspection. The segmentations were checked using the ILS commands set up for this purpose (see Appendix 5.2 for a description of ILS and commands used). Once the data was digitised, the acoustic analysis was done on the VAX using the different ILS functions set up for formant extraction. The formant values obtained this way were transferred to EMAS-A. SPSSX is available on this machine and several of its procedures were used for the statistical analysis of the vowel data. ANOVA, MANOVA and BREAKDOWN were used for the analysis of duration and DISCRIMINANT, CROSSTAB and Analysis of variance (MANOVA and ONE-WAY) were used for the formant frequency analysis.

5.3. Experiment 1: Durational differences in vowels

5.3.1 System of hypothesis:

The purpose of this experiment is to try to verify the often repeated hypothesis that when a final /s/ (marker of plurality or marker of the second person in the verb) is deleted, the vowel preceding it undergoes compensatory lengthening. This assumption leads to the substantive hypothesis that vowels in the plural and second person in the verbs are longer than vowels in the singular and first and third person in the verbs.

The question we want to answer with the sample data is then: whether or not SP/VOWEL has an effect on vowel duration. This implies a null hypothesis which states that all the SP/VOWEL effects are equal to zero. The only way a variance can equal zero is for all values (when taken as deviations from their mean) to equal zero themselves.

5.3.2 Operational definition of the variables:

a) **Dependent variable:**

Durational measurements of the vowels /a, e, o/, in centiseconds (see Appendix 5.3).

b) **Independent variable:**

-List of 614 vowels (extracted from the material described in section 5.2)

-Three subjects from whom the data were obtained

-Three vowel qualities, i.e. /a/, /e/, /o/.

-Ten SP environments, specified as follows

SP1= isolated singular noun

SP2= isolated plural noun

SP3= plural noun in the context Determiner + Noun

SP4= plural noun in the context Det. + Noun + Adjective

SP5= plural determiner from context in 3 and 4

SP6= plural adjective from context in 4

SP7= 3rd person present indicative

SP8= 2nd person present indicative

SP9= 1st/3rd person present subjunctive

SP10= 2nd person present subjunctive

where SP2 to SP6, SP8 and SP10 have underlying /s/ whereas SP1, SP7 and SP9 do not.

5.3.3 Results

The number of vowel cases (observations) subjected to durational measurements and analysis are shown in Table 5.5 (this data was obtained from the material described in section 5.2).

Table 5.5.- **Number of vowels analysed for durational purposes** (according to the SP specification).

V/SP	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	total
/a/	19	18	18	36	97	43	0	0	30	30	291
/e/	12	27	26	50	0	22	29	25	0	0	191
/o/	9	9	9	15	57	33	0	0	0	0	132
TOTAL	40	54	53	101	154	98	29	25	30	30	614

Table 5.6 displays the mean durational values per vowel, per speaker and per SP.

Table 5.6.- **Mean Durational Values** (in centiseconds)

S/P	VOWEL	SUB1	SUB2	SUB3
SP(1)	/a/	9.16	10.33	9.66
	/e/	13.50	12.00	12.00
	/o/	11.33	9.66	10.66
SP(2)	/a/	9.16	8.33	8.50
	/e/	9.66	8.88	6.77
	/o/	11.00	8.33	7.66
SP(3)	/a/	10.66	8.16	6.83
	/e/	9.25	7.66	6.50
	/o/	13.66	8.00	6.66
SP(4)	/a/	7.75	7.91	7.50
	/e/	8.00	6.94	6.37
	/o/	8.40	7.40	7.20
SP(5)	/a/	7.74	8.09	6.51
	/o/	7.63	7.11	6.53
SP(6)	/a/	8.64	8.35	5.53
	/e/	11.00	7.44	5.37
	/o/	9.27	6.81	5.63
SP(7)	/e/	11.44	12.44	9.18
SP(8)	/e/	9.33	10.71	8.00
SP(9)	/a/	12.00	12.18	8.27
SP(10)	/a/	9.33	10.70	6.27

The statistical test used for the analysis of duration was the Multivariate analysis of variance, referred to as MANOVA, and it is a procedure of SPSSX computer package. MANOVA is another case of ANOVA but more sophisticated.

It is one of the most important features of the MANOVA procedure that it allows for analysis of correlated explanatory variables, that is, designs with unequal as well as unproportional cell entries (nonorthogonal designs,

known as well as "random models"). In our data we do not have observations on the dependent variable for all categories of the independent variable, therefore the use of MANOVA. However, the ANOVA procedure has recently been modified and it can now cope with data it couldn't before. Also BREAKDOWN, another procedure of SPSSX, offers analysis of variance. We ran the three procedures on our data, as there were particular statistics that were available on one procedure but not on another (the instructions for these procedures can be seen in Appendix 5.4).

In the analysis of variance results given in Table 5.7., where the SP variable was introduced with all its factors, i.e. SP1 to SP10, it can be observed that there is a difference between the sample means (the means for the different SPs). These means not only differ in numerical value but, as shown in the second half of the Table, the large value of the F-ratio shows that there is a systematic difference between the group means. The computed F-ratio is evaluated against the tabled F-value that bounds the critical region of the sample distribution. The 9 degrees of freedom (df) for the **between groups** variance and the 604 df for the **within group** variance give us the F-value that bounds the 5% critical region which is 1.94 (critical values can be found in Tables provided in any statistical book)

Table 5.7.- **Analysis of variance** (BREAKDOWN output)

VALUE	LABEL	SUM	MEAN	STD DEV	SUM OF SQ	CASES
1		439.0000	10.9750	2.7126	286.9750	40
2		465.0000	8.6111	2.3264	286.8333	54
3		441.0000	8.3208	2.6149	355.5472	53
4		748.0000	7.4059	2.0454	418.3564	101
5		1122.0000	7.2857	1.7628	475.4286	154
6		729.0000	7.4388	2.4413	578.1327	98
7		316.0000	10.8966	3.0160	254.6897	29
8		231.0000	9.2400	2.7881	186.5600	25
9		321.0000	10.7000	2.4796	178.3000	30
10		260.0000	8.6667	2.7334	216.6667	30
WITHIN GROUPS TOTAL		5072.0000	8.2606	2.3152	3237.4895	614

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F	SIG.
BETWEEN GROUPS	996.8167	9	110.7574	20.6634	p<.0001
LINEARITY	2.5095	1	2.5095	.4682	p<.4941
DEV. FROM LINEARITY	994.3072	8	124.2884	23.1878	p<.0001
	R = .0243		R SQUARED = .0006		
WITHIN GROUPS	3237.4895	604	5.3601		
	ETA = .4852		ETA SQUARED = .2354		

The first part of Table 5.8 shows the results when the variable Vowel sum of squares is computed directly from the Vowel means through a one way analysis of variance. The SP sum of squares then shows the amount of variation that is left for the SP variable to explain, after the Vowel variable first has been allowed to explain all the variation it can. In the second part of the Table, where SP first explains all it can, the remaining sum of squares for the Vowel variable reduces considerably. The impact on the Vowel variable is very severe. When Vowel is introduced first, the F-ratio is as large as 6.897 which with 2 degrees of freedom (for the vowel group) and 593 degrees of freedom (for the residual), has a significance of $p < 0.001$. But when the SP variable is left to pick up after the Vowel variable, the sum of squares drops from 72.585 to 0.482, and the corresponding F-ratio drops to 0.046 with a p-value of 0.955. The interaction sum of squares is always the same in the two cases, but the sum of squares for the two main variables differ.

TABLE 5.8.- **Analysis of variance**(ANOVA output)

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	997.299	11	90.664	17.230	p<0.001
VOWEL	72.585	2	36.293	6.897	p<0.001
SP	924.714	9	102.746	19.526	p<0.000
02-WAY INTERACTIONS	116.710	9	12.968	2.464	p<0.009
VOWEL SP	116.710	9	12.968	2.464	p<0.009
EXPLAINED	1114.008	20	55.700	10.586	p<0.000
RESIDUAL	3120.298	593	5.262		
TOTAL	4234.306	613	6.908		

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	997.299	11	90.664	17.230	p<0.001
SP	996.817	9	110.757	21.049	p<0.001
VOWEL	0.482	2	0.241	0.046	p<0.955
02-WAY INTERACTIONS	116.710	9	12.968	2.464	p<0.009
SP VOWEL	116.710	9	12.968	2.464	p<0.009
EXPLAINED	1114.008	20	55.700	10.586	p<0.001
RESIDUAL	3120.298	593	5.262		
TOTAL	4234.306	613	6.908		

5.3.4 Discussion

As can be seen from Table 5.6 there is a degree of variability amongst the subjects in respect to the mean durations of the vowels. Subject 1 vowels seem to be longer and Subject 2 vowels seem to be shorter. This Subject effect however can be said to be idiolectal and its implications are outside the scope of this thesis. From Tables 5.7 and 5.8 it can be inferred that Duration is very much dependent on SP and to a lesser degree on Vowel. This SP and Vowel effect are of interest to us since the SP effect can be associated with the notion of compensatory lengthening already advanced for some dialects of Spanish, as it has previously been mentioned in the introduction to this chapter. There is a difference though for it has been argued that compensatory lengthening is a natural consequence of sound loss and according to our findings it is not in the Plural with s--->Ø that the lengthening occurs but in the Singular were deletion does not apply. The Vowel effect, also present, can be identified with the theory that certain vowels do not undergo compensatory lengthening but compensatory quality change instead.

When collapsing all the plurals into one category and contrasting it with the singular, it is shown that for all subjects, vowels in the singular are systematically longer than vowels in the plural (Table 5.9). This is quite an interesting but unexpected result. If it is true, as seems to be the case at least for our sample, that vowels in the singular are longer than vowels in the plural then it could be argued, contrary to what has been demonstrated for other Spanish varieties, that plurality is expressed by shortening of the vowel or that singularity is conveyed by lengthening of the vowel.

Table 5.9.- **Mean durational values**(in centiseconds)

MEAN COUNT	VOWEL 1 [a]	2 [e]	3 [o]	TOTAL
SP 1 (SINGULAR)	9.84 19	13.08 12	10.56 9	10.97 40
2 (ALL PLURALS)	7.67 212	7.63 125	7.51 123	7.62 460
3 (1//3 PERSON VERB)	10.70 30	10.90 29	-- --	10.80 59
4 (2ND PERSON VERB)	8.67 30	9.24 25	-- --	8.93 55
TOTAL	8.23 291	8.68 191	7.72 132	 614

This generalization concerning number marking can be extended to the verbs as well. First and third person vowels are equally longer than second person vowels both in the indicative and in the subjunctive forms of the verbs (Table 5.9).

However, our sample contained a small amount of singular words, therefore it would be advisable to replicate the experiment, introducing more data for the singulars in order to see if the same trends hold.

5.4 Experiment 2: Formant frequency analysis.

5.4.1 Hypothesis

The experiment described in this section is an attempt to verify the often repeated hypothesis that a compensatory phonemic change has taken place in certain Spanish varieties in which syllable-final and word-final /s/ is deleted. The change claimed to take place involves the phonemicization of the difference in open versus closed quality of the vowel inmediately preceding -s ------> [ø] in Caribbean Spanish.

5.4.2 Formant data and measurements

The data for this experiment consists of a group of 595 vowels, taken from the corpus described in section 5.2.

Current available instrumental techniques are sophisticated enough to provide procedures by which it is possible, with certain degree of accuracy, to derive formant frequencies. We have done this for the present experiment, using the different ILS commands related to formant frequency extraction and storage (see Appendix 5.5 for the formant-data list).

While the extraction of the values for each formant was a fairly straightforward procedure, the location of the center of the formants remained a problem. To Peterson (1959) the peaks of the vowel envelope curves provide the most meaningful data regarding formant frequencies. In locating the centers of the formants, however, the following criteria were adopted:

a) Whenever the formant values remained constant for 20 or more milliseconds (2 or more frames), the mean of such values was taken as the "target" for that particular formant.

b) Whenever the values were kept fairly constant, an extra value at either side was taken as a margin of error.

c) whenever the formants resolved in a positive or negative slope, three measurements were taken, i.e. one at the beginning, one at the middle and one at the end of the vowel.

d) whenever there was a peak or peaks associated with a formant, the average of such peaks was taken as the center of the formant.

e) When none of the above applied then the total of the values was averaged.

For the purpose of our analysis, the data was treated using the most common of all data reduction techniques, i.e. a simple averaging of the formant values over all speakers. For each vowel, the means are calculated for each formant. This method has been previously used by Lindau and Wood (1977) for Yoruba and Halle (1959) for Russian.

The instrumentation used for the extraction of the formant-data as well as the procedure followed have been already described in section 5.2.

5.4.3 Operational definition of the variables:

a) Dependent variable:

For the Discriminant analysis the dependent variable was the group of vowels /a, e, o/.

b) Independent variable:

-Measurements of F1 to F3 values for vowels /a, e, o/

-Three subjects from whom the data were obtained

-Ten SP environments as specified in section 5.3.2.

5.4.4 Results:

The statistical test used for the discriminant analysis performed on the formant data was the DISCRIMINANT procedure of SPSSX (Nie et al., 1983). Using a collection of values, i.e. Formant 1 to Formant 3 frequency values (F1 to F3), we wanted to distinguish between the vowels /a,e,o/. By the discriminant procedure we also wanted to identify amongst the formants those which were most essential for distinguishing amongst the groups of vowels and to develop a procedure for predicting group membership for new cases whose group membership was undetermined (the entire SPSSX instructions for the procedure DISCRIMINANT can be found in the Appendix 5.6). The factors of the group variable are the vowels /a, e, o/ and the group variable is taken to be the dependent variable. The values of the formant frequencies are set as the independent variables, they are also called "discriminant variables" in the context of the Discriminant analysis as they serve as the basis for classifying cases into one of the three groups. Linear combinations of these variables are made and they are called **linear discriminant functions**. In other words, the **functions** are derived by equations which combine the discriminating variables in a way that will allow one to identify the group which a case more closely resembles. The maximum number of functions is equal to the number of groups minus one or the number of discriminating variables, whichever is fewer. In our case we have three discriminating variables (F1 to F3) and three groups (a,e,o), so two

functions are the most we can derive. These functions or equations are also called **canonical discriminant functions** and are displayed in Table 5.10. In this table an **eigenvalue** is attached to each function, such eigenvalue is converted to a relative % and both measures account for the discriminatory power of each function. In our case the first function has the largest eigenvalue which converted to a % can be said to contain 83.34% of the total discriminating power in this system of equations. The canonical correlation is a measure of association, the large number in Table 5.10 represents increasing degree of association between the groups and the first discriminant function.

Table 5.10.- **Canonical Discriminant Functions**

Function	Eigenvalue	% of variance	Canonical correlation
1	1.44072	83.34	0.7683002
2	0.28806	16.66	0.4729060

Table 5.11 reports the standardized coefficients for the vowel-formant data.

Table 5.11.- **Standardized Canonical Discriminant Function Coefficients**

	Function 1	Function 2
F1	-0.68824	0.80469
F2	0.97427	0.39156
F3	0.07476	-0.04706

The standardized coefficients are helpful because we can use them to determine which variable contributes most to determining scores on the function. This is done by examining the magnitude of the standardized coefficients (ignoring the sign): the larger the magnitude, the greater is that variable contribution. From the figures in Table 5.11 it is clear that Formant 1 and Formant 2 are the most important factors for the discrimination of the vowels in the Caracas data. Also Quilis (1981), considers Formant 2 as the most important for the characterization of the vowels when synthesizing speech.

The mean values for each formant, for each vowel, for all speakers and for each individual speaker, are given in Table 5.12. The average frequency for each formant per each of the vowels analysed corresponds roughly to those given by Alarcos (1965) for Castilian Spanish (Table 5.3).

Table 5.12.- **Group Means**

a.- Group Means per subject

	SUB1			SUB2			SUB3		
VOWEL	F1	F2	F3	F1	F2	F3	F1	F2	F3
/a/	764	1571	2402	647	1534	2441	578	1434	2405
/e/	428	1837	2560	440	1774	2510	450	1668	2424
/o/	534	1267	2401	532	1216	2279	466	1120	2354

b.- Group means and Std.Dev. for all subjects

VOWEL	F1	St.D.	F2	St.D.	F3	St.D.
/a/	667	172	1492	165	2408	294
/e/	439	132	1770	217	2505	147
/o/	511	144	1201	276	2346	242

A significance test (Wilk's lambda) for the equality of group means is shown in Table 5.13. Wilk's lambda takes into consideration both the differences between groups and the cohesiveness or homogeneity within groups. By cohesiveness is meant the degree to which cases (vowels) cluster near their group centroids (Fig. 5.3). Values of **lambda** near zero indicate high discrimination; as lambda increases towards its maximum value 1.0, it reports progressively less discrimination; in Table 5.13, we can see that F2 has the smallest lambda, therefore indicating, as already pointed out, that that variable has the highest discriminating power. To test its significance, lambda is converted into an approximation of either chi-square or F-distributions. In our case we converted lambda into an overall Multivariate F statistics.

Table 5.13.- **Wilk's lambda**

VARIABLE	WILK'S LAMBDA	F	SIGNIFICANCE
F1	0.69726	127.2	p<0.0001
F2	0.51246	278.7	p<0.0001
F3	0.94571	16.82	p<0.0001

Table 5.14 displays the classification results attained by the procedure discriminant.

Table 5.14.- **Classification Results**

Actual group	No. of cases	Predicted group membership		
		1/a/	2/e/	3/o/
Group 1/a/	279	242 (86.7%)	13 (4.7%)	27 (8.6%)
Group 2/e/	178	6 (3.4%)	163 (91.6%)	9 (5.1%)
Group 3/o/	132	14 (10.6%)	8 (6.1%)	110 (83.3%)
Ungrouped	6	0 (0.0%)	1 (16.7%)	5 (83.3%)

Percent of "grouped" cases correctly classified: 87.44%

Number of cases processed: 595

As seen in Table 5.14, the vowels where the most number of missclassifications occurred were /a/ and /o/. We will look into this fact later.

A list of the vowels misclassified is given in Table 5.15., together with an indication of the word from which they were extracted, and their independent Formant Frequency values.

Table 5.15.- **Misclassified cases**

	F1	F2	F3
Vowel /a/ misclassified as /e/			
las	456	1571	2076
carta	460	1607	2474
pequeñas	496	1635	2696
solitarias	594	1734	2424
pequeñas	622	1853	2699
viejas	334	1465	2232
acidas	465	1521	2304
solitarias	406	1591	2473
anchas	436	1548	2346
prendidas	437	1477	2409
abiertas	549	1634	2486
seas	467	1661	2391
vengas	380	1542	2360
Vowel /a/ misclassified as /o/			
camas	445	1023	2362
frutas	354	1182	2383
frutas	475	1349	2610
cartas	644	1006	1536
conocidas	459	1436	2500
las	537	1091	2436
drogas	623	1204	1067
adictivas	482	1395	2433
frutas	444	1404	2550
adictivas	389	1320	2140
casas	494	1370	2447
capas	513	1333	2243
las	510	1374	2494
las	545	1323	2367
frutas	493	1397	2500
cosa	516	1297	2394
cosas	510	1361	2294
muerda	407	1298	2189
muerdas	456	1402	2329
venga	541	1342	2360
bebas	547	1367	2347
pinta	534	1244	2461
pintas	476	1416	2511
Vowel /e/ misclassified as /o/			
calle	336	1137	2798
peces	406	1445	2332
voces	466	885	2288
cruces	312	1011	2095
azules	369	1309	2286
meses	390	1429	2408
vienes	465	982	2578
viene	320	1137	2798
pinte	488	1410	2487

Vowel /e/ misclassified as /a/

luces	634	1656	2523
reales	1734	1746	2353
lápices	537	1540	2532
luces	504	1482	2470
pinte	623	1538	2394
voces	440	1454	2449

Vowel /o/ misclassified as /a/

mansos	1022	2128	2797
perros	1137	1761	2438
hambrientos	892	1879	2672
los	966	1931	2752
articulos	1239	1269	2540
los	628	1396	2431
venezolanos	692	1601	2458
africanos	759	1578	2651
nuevos	631	1336	2123
abiertos	763	1366	1756
los	611	1334	2363
perro	524	1427	2792
los	702	1271	2299
articulos	653	1427	2792

Vowel /o/ misclassified as /e/

perro	543	1822	2518
perros	480	1960	2457
perros	512	1932	2328
amarillos	326	1478	2271
nuevos	470	1746	2603
los	801	2193	2326
amarillos	406	1591	2473
los	466	2488	2907

The Territorial Map presented in Fig.5.2., shows the vocalic field for each of the discriminated vowels. In the territorial map, the space is subdivided according to each centroid's position. Asterisks are placed at the group centroids.

A scatterplot showing vocalic groupings and the shifting of vowels from one vocalic field to another can be seen in Fig. 5.3. In this All-group scatterplot we can observe: (a) the group centroids, which represent the mean of the classified groups and (b) the shifting of the vowels from one vocalic field to another. This shifting of the vowels from one vocalic field to another implies either a lowering or an increase of F1 and/or F2.

The kind of shifting that occurs is as follows:

/a/ ----- /e/

/a/ ----- /o/

/e/ ----- /o/

/e/ ----- /a/

/o/ ----- /a/

/o/ ----- /e/

First of all some information about the dimensions on the scatterplot. In the All-groups scatterplot there are two axes. The horizontal axis corresponds to Function 1 (F2) and the vertical axis corresponds to Function 2 (F1). Each axis has a range of positive and negative values. Displacement towards the positive range means an increase in value, whereas a displacement towards the negative range is associated with a decrease in value, i.e., for Function 1, defined mainly by Formant 2, the positive side of the axis would express increasing values for F2, whereas for Function 2, defined mainly by Formant 1, the positive side would represent increasing values for F1.

Fig. 5.2.- **Territorial Map showing vocalic field.**

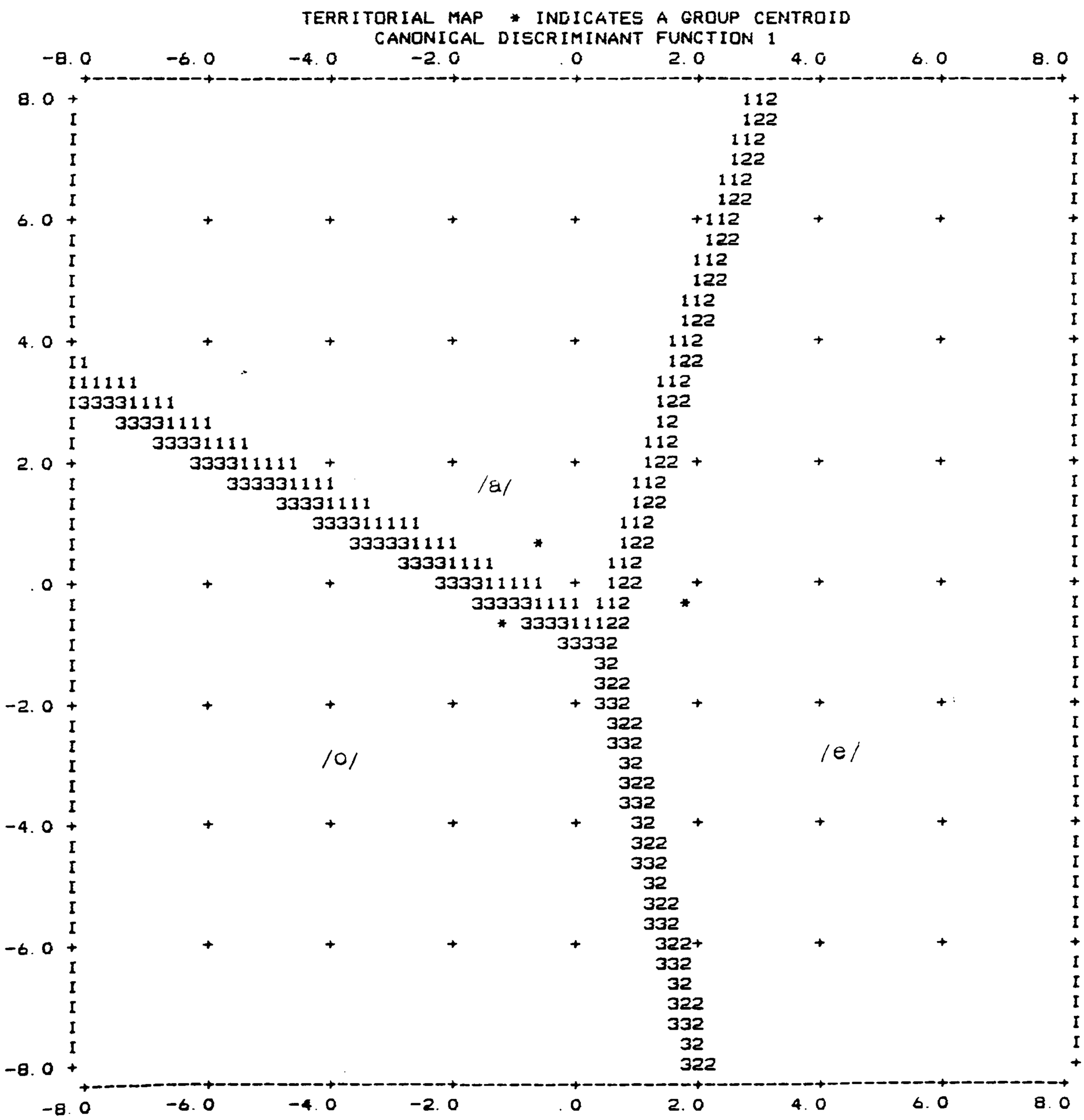
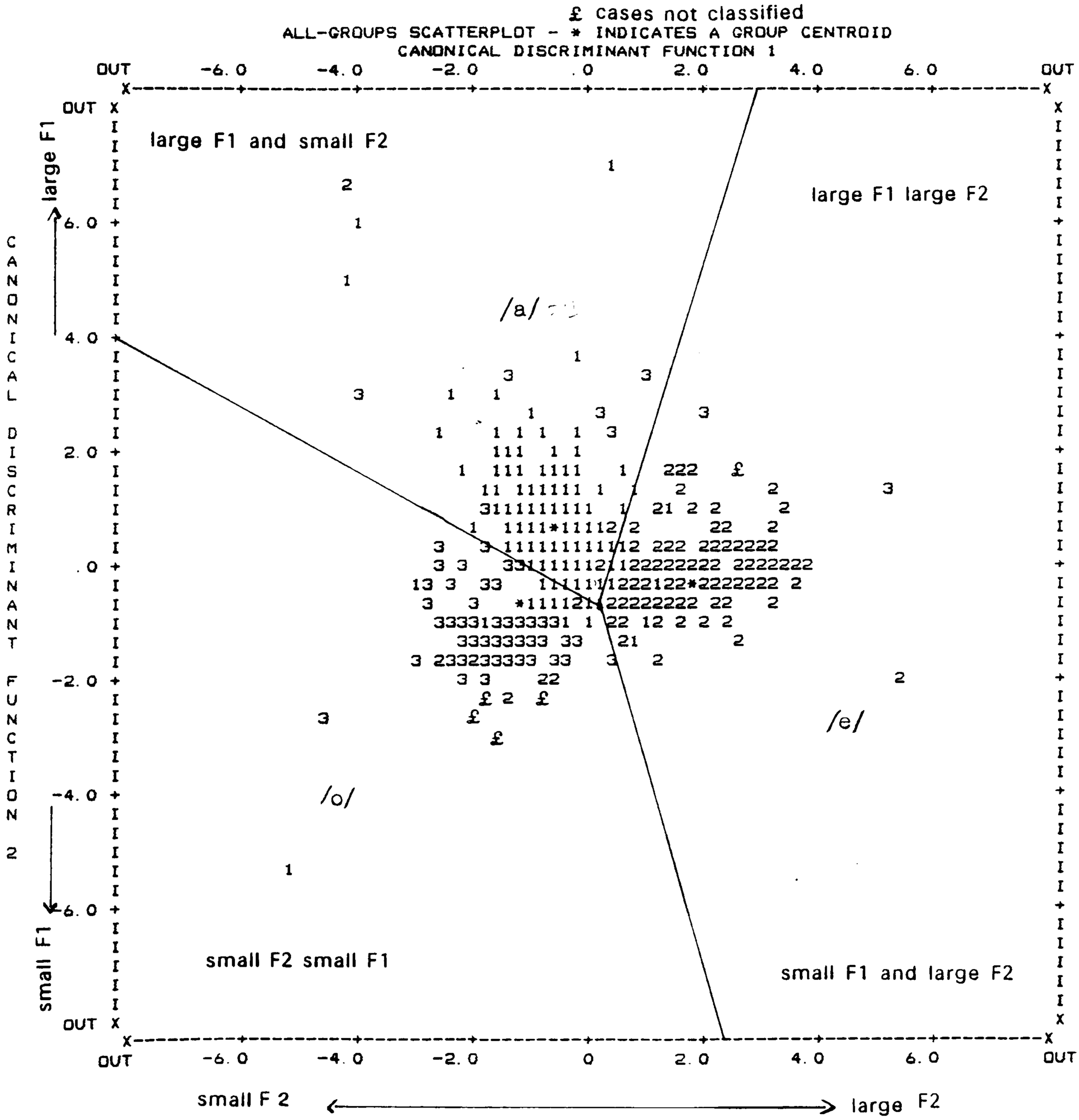


Fig. 5.3.- **Scatterplot showing vowel shifting.**



The data for all vowels and all subjects was plotted on a log-log scale (Fig. 5.4 to 5.7) and an ellipse was drawn, taking 1 standard deviation, independently along the axis of each formant in order to appreciate the definition of the formants in relation to the vowels. Also a technique known as least square fit, linear trend, was applied on the data, the best fit of a line representing the ratio of one formant to the other.

Fig 5.4 shows a plot of vowel clustering a,e,o for all subjects for the classified data.

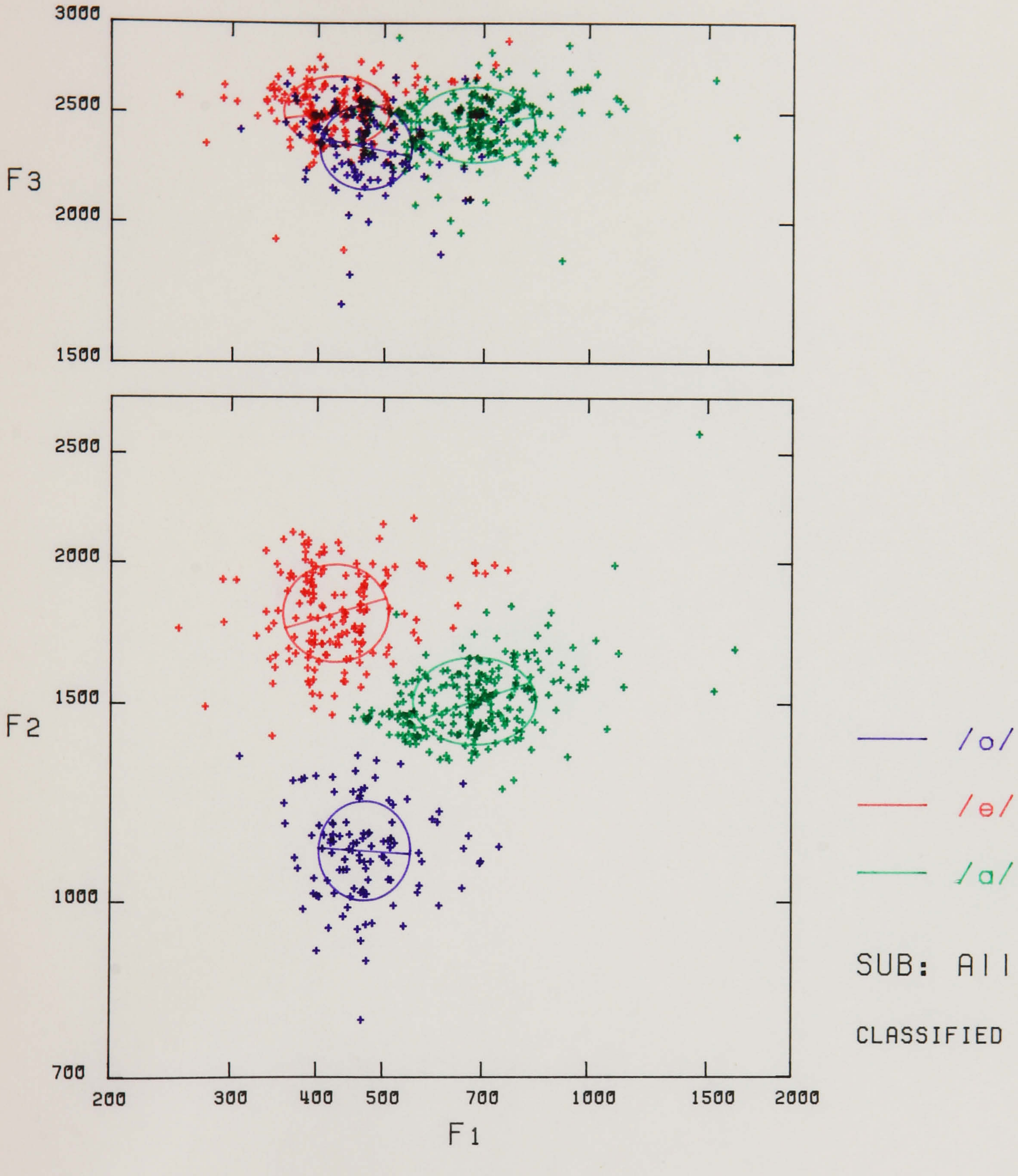
Fig 5.5 shows the vowel space per subject for the classified data.

Fig 5.6 shows the clustering of vowels a,e,o for all subjects in the misclassified cases.

Fig 5.7 shows clustering of subjects 1,2,3 for all vowels.

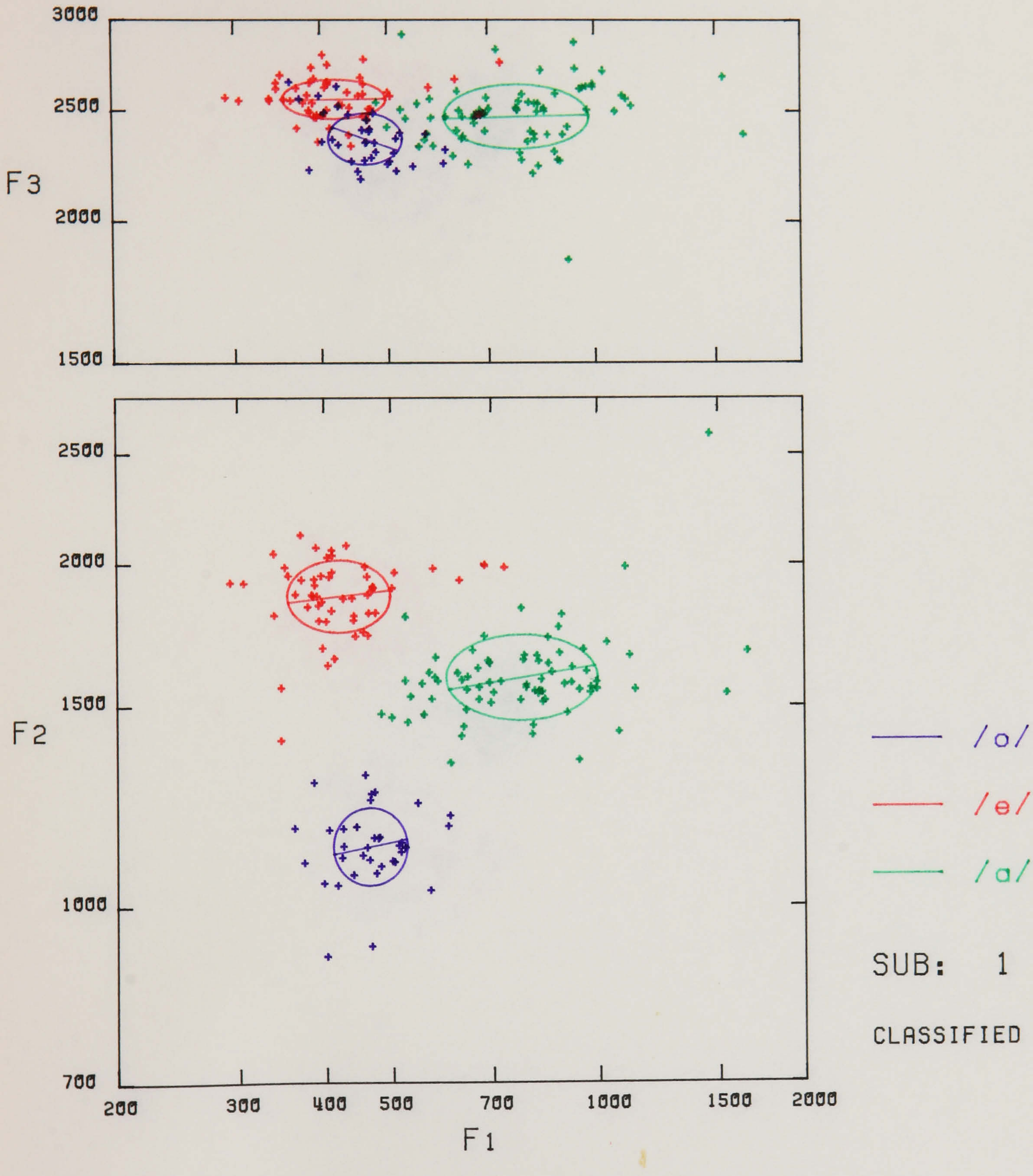
Fig 5.8 shows a scattergram of F1/F2 ratio to F3.

We also ran a series of statistical tests in order to first assess the factors intervening in this drift and second to isolate those which appeared to be most significant in the process of drifting. The statistical tests used were BREAKDOWN, CROSSTABS, ONE-WAY and MANOVA, all procedures of SPSSX. BREAKDOWN calculates means and variances for one dependent variable over subgroups of cases defined by independent variables. CROSSTABS produces tables which represent the joint distribution of two or more variables that have a limited number of distinct values. ONE-WAY and MANOVA both perform analysis of variance but there are optional statistics that are available on one and not on the other.



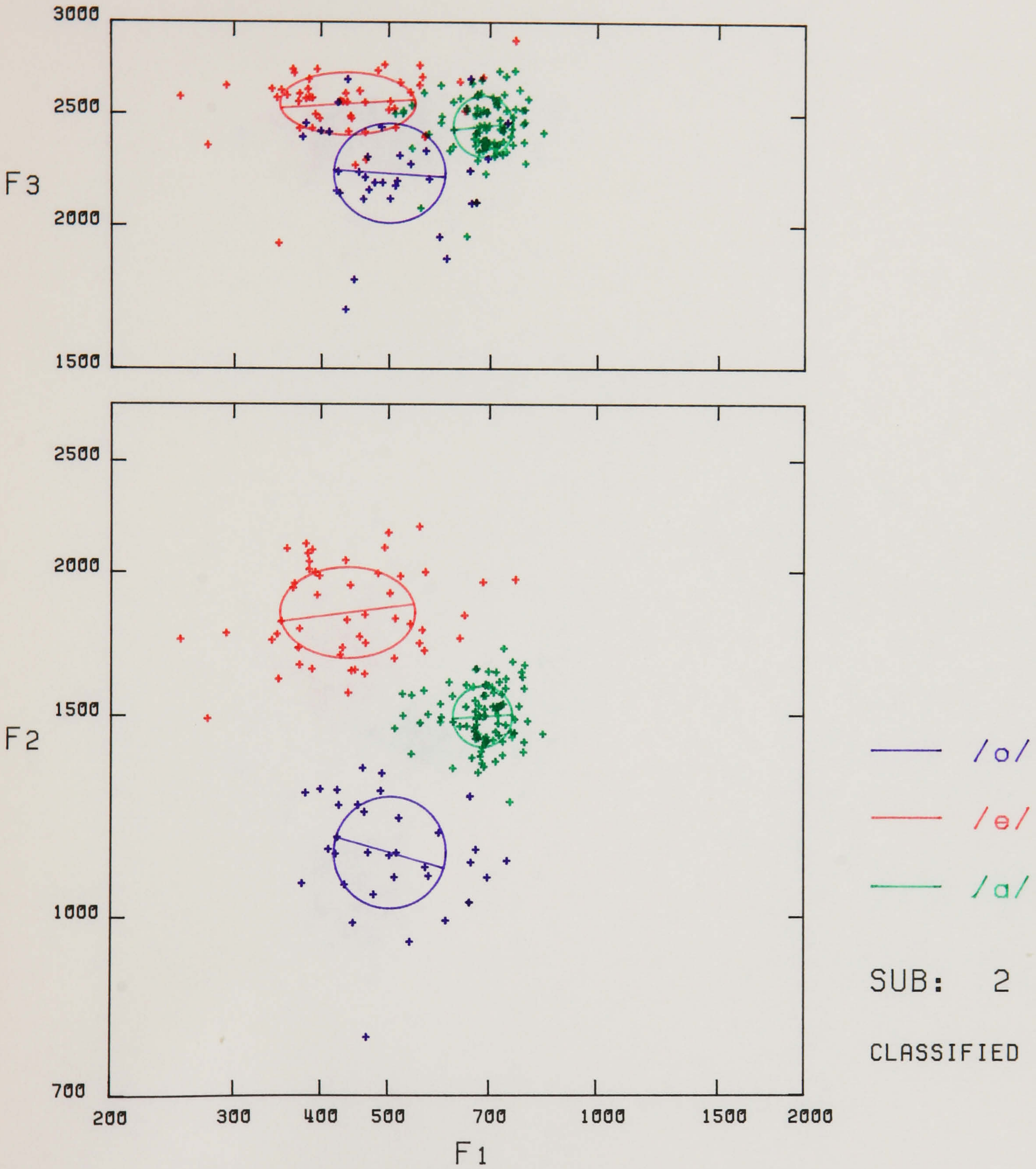
Plot of vowel clustering /a e o/ for all subjects for classified data.

Fig. 5.4



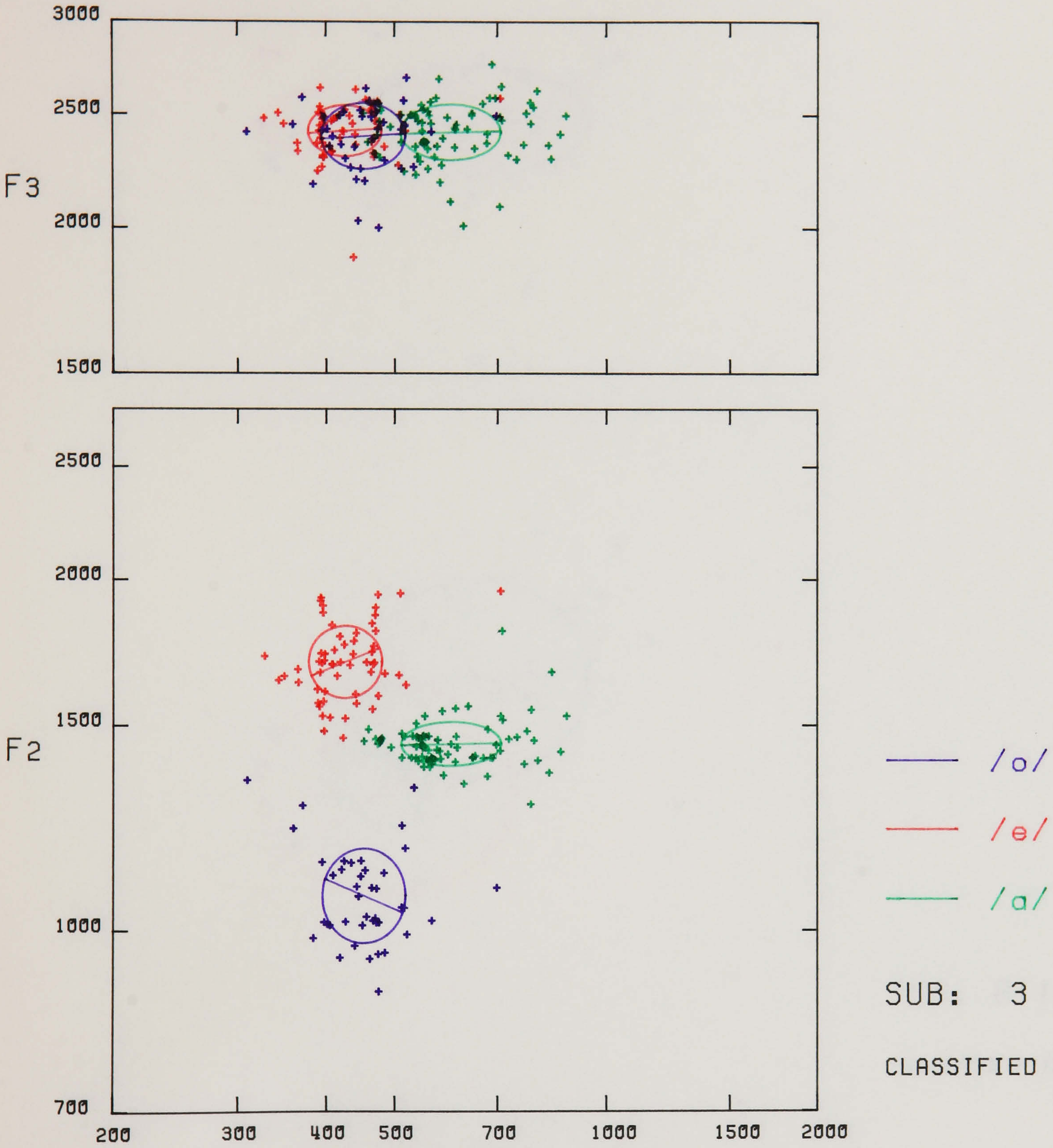
Vowel space for SUB1 for the classified data.

Fig. 5.5a



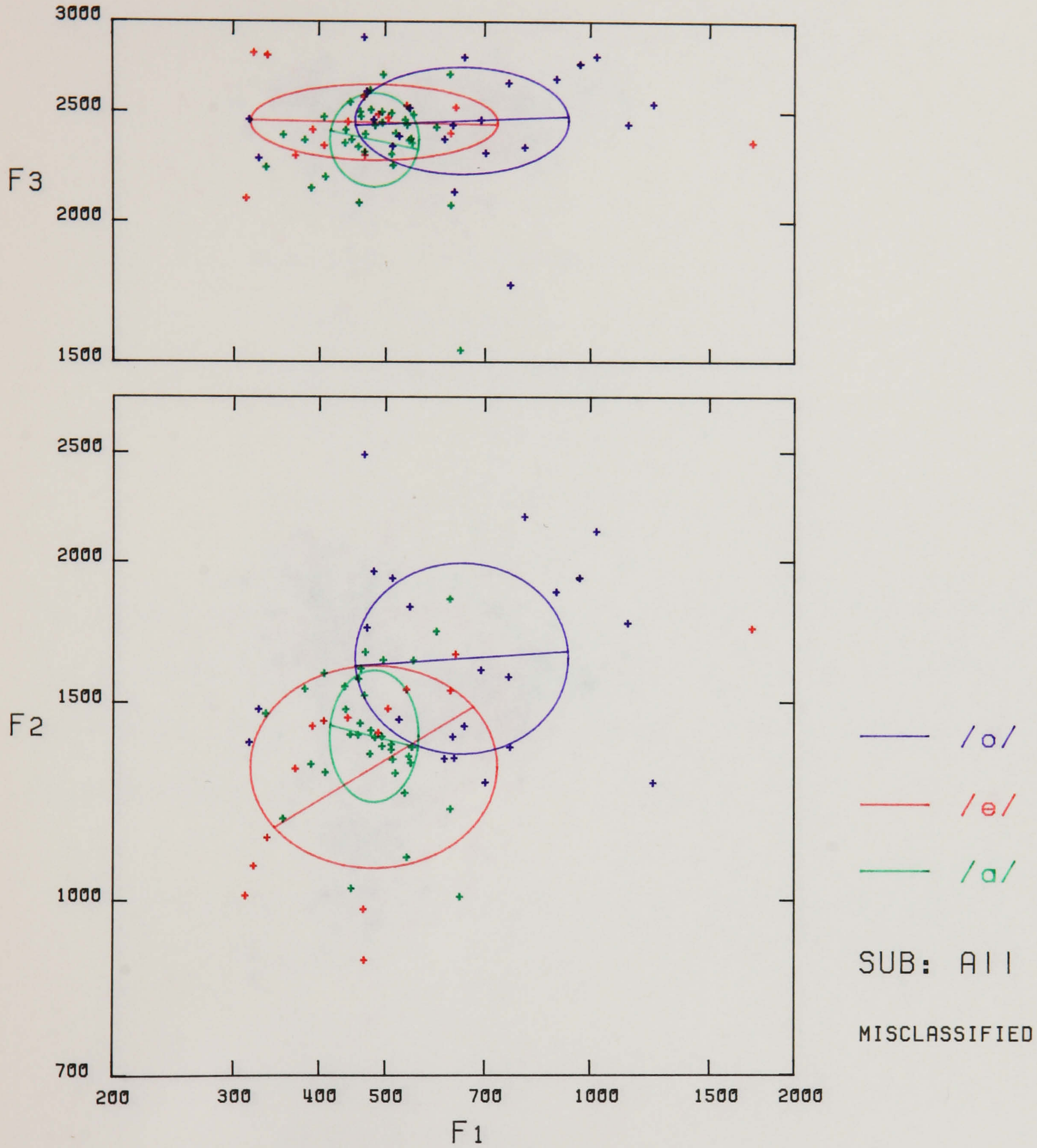
Vowel space for SUB2 for the classified data.

Fig. 5.5b



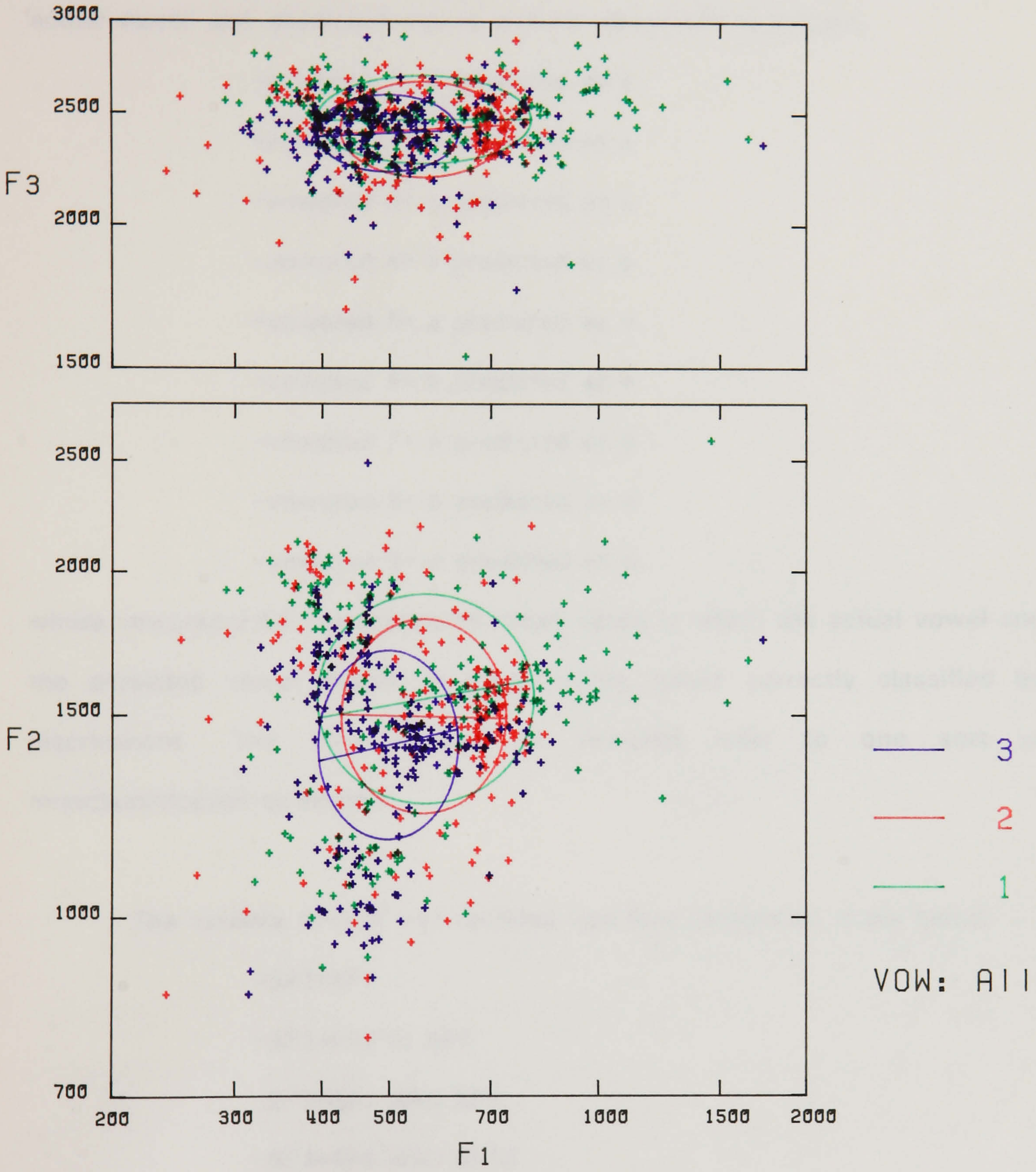
Vowel space for SUB3 for the classified data.

Fig. 5.5c



Plot of vowel clustering /a e o/ for all subjects for misclassified data.

Fig. 5.6



Clustering of subjects 1, 2, 3 for all vowels.

Fig. 5.7

The crosstab-table (Table 5.16) gives us a numerical indication of the cases in which a particular vowel quality was intended and a particular vowel was predicted (by the discriminant procedure). For these procedures a new variable was introduced, namely, VOWPRED. Vowpred is a compound of 'actual vowel' and 'predicted-vowel' and its values are as follows:

-vowpred 1= a predicted as a

-vowpred 2= e predicted as a

-vowpred 3= o predicted as a

-vowpred 4= a predicted as e

-vowpred 5= a predicted as o

-vowpred 6= e predicted as e

-vowpred 7= e predicted as o

-vowpred 8= o predicted as e

-vowpred 9= o predicted as o

where vowpred 1,6,9 correspond to those cases in which the actual vowel and the predicted vowel match, in other words, cases correctly classified by discriminant. The other values of vowpred refer to one sort of missclassification or another.

The variable SP(1,9) was recoded into four categories, these being:

-SP1=SP1

-SP2=SP2 to SP6

-SP3=SP7 AND SP9

-SP4=SP8 AND SP10

SP was introduced in this manner so that we will get 4 groups in which 2 and 4 have an underlying -s and 1 and 3 do not. The results of the BREAKDOWN and CROSSTABS are presented in Table 5.16.

Table 5.16.- **Crosstabulation of VOWPRED by SP**

(*0=cases not classified)

	SP				
	1	2	3	4	TOTAL
VOWPRED					
*0	6	0	0	0	6
1	14	176	25	23	238
2	0	6	1	0	7
3	1	11	0	0	12
4	1	12	5	7	25
5	1	18	4	4	27
6	10	111	14	17	152
7	1	4	2	1	8
8	1	6	0	0	7
9	10	103	0	0	113
TOTAL	45	447	51	52	595

CHI-SQUARE	DF	SIGNIFICANCE	MIN E.F.
130.39854	27	p<0.0001	0.454

LAMBDA	WITH VOWPRED DEPENDENT	WITH SP DEPENDENT
	p<0.0001	0.04054

As we can see from Table 5.16, the majority of the misclassifications occurred in the plural (SP2). The Chi-square tested the relationship between vowpred and SP and such relationship proved very significant ($p<.0001$). The ONE-WAY analysis of variance also confirms the significance ($p<.05$) of this effect (Table 5. 17); SP then can be said to have a statistically significant effect on the vowel-prediction.

Fig 5.9 shows a graph of vowel and predvowel superimposed and plotted on a F1, F2 scale.

Table 5.17. displays the results of the Analysis of variance

with F2 by SP as variables.

Table 5.18 shows the results of the Multiple Comparisons test (One-way analysis of variance with F2 by VOWPRED as variables)

Table 5.19 shows the results of the Analysis of variance with F1 by VOWPRED as variables.

Table 5.20 shows the results of the Multiple Comparisons test (One-way analysis of variance with F1 by SP as variables).

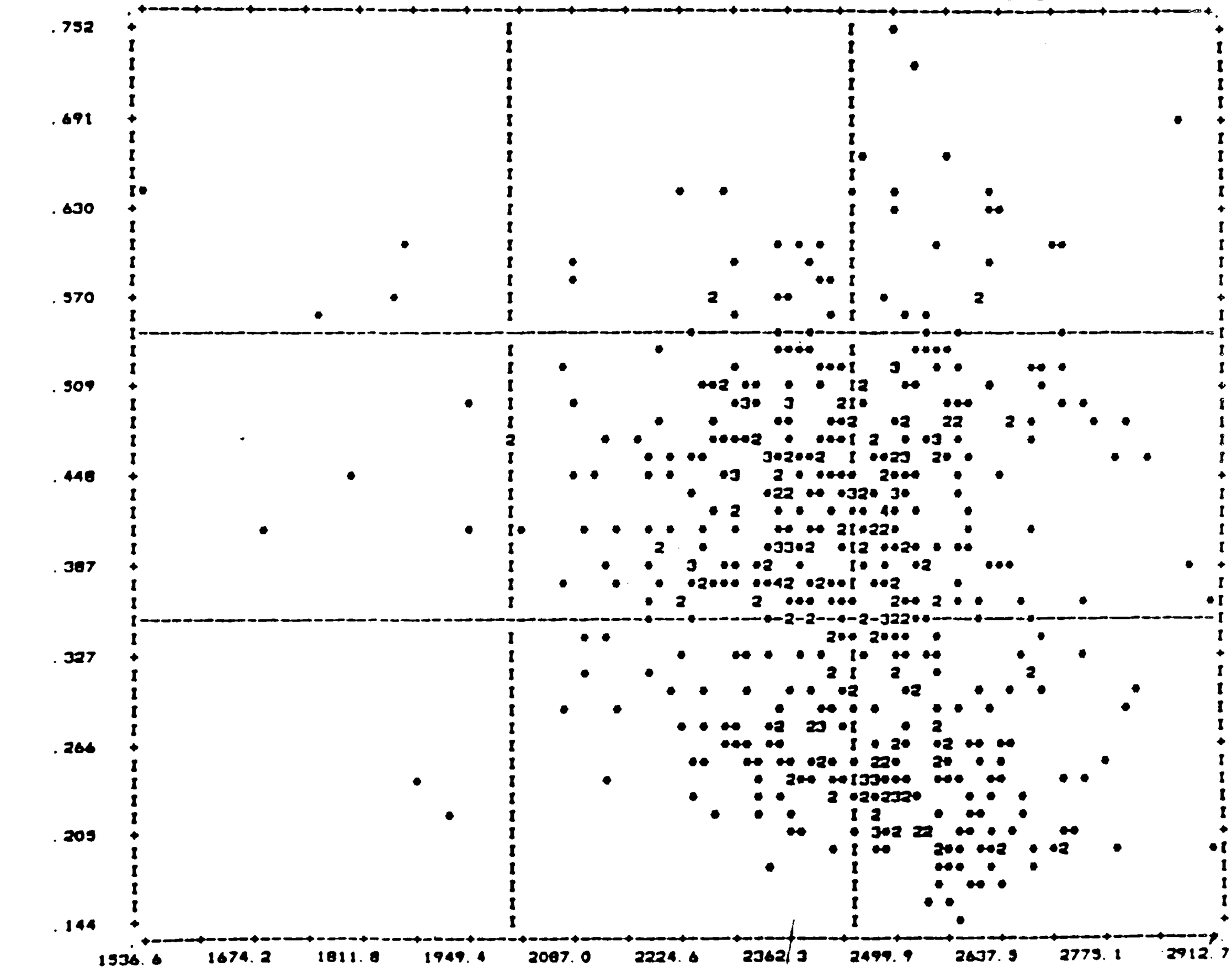
Table 5.21 shows the results of the Multivariate analysis of variance.

In turn we tried to see what effect VOWPRED had on F1 and F2 and found that the resulting means for F1 and F2 (Tables 5.18 and 5.20) were very different, which is an indisputable fact as particular vowel qualities have different formant values.The test of homogeneity of variance also stands out as very significant ($p<.0001$), stressing once more the fact that the difference between the groups is a real one.

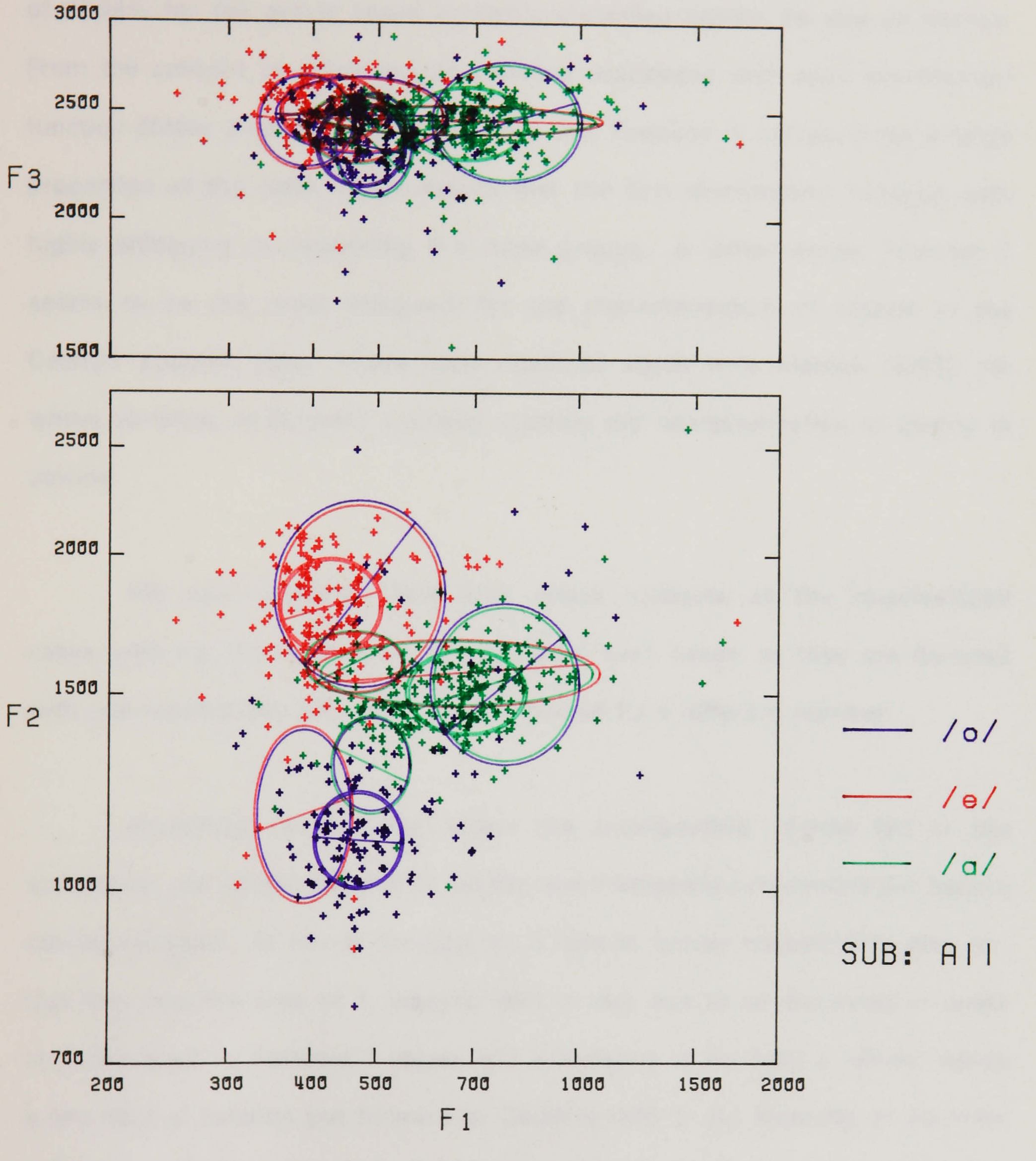
Through the Multiple comparison of variance (Tables 5.17 to 5.20) we observed that the groups significantly differ at the 0.50 level. In Table 5.19 for example, the vowpreds 7, 6, 4, 9, 5 and 8 are not very different among themselves but differ considerably from 1, 2, 3 (vowpreds are listed in such particular order to indicate the increasing magnitude of their means). Classifications relating to /a/ are very different from classifications relating to the other vowel targets /e/ and /o/.

Fig. 5.8.- **Scattergram of F1/F2 ratio to F3.**

```
10  0          COMPUTE RAT=(F1/F2)
11  0          SELECT IF(RAT LT 0.65)
12  0          SELECT IF(F3 GT 1400)
13  0          SCATTERGRAM RAT F3/
14  0          STATISTICS ALL

**** GIVEN WORKSPACE ALLOWS FOR  48373 CASES FOR SCATTERGRAM PROBLEM ****

 9 AUG 86   FORM. FREQ.
 9: 17: 26  **E. R. C. C.  EMAS-A AMDAHL V7**  AMDAHL V7 000001 EMAS-3 (VBS)

DWN:  RAT                              ACROSS:  F3
                1605.4   1743.0   1880.6   2018.2   2155.8   2293.5   2431.1   2568.7   2706.3   2843.9
```




```
                1536.6   1674.2   1811.8   1949.4   2087.0   2224.6   2362.3   2499.9   2637.5   2779.1   2912.7

 9 AUG 86   FORM. FREQ.
 9: 17: 28  **E. R. C. C.  EMAS-A AMDAHL V7**  AMDAHL V7 000001 EMAS-3 (VBS)

STATISTICS..
  CORRELATION (R)-        -.18202     R SQUARED       -        .03313     SIGNIFICANCE  -        .0000
  STD ERR OF EST -         .11604     INTERCEPT (A)   -        .68274     SLOPE (B)     -       -.0001
  PLOTTED VALUES -             385    EXCLUDED VALUES-              0     MISSING VALUES -             0
```



Plot of vowel and predvowel space.
Outer elipse: vowel, inner elipse: predvowel.

Fig. 5.9

5.4.5 Discussion:

The percentage of the cases correctly classified (Table 5.14) is one indicator of the effectiveness of the discriminant functions. Such a high value of 87.44% for the group cases correctly classified cannot be due to chance. From the amount of discriminable variance associated with each discriminant function (Table 5.10), it will be observed that Function 1 accounts for a large proportion of the total, which means that the first discriminant function acts highly efficiently in separating the three groups. In other words, Formant 2 seems to be the most important for the characterization of vowels in the Caracas Spanish data. These facts seem to agree with Alarcos (1965), for whom variation in Formant 2 values controls the characterization of quality in vowels.

We can compare Table 5.15, which contains all the misclassified cases, with fig. 5.3., where we can pin point such cases, as they are denoted with one number but fall into a group denoted by a different number.

According to the area where the misclassified vowels fall in the scatterplot, we should be able to assess the Formant(s) responsible for such a misclassification. A vowel denoted by 2, whose actual membership was /e/, that falls into the area of 1, (vocalic field of /a/), has to be explained in terms of an increase on Formant 1 values and a lowering of Formant 2 values, which is the kind of relation put forward by Delattre (1951). An increase on Formant 1 values implies an opening of the vocal tract, Formant 2 lowering implies a certain retraction of the tongue from the front position of /e/ to that more central of /a/. The same vowel /e/, in other misclassifications, falls into the area of /o/, and this fact can be explained in terms of a decrease in the values of both F1 and F2. When /a/ falls into the area of /e/, it is due to a

decrease in the value of F1 and an increase in F2, which articulatorily implies a decrease in the opening of the vocal tract, and a decrease in cavity lengthening respectively. When /a/ falls into the area of /o/, it is so due to a decrease in the value of both F1 and F2, which corresponds to a decrease in the overall opening of the vocal tract and an increase in cavity lengthening.

From Table 5.15. we can observe that with very few exceptions, all the vowels misclassified are those located in plural words. From this fact we can make the assumption that the plural environment seems to be a factor contributing to the changes of the Formant frequencies observed in the vowels. The fact that there are a few singular nouns in which the vowel Formants change, could be taken as an indicator of the fluctuating nature of the process.

From the plots in Figs. 5.4 to 5.7 we can observe that Formants 1 and 2 are the best defined, and also the ones that contribute most to the vowel differentiation just as has been shown by the statistical analysis. The sort of relationship shown in Fig. 5.4 to 5.7 indicates the intricate relationship between the formants. The structure of the vowels, then, will be defined not just in term of absolute formant frequency values but also taking into account the proportional ratio between the formants. If the sort of proportional ratio relationship is valid, as seems to be the case for this data, then it is possible to predict F1 values by knowing the values of F2 and viceversa. The same sort of relationship seems also to hold for F3 as shown in the scattergram in Fig. 5.8 where F1 and F2 ratio in respect to F3 is shown to be statistically significant. Evidence for this sort of statistical relationship between F1,F2 and F3 has been provided by Sato et al. (1982) in their study of Japanese. They found that F3 values can be estimated from F1 and F2, estimation errors being comparable to difference limens in hearing.

What the discriminant analysis shows is that there are vowels (mainly in the plural) that drift from one vocalic field to another. (The vowel space has already been defined by the F1 and F2 frequency values). We want now to address ourselves to the question of why is this the case.

Fig. 5.9 shows the vowpreds 1, 6, 9 (vowels /a/, /e/, /o/) plotted on a graph displaying their average F1 and F2 values with the other vowpreds superimposed on the same graph. The Analysis of variance results revealed that in the F2 domain (Table 5.17), there is a highly significant SP effect ($p<.0001$) that is, the overall means of the SP1 and SP2 vowels are lower than the overall means for SP3 and SP4 vowels. There is also a very significant "pattern effect" (vowpred by SP interaction effect) which shows the vowpred sets not only to be centered at different locations in the vowel space but also patterning differently around those means. That is to say, while all the vowels for SP1 and SP2 are lower on average, than the vowels for SP3 and SP4, not all the vowels participate equally in determining this difference.

Table 5.17.- **Analysis of variance** (Multiple comparisons test)

(F2 by SP(1,4)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F. RATIO	F. PROB.
BETWEEN GROUPS	3	2024419.290	674806	8.2272	p<.0001
WITHIN GROUPS	590	48392475.11	82021		
TOTAL	593	50416894.40			

MULTIPLE RANGE TEST (F2 BY SP)

MEAN	GROUP	(* DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT 5%)
1429.8556	1*	
1489.9529	2*	
1620.9882	3	
1643.5827	4	

HOMOGENEOUS SUBSETS

SUBSET 1= GROUP 1 and GROUP 2

SUBSET 2= GROUP 3 and GROUP 4

It can be seen from the Multiple comparison statistics tests (Table 5.18) that as regards the direction towards which the vowels drift in the vowel space, vowpreds 4, 6, 8 are very different from 9, 7 and 5, at least with respect to their F2 values..

Table 5.18.- **Analysis of variance**(Multiple comparisons test)
(F2 by VOWPRED)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	8	35399315.10	4424914.388	197.9989	p<.0001
WITHIN GROUPS	579	12939592.71	22348.1739		
TOTAL	587	48338907.81			

MULTIPLE RANGE TEST (F2 BY VOWPRED)

MEAN	GROUP (* DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT 5%)
1113.8752	9*
1154.8625	7*
1309.4000	5*
1511.6597	1**
1593.5667	3**
1595.0429	2**
1782.6640	4***
1794.4401	6***
1945.9000	8***

HOMOGENEOUS SUBSETS

SUBSET 1= GROUP 9 and GROUP 7 and GROUP 5

SUBSET 2= GROUP 5 and GROUP 1

SUBSET 3= GROUP 1, GROUP 3 and GROUP 2

SUBSET 4= GROUP 4, GROUP 6 and GROUP 8

The F1 values, however, reveal a rather different set of facts. There is still a very significant "pattern effect" ($p<.0001$) in the openness dimension (Table 5.19), but the SP effect (Table 5.20) has diminished ($p<.198$). In other words although there is no significant difference in openness (Table 5.19) between vowpreds 7, 6, 4, 9, 5, 8 as a group, nevertheless there are differences between vowpreds 1 and 2, and 3 which is reflected in the degree of openness of those individual vowpreds.

Table 5.19.- Analysis of variance(Multiple comparison test)

(F1 BY VOWPRED)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	8	9501617.749	1187702.219	68.1353	p<.0001
WITHIN GROUPS	578	10075424.55	17431.5304		
TOTAL	586	19577042.30			

MULTIPLE RANGE TEST

MEAN	GROUP (* DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT 5%)
393.5625	7*
432.1947	6*
450.8720	4*
477.7876	9*
503.7038	5*
514.2857	8*
699.3731	1**
729.6857	2**
825.6583	3***

HOMOGENEOUS SUBSETS

SUBSET 1= GROUP 7, GROUP 6, GROUP 4, GROUP 9, GROUP 5, and GROUP 8

SUBSET 2= GROUP 1 and GROUP 2

SUBSET 3= GROUP 3

The non-significance of the overall mean differences in F1 (Table 5.20) is suggestive in its own right. It indicates that the significant differences in F2 between the vowels of the SP's are real phonetic differences. Whether these differences can be considered of morphological validity to separate SP's as a whole is entirely another question. Once the significance of an overall difference between the F1 or the F2 values of the vowpreds for different SP's has been calculated by the various statistical procedures (one-way in this case), it is possible to determine where in the pattern the significant differences reside.

Table 5.20.- **Analysis of variance**(Multiple comparisons test)

(F1 by SP)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	157036.1653	52345.3884	1.5587	p=.193
WITHIN GROUPS	589	19780293.87	33582.8419		
TOTAL	592	19937330.04			

MULTIPLE RANGE TEST (F1 BY SP)

No two groups are significantly different at the 0.050 level

HOMOGENEOUS SUBSETS

SUBSET 1:

MEAN	GROUP
523.9654	4
534.0864	1
568.0076	2
587.2059	3

Many of the (Multiple comparisons tests reveal significant pattern differences of the type described earlier. In somecases, the individual vowpreds pattern together forming a natural class. This can be seen in Table 5.18 where the F2 values pattern together in accordance with the feature back ([back] vowpreds 9, 7, 5) on one side of the mean and front ([front] vowpreds

Text cut off in original

4, 6, 8) on the other. Also in Table 5.19, the F1 values pattern together in accordance with the feature open/close, ([open] vowpreds 1, 2, 3) and close ([close] vowpreds 7, 6, 4, 9, 5, 8). We have shown that the interaction F2/SP seems to have been the factor conditioning the change in formant frequency of the vowels studied here and whose effect is the wondering of the vowels from one vocalic field to another.

In the foregoing discussion we were mainly involved with the results of the univariate statistics. In order to complement those results we performed a multivariate analysis on the data, using procedure MANOVA (already described in pp. 132). In the multivariate analysis the interaction effect VOWPRED/SP is shown (Table 5.21) to be highly significant on the F1 to F3 dimension. These results are comparable and compatible to those predicted independently by F1 and F2.

Table 5.21.- **Multivariate analysis of variance**(F1 to F3 by SP VOWPRED)

EFFECT=SP BY VOWPRED

(Multivariate tests of significance)

Test name	Value	Aprox. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.10066	2.18259	22.00	906.00	p<.001
Hotellings	.10896	2.23368	22.00	902.00	p<.001
Wilks	.90060	2.20819	22.00	904.00	p<.001

(Univariate F test)

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
F1	137953.57231	9171438.02491	12541.23385	20246.00005	.61944	p=.813
F2	826578.68884	9914897.16528	75143.51717	21887.19021	3.43322	p<.001

From the data presented and analysed here it is clear that there is a difference in production among the vowels studied (a,e,o); it is also clear that such differences seem to be motivated by morphological categories, however, given the size of the sample and the small number of people chosen for the

study, it would be premature (although not inconceivable) to adhere to the position, already advanced for many varieties of Spanish, that supports the phonologization of the closed and open qualities of the vowels and consequently a new morphological distinction between singular and plural by means of these vowel qualities. Furthermore, there were certain factors which were not considered in the analysis i.e. position in the phrase, position in the word, stress, which might be relevant both for vowel duration and vowel quality and which need to be investigated in order to assess the process of vowel variability in a more comprehensive manner.

CHAPTER 6

Conclusions

The phonological processes that are productive in Caracas Spanish, and to a larger extent, in Caribbean varieties, seem to be related to the preference for the canonical syllable shape **CV**. Weakening of consonants and reduction of consonant clusters are examples of the processes that are progressing in the language with the aim of opening closed syllables. The locus of these processes are mainly syllable- and word-final positions (Table 2.2). Almost all of the changes in place of articulation of final consonants are weakening processes and they are expressed in the strength hierarchy built for Caracas (pp48,49 supra). There is, however, a lot of circularity in the setting up of the hierarchies as well as in the assessment of the processes involved. In the absence of independent evidence within Spanish for determining language specific strength and weakness it seems we have little choice but to accept the hierarchy proposed in section 2.3.3 at least until more research is done in this area.

Before entering into considerations about the morphophonemics of the variety of Spanish analysed here, I think it would be convenient to underline certain points in relation with the dynamics operating in it. First of all there is a process of "on going sound change" i.e. [s] > [h] > Ø. The same pattern has been described in quite a number of languages(cf. chap. 2). Secondly, these changes do not seem yet established or completed in the variety of Spanish spoken in Caracas, but a great deal of variation has been observed between /s/ retention, aitchification and /s/ deletion. Different phonetic constraints interact to condition the variation and their interpretation on the light of experimental phonetics and psycholinguistics should help to

deepen our understanding of the role played by articulatory and perceptual factors in phonological change (Janson, 1979,1983).

Judging from the data presented here, aitchification, generally speaking, appears to be conditioned by the phonological environment while deletion seems to be ruled by morphophonological constraints.

The auditory analysis of the data, undertaken in chapter 3, provided the understanding of a tendency which is developing in Spanish towards the blocking of grammatical redundancy, in relation with the distribution of the plural morpheme [s]/[es] ([h]/[eh]). The same process of blocking of grammatical redundancy seems to be operating in Brazilian Portuguese where the plural marker is found more frequently in the first element of the nominal phrase than in the rest of it (Scherre, 1978). According to Naro (1978), "**as minhas primeira amiga** is more common than **as minha primeira amigas** and both even more common than **as minhas primeiras amigas**" (1978:14).

In the case of plural marker deletion, it is still possible to obtain additional information both within and outside the nominal phrase, which could help the listener to interpret the notion of plurality. We find that the information of plurality, normally given flexionally, can be rendered otherwise. The adding of [s] or [h] to some element in the noun phrase helps to identify plurality, as can be observed is the case in the data presented to the respondents in the Perception Tests and also the data analysed in the preceding pages, where we find cases similar to the following:

'la(h) amiga(Ø)' [lahamiɣa] as oppossed to

'la amiga' [lamiɣa]

'la(Ø) pintura(Ø) de(h) Dali'

where in the last the plural marker is deleted from the modifier as well as

from the noun. The only way the information of plurality could be conveyed was through the placement of an [h] somewhere. In this particular case it was placed in the preposition 'de' <of> which is standardly an invariable form.

Cases like the one cited above have been found to occur in other varieties of Spanish where similar morphological changes occur in order to convey the information of plurality. The following examples are quoted from Poplack (1979, as given in Jiménez Sabater, 1978) and they show how advanced are the processes of weakening and deletion in the Dominican Republic where such processes have culminated in the total elimination of syllable and word final [s], so much so that attempts of "s" insertion are often incorrect, e.g.

'muchachase' for 'muchachas'

'¡Qué sojo tiene!' for '¡Qué ojos tiene!'

(1979:79)

The examples to follow are taken from our data.

'lo obsesionan la(Ø) ficcione(Ø)'

<he is obsessed with fiction>

'son problema(Ø) psicológico(Ø)

<they are psychological problems>

'con lo(Ø) muchachito(Ø) se trabaja mejor'

<one works better with children>

'pre(h)tacione(Ø) sociale(Ø)'

<superannuation>

'tu(Ø) decisione(Ø) son correcta(Ø)'

<you are right in your decissions>

In some cases where neither [s] nor [h] appears on the surface, we observed the following disambiguating factors at play:

a) The masculine plural determiner undergoes a stem vowel change, i.e. 'el' (singular) > 'los' (plural), which indicates plurality even when the [s] is deleted, as in:

'los niños' [lonip̃o] (plural) as opposed to

'el niño' [elnip̃o] (singular).

In the same way nouns and adjectives which end in a consonant and form the plural by adding [es], even if they lose the [s], preserve the vowel which is part of the plural morpheme. So, just as has been documented for Portuguese (Scherre, 1978; Lemle and Naro, 1977), plurality is conveyed not only by [s] insertion but also by any vowel with which this [s] is related in order to render such information, e.g.

'populare(Ø)'

'la(Ø) ficcione(Ø)'

'pre(h)tacione(Ø) sociale(Ø)'

'lo(Ø) muchachito(Ø)'

'lo(Ø) mismos caminos'

b) Verbal agreement can also help to disambiguate:

'son problema(Ø) psicolõgico(Ø)'

'tu(h) decisione(Ø) son correcta(Ø)'

c) The use of any quantifier (either a number itself or any other form) can act as a disambiguating factor as well:

'40 y pico de añoØ)'

'sei(Ø) mese(Ø)'

'la(Ø) do(h) carrera(Ø)'

'varia(Ø) vece(Ø)'.

'alguno(Ø) discípulo(Ø)'

The perception tests proved to be difficult tasks for the subject-respondents, due to different factors. Perhaps the most important of them lies in the theoretical assumptions of perception itself. It was found that the inflected plural marker (-s/-es) was more perceptually salient than other suffixal markers. Also, more missperceptions occurred in isolated words (mainly in those with no mark) than in context bound words, which supported the hypothesis that the notion of plurality is perceived when there is a good deal of phonetic/phonemic information and in its absence semantic and syntactic cues are available to the listener for his recovering of the plural information. It was shown (Chapter 5), that although in production there is a difference in the articulation of the vowels when the "s" has been deleted, there is no way the listener can recover the plural information by means of vowel changes (either in quantity or in quality) alone (Chapter 4). However, with this sample of 'isolated words' the respondent is faced with a very artificial situation given that in normal speech interactions higher level linguistic structures are implemented. The problem also is that our present state of knowledge is very limited regarding the parameters which control listeners' judgements.

The acoustic analysis offered insights on vowel variability. It is possible to predict that Spanish vowels will develop a more complex system and there is diachronic evidence of a process of similar nature. The loss of /s/ was responsible for changes in the quality of some French vowels (cf. Chap 2) and also in Italian, where the vowels /i/ and /e/ express the plural notion for masculine and feminine nouns and adjectives.

It is striking to observe that the weakening of [s] and its morphological implications in the Spanish speaking world, are very similar to those which occur in the Romania. The treatment of final [s] (Politzer, 1947; Wartburgh, 1967) led to a division between the East, where [s] was lost and the West, where [s] was preserved. This tratment of [s] in southern Spain as well as in the Caribbean is affecting not only the phonology but also the morphology, just as it happened in the Roman world. As a result different systems of number and person marking have evolved: -marking by vocalic alternation, -marking by preposed modifiers or subject pronouns.

Number and person marking by vocalic alternation occurs not only in Italian but also in Eastern Andalusian Spanish (Alonso et al., 1950), where weakened [s] affected the quality of the preceding vowel (a similar case has been argued for certain Latinamerican varieties of Spanish, cf. Vázquez, 1953 and Saporta,1965, but it hasn't been as well documented as in the Andalusian variety). The actual vowel quality and their evolution, however, seems to have been different. In Italian the vocalization of [s] to [j] raised the vowel preceding [s] whereas in Eastern Andalusian the aitchification of [s] to [h] lowered the final vowel in the plural and second person singular in the verb. Olmstead (1964) reported a phonemic role for vowel lengthening capable of distinguishing singular and plural in the Regla dialect of Cuban Spanish,

however, it is premature to conclude on the basis of one dialect that distinctive vowel length plays a role in signaling the morphological categories formerly marked by [s]. Our data contradict Olmstead's findings. Contrary to what has been hypothesized for Spanish, our results show that vowels in the singular are longer than vowels in the plural. However, as it happened in French, this feature of lengthening, could just be considered a byproduct of the [s] deletion process (Joos, 1952) and therefore likely to disappear.

The deletion of [s] has led to a reduction of grammatical redundancy, as has already been mentioned, since number is no longer marked consistently on every noun and adjective in the NP but only on determiners which can also be observed in French as well as in Brazilian Portuguese. There also seem to be a link between [s] deletion and the increased use of subject pronouns. In French, the subject pronoun became obligatory in response to the phonetic erosion of suffixed person markers. In Spanish such increase in the use of subject pronouns has been documented by Terrell (1978e) for Caribbean Spanish in general. Poplack (1979) found that in Puerto Rican Spanish the pronoun **tú** served as a disambiguator when [s] was deleted. It was also evident in our data even in places unknown and also inappropriate to Modern Standard Spanish (A. Gavarró personal communication), e.g. ¿Qué *tú* quiere(Ø)?, Sin *tú* quere(Ø) mete(Ø) la pata!

It is clear that these changes we have been referring to are at different stages of development in the different varieties of Spanish. In some areas they are established, as in Eastern Andalusia, in others they are progressing very fast as is the case of Dominican Spanish. The evidence from our data is not conclusive, given the limitations already pointed out, but I believe that the morphological and syntactic implications of the weakening of "s" support the prediction that the Spanish system will be restructured. What

direction this restructuring will take is not possible to say at this incipient stage but continuous monitoring of the process is necessary.

Appendices

Chapter4

Appendix 4.1.- Test 1

28 isolated words in relation with the context from which they were isolated.

	Words		Y	N	?	Context		Y	N	?
1	(43)	preparados	11	39	0	(102)	compositores bien preparados	41	8	1
						(110)	bien preparados	10	39	1
2	(32)	chiquitos	7	42	1	(105)	los lugares más chiquitos	43	7	0
3	(49)	estudios	13	37	0	(104)	mis estudios	43	7	0
4	(53)	religiosas	1	48	1	(103)	las escuelas místicas o religiosas	47	3	0
5	(38)	carreras	15	33	2	(101)	las dos carreras	19	27	4
6	(7)	manos	8	39	3	(100)	con las manos	11	39	0
7	(46)	problemas	4	39	7	(96)	son problemas más que nada psicológicos	47	3	0
8	(41)	psicológicas	7	43	0					
9	(25)	idiomas	9	40	1	(94)	los idiomas	43	6	1
10	(9)	pinturas	7	37	6	(92)	las pinturas de Dali	21	24	5
11	(40)	clásicas	1	49	0	(91)	obras clásicas	21	24	5
12	(17)	claves	10	40	0	(90)	puras claves	42	8	0
13	(24)	palabras	18	31	1	(89)	pocas palabras	43	7	0
14	(52)	continuas	1	48	1	(86)	actividades continuas	43	7	0
15	(28)	tarjetas	14	35	1	(85)	unas tarjetas	41	9	0
	(8)	tarjetas	38	12	0					
16	(60)	caminos	34	16	0	(82)	los mismos caminos	44	6	0
17	(106)	novelas	17	31	0	(81)	las novelas de Sábato	6	44	0
18	(16)	interesantes	31	19	0	(80)	estudios bastante interesantes	28	22	0
19	(45)	hijos	22	28	0	(79)	mis hijos	46	4	0
20	(29)	carreras	11	19	20	(72)	dos carreras	30	14	6
21	(3)	larguísimos	9	25	16	(76)	unos aplausos larguísimos	45	5	0
						(83)	aplausos larguísimos	43	7	0
22	(55)	electrónicas	0	50	0	(74)	casas electrónicas	39	11	0
23	(21)	distinos	4	40	6	(73)	muchos lados distinos	46	3	1
						(69)	lados distinos	14	35	1
24	(26)	carreras	14	35	1	(66)	las carreras	27	23	0
25	(48)	años	5	45	1	(64)	40 y pico de años	34	16	0
26	(30)	cosas	4	45	1	(62)	esas cosas	27	17	6
27	(12)	entrades	14	55	1	(61)	muchos entrades	44	2	4
28	(51)	físicas	3	47	0	(56)	ciencias físicas	12	38	0

Appendix 4.2.- Copy of the instrument.

TEST DE PERCEPCION DEL PLURAL (PLURAL PERCEPTION TEST 1)
(CORPUS-CLAVE)

1.- carrera
2.- papa
3.- larguísimos
4.- adultos
5.- problema
6.- clase
7.- manos
8.- tarjetas
9.- pinturas
10.- carreras
11.- populares
12.- entradas
13.- religiosa
14.- capa
15.- problemas
16.- interesantes
17.- claves
18.- estudios
19.- ciencia
20.- café
21.- distintos
22.- tarjetas
23.- café
24.- palabras
25.- idiomas
26.- carreras
27.- libro
28.- tarjetas
29.- carreras
30.- cosas
31.- manos
32.- chiquitos
33.- drogas
34.- amigos
35.- tarjeta
36.- problema
37.- pinturas
38.- carreras
39.- droga
40.- clásicas
41.- psicológicos
42.- capas
43.- preparados
44.- pacientes
45.- hijos
46.- problemas
47.- libros
48.- años
49.- estudios
50.- papas
51.- físicas
52.- continuas
53.- místicas
54.- habitantes
55.- electrónicas
56.- ciencias físicas
57.- realistas
58.- clases
59.- existenciales
60.- caminos
61.- muchas entradas
62.- esas cosas
63.- novelas de vanguardia
64.- 40 y pico de anos
65.- dime qué libro
66.- las carreras
67.- algunos discípulos
68.- puros símbolos
69.- lados distintos
70.- dime qué clase
71.- mis hijos
72.- dos carreras
73.- muchos lados distintos
74.- cosas electrónicas
75.- dime qué seña
76.- unos aplausos larguísimos
77.- dime qué clases
78.- por esas dos carreras
79.- mis hijos
80.- estudios bastante interesantes

81.- las novelas de Sábato
82.- los mismos caminos
83.- aplausos larguísimos
84.- propios problemas
85.- unas tarjetas
86.- actividades continuas
87.- dime qué libros
88.- folleto de estudios
89.- pocas palabras
90.- puras claves
91.- obras clásicas
92.- pinturas de Dali
93.- sus propios problemas
94.- los idiomas
95.- las arepitas
96.- son problemas más que nada psicológicos
97.- los conocemos todos
98.- hay corrientes que son casi místicas o religiosas
99.- dime qué señas
100.- con las manos
101.- las dos carreras
102.- compositores bien preparados
103.- las escuelas místicas o religiosas
104.- mis estudios
105.- los lugares más chiquitos
106.- novelas
107.- estudio
108.- idioma
109.- las novelas de Sábato
110.- bien preparados

Appendix 4.3.- Instructions test 1

INSTRUCCIONES.-

Llene los datos correspondientes a edad, sexo y procedencia, note que su nombre no es importante.

A continuación Ud. oirá una lista de palabras y frases leidas por varias personas.

Cada frase/ palabra sera leida dos veces.

Todo lo que Ud. tiene que hacer es identificar, primero, si lo que la persona esta diciendo se refiere a una cosa o a varias cosas y luego, señalar su impresion en el espacio indicado.

Los espacios están numerados, de acuerdo a los items presentados. Recuerde que cada item es dado dos veces.

GRACIAS.-

Appendix 4.4.- Answer sheet.

PPT/AST.82.

Procedencia:

Edad: **Sexo:**

1.-	21.-	41.-	61.-	81.-	101.-
2.-	22.-	42.-	62.-	82.-	102.-
3.-	23.-	33.-	63.-	83.-	103.-
4.-	24.-	44.-	64.-	84.-	104.-
5.-	25.-	45.-	65.-	85.-	105.-
6.-	26.-	46.-	66.-	86.-	106.-
7.-	27.-	47.-	67.-	87.-	107.-
8.-	28.-	48.-	68.-	88.-	108.-
9.-	29.-	49.-	69.-	89.-	109.-
10.-	30.-	50.-	70.-	90.-	110.-
11.-	31.-	51.-	71.-	91.-	
12.-	32.-	52.-	72.-	92.-	
13.-	33.-	53.-	73.-	93.-	
14.-	34.-	54.-	74.-	94.-	
15.-	35.-	55.-	75.-	95.-	
16.-	36.-	56.-	76.-	96.-	
17.-	37.-	57.-	77.-	97.-	
18.-	38.-	58.-	78.-	98.-	
19.-	39.-	59.-	79.-	99.-	
20.-	40.-	60.-	80.-	100.-	

Appendix 4.5.- Test 1 (Pilot) Data.

A= Subject
B= Age
C= Sex
D= Origin (Caracas: **Y**; NonCaracas: **N**
E= Key answer
F= Speaker
G= Variant type

A B C D

1 30 F Y SSSSSSSSSPPS SPPSSSSSPPPSPSS SPSPPSPP SSSPPPP S SPSSSPSP SSPP SPSPP PSPP PSPS PSPPPPPPPSPPP PPSPPPPSPPPPP SSPP
2 20 M Y SS SSSPSPSSSSPPSSSSSPPSPPSS PSPPSSPS SSPSSPSSSPSSSSSSSSSSSPPSPSSS PSSPPPSPPSPPSPPPPPSPPPPSPPSPPPPSPPPSPSPSPS
3 20 M Y SS SSSPPSP P PPPPSSSSPPPSSSS SPSPPSSPPSSPPSSPSSSSPS SSSPSS PPPPPSSP PS PPSPP PPSPPPPPPSPPPPPPPPPPPPPPPPPPSSS
4 20 F Y SS SSSSSSPSSSPPPSSSSSPPSSSSP SPSPPSSPSSSSPSSPSSSSSSSSSSSSSSSSSSSPPSSSSSPPPSPSPPSSSSSPSSSSSSSSSSSPSSSSPSSSSSSS
5 20 F Y SSSSSSSPSPPSPSPPSSSSSPPSSSSSPSPSPPSSPPSSSPSPSSSSSSSSSPSPSSPPPPPPSPPPPSPPPPSPSSPPSPPSPPSSPPPPPPPPPPSSPPPPPPSPS
6 20 F Y SSSSSSSPSPSSSSPPSSSSSPPSSSSPPSPSPPSSPSSSSSSSPPPSSPPSSSSSSPSPPPPSPSPPSSSPPPPSPSSPPSPPPPPPPPPPPPPPPPPPPPPPPSPP
7 20 F Y SSSSSSSPSPPPPSPPSSSSSPPSPSSSSSPPPPPSPSSPPPPSSSSPPPPSPSPSPPPPPSPSSPPSSSPPPPPSPPPSPPPPPPSPPPSPPPPSPPSPPPPSPSSSP
8 20 F Y SSSSSSSPSPSSSSPPSSSSSPPSSSSSPSPSPPSSPSSSSSPSSSSSSSPSSSSSSSSSSPPPSPSSPSPSSPPSSPPSPPSPSPPPPPPSPPPPPPSSPPPPSSSSS
9 20 F Y SS SSSPPSPSSSSPSSSSSSPPSSSSS SPSPPSSPSSSSPSPSSS SSSSSSSSSSSPPPSPSSPPPSS PPSPSSPSSPPSPPSSPPPSPPPPPPSSSPPPPSSSPS
10 20 F Y SSPSSSSPSPPSPSPSSSSSSPPSSSSSSSPSPPSSPSSSSPSSPSSSSSSSSPSSSSPPPPPPSPPPSSSSPPSPPSPPSPPPPPPSSPPSPPPPPPSSSPPPPPSSSS
11 20 F Y SS SSSSPPPPSSSPPPSSSSPPSSSSSPSPSPPSPPSSSSPSPS SSSPSSSPSSPSPPP SPSPPPPSSPPPSPS PPSPPPPPSSPPP PPPPPPPPPPPPPSSSSP
12 20 F Y SSSSSSSSSPPPPSPSSSSSSPPPPSSSSSSPSPPSSPSSSSSSPSSSSSPSSSSSSSSSSPPSSSSSSSSSSSPPSSSSPPSSPSSPSSPSPPPPPPPPPSSPPPPPSSSSS
13 20 F Y SSSSSPPSPSSPSPPSSSS PPSSSSP SPSPPSSPPSSSSSSP S SSSSSSSSSSPSPPSPSPPSSS SPPSPPPPSSPPPPPSPPPPPPPPPPPPPSPSPPSPSSP
14 20 F Y SS SSP PSPPSPSPPSSSS PPPSSSS SPSPPSSPSSSSSPPP P SPSSSPSSPPPPP PPSPPSPS PPPSPPPPSSPPSPPPSPPP SPPPPPPS PPPPSPSSS
15 20 F Y SS SSSSPSPSSSSPSSSSSSPPSSSSS SPSPPSSPSSSSPSSPSP SPSSSPSSSPPPPSSPSPPSSS PPSPSPPPSPPPPPSPPPPPPPPPPPSSPPPPSSSSS
16 20 F Y SS SSSSPSPPPSSPSPSSS PP PPSP SPPPPSPPPSSSSSPSSSSPPSSSSSSSSPSPPPSSSPSSS PPPSSSSPPSSSPPPSSPPPPPPSPPPSS PPPSSSSSS
17 20 F Y SSPSSSSPSPPSPSPPSSSSSPPSSSSSSSPSPPSSPSSSSPSPPSSSSSSSSPSSPSPPPPSPSSPPSSSPPSSPPSPSSPSPPSSSPPPSPPPPPPSSPPPPSSSSS
18 20 F Y SS SSSSSPPPSPSPPS SSSPPSSPSSPSPSPPSPPSSSSSSPSSSSSSPSSSSP SPPP PSSSPP S SSPSSS SSSPPPSSS SSS PSSPP SS PPSPPSSPS
19 20 F Y SS SSS S PPSSSPSSSSSSPSPP SP SPSPPSSPSSSSPS SSSSSSSSSSSSSS SP SSSSPSSSSPPPSPS PPSPPPPPSSPPPPPPSPPPPSPPPPPPSSSS
20 20 F Y SSSSSSSPSPPPSSPPPSSSSPPSSSSSPSPSPPSSPSSSSSSPSSSSSPSSSSSSSSSPPPPSPSPPSSSPPPPSPSSPPPPPSSPSSPPPPPPPPPPPSPPPPPSSPS
21 10 F Y SSSSSSPSSPPSSSPSSSSSPSPSSSSSPSPSSPSSPSSSSPSSSSSSSSSSSSSSSSSS SSPSSSSSSSSSSSSSSSSSPPPSSSSSSPSSSSSSSSSSSSSPPPSPSSS
22 20 F Y SS SSSSS PPSSSSSSPSSSPPPSSSP SPSSPSSPSSSSSSPSSPSSSSSSSSPSSPPPSSPSPPPSSSSPPSPPSPSSPPSSPSSPPPSPPSPPPPPSSSPPPSSSSS
23 20 F Y SSSSSSSPSPPSSSPPSSSSSPPSSSSSSSPSPPSSPSPSSPSPPSSSSPSSSSSSSSSPSPSSSSSSSSSSSPPSPPSSPPSPPPPPSSPPSSPPSPPPSSSPPPPSSSSS
24 20 F Y SSSSSSSPPPPSSSPSSSSS PPPSPSS SPSPPSSPPSSSPSPPSSSPPSSSSSPSSPPPSPSSSPSPS PPPSPSPPSSPPPPSPSSPPSPPPPPPSPSPPPPPSSSS
25 30 F Y SSSSSSSPSPSPPPPPPPSSSPPSSPSPSSPSPPSSPPSSSPSSSSSSSSSSSSSSSSSSPPPPSPSSP SSSSPPSPSSPSSPPPPPPSSPPPPPSPPP SPSSPPSSSSSS
26 20 F N SSSSSSSPSPPSPSPPPSSSSPPSSSSSSSPSPPSSPSSSPPPSSSSSSSSSSSSSSSSSSSPPPPPPSSPSPSSSPPSPSSPSSPSPPSPPPPPPPPPSSPPPPPSSSSS
27 10 F N SSSSSSSP PPP SPPPPSSSPPPSPSSP SPSPPSSPSSSSSSSPSSSPSSSSSSSPSPPP PSSSPPSPS PPPPSSPSSPPPSPSSPPPSPPSPPPPSSPPSPSSSSS
28 20 F N SSPSSSSPSPPSPSPSSSSSSPPSSSSSPSPSPPSSPSSSSSSPSSSSSSSSSPSSSSPSPPSPSSPSSSPSPSSPSSPPSSPSPPSSSSSSSSPPPSSSSSPPPPSSSSS
29 20 F N SSPSSSSPPPPP SPPP SSPPPPPPSS SPPPPSPPPSSSPPPS S PPSPSPSSSSPPPPSPSPPPPS PPPSPPSPPSPPPPPSSPPPPPPPPPPSSPPPPPPPSPP
30 20 F N SSSPSSPPSPSPSSPPSSSSSPPPPPSPSPPPPPSPPPSSSPSPPSSPSSSSSSSSPPSPPPSPPPPSPPSPPPSPPPPPPPPPPPPSSPSPPPPPPPPPPSPPPPPSSSS
31 20 M N SSPSSSSPSPPSSSPPSSSSPSPPSSSSSSSPSPPSPPSSSPPSPSSSPSPSSSSSPSSSP SPSSPPPSSSPPPSSSSPPPPSSSPSSPPPSPPPPPPPSSSPPPSSSSS
32 20 F N SSSSSSPPSPSSSPPPPSSSPPPPSSSPSSPSPPSPPSSSSSSPSSSSSSSSSSSSSPSPPSSSSSPSSSSSPPSSPSSSSSSPSSSSSSSSSSSSSSSSS SSPSSSSS
33 30 F N SS SSSSPPPPPPSPPSSSSSPPSSPSS SPSPPSSPPSPPPPPPPP PPSSPPSPPPPSPPSSSPPSPPSSPPPPSSPSSPSPPPPSPPPPPPPPSPPSPSPPSPPSSP
34 10 F N SSPSSS SSPPP SPSSSSSSPPPSPSSSSPSPPSPPPSSSPSPPPSSPPSSSSSSPS PPSSPSSPPSS SPSSPP PSSPPPPPSSPSSSPPSPPPSSSSPPP SSSS
35 30 M N SSSSSSSSSPPSSSPSSSSSSPPSSSSSSSPSPPSSPSSSSPSSSSSSSPSSSPSSSPSS SSPSSPPSSSPPPPPSPPPSPPPPPPSPPPPPPSPPPPSSPPPPPPSSS
36 30 F N SSSSSSSSSPPSSSPPSSSSSPPPSSSSSSSSPPSSPSSSSPSPSSSSSPSSSSSSSSSPPPSSSPSSSSSSSPPSPSSPSSPPPPPPSSPPPSPPSPSSSSSPPSPSSSPS
37 20 F N SSSSSPSSSSPSS SSSPPSSSSS SPSPPSSPPSSSPSPSSSPSPSSSSSSSSSSSPSSSSPPSSSSPPPSPSSPPSPPSPPSSPPPSPPPPPPSPPPPPPPSSSS
38 30 M N SS SSSSP SPSSSPSSSPS PPPSPSS SPPPPSSPPSSPPPSP S PSSSS SSSSPPPSPS PPPSS PPSPP PPSPPPPPPSPPP PPSPPPPSPPPPPPPSPS
39 20 F N SSSSSSPPPPPPPPPSPSSSPPPPPSS SPSPPSPPSSSSPP SSPPSPSSSPSPSPPPPPSPSPPPSSPPPSSPSPPPSPPPPPPSPPPPPPPPPPPSPPPPPSPPSS
40 10 F N SSPSSSSPSPSSSSPSSSSSSPPSSSSS SPSPPSSPSSSSSPPSSSPPPSSSSSSSPSPP SSPSSPSSSSSSPPSPPPPPSPPPPPSSPPPPPPPPSPSSPPPPPSSSSS
41 20 F N SSSSSSSPSPPSSSPSSSSSSPPSSSSSSSPSPPSSPSSSSSPSSSSSSSPSSSSSSSSSPSPPSPSSPPSSSSPPSPPSPSSPPPPPPSPPPSPPPPPPSSSPPPPSSSS
42 20 F N SSPSSSSPSPPPSSPSSSSSSPPPSSSPSPPSPPSPPPSSSPPPPSPSSPSSSSSPPPPPPPPSPSPPSSSPPPPSPSSPPSPPSPPPSPPPPPSPPPPPPPPPPPPPSSP
43 20 F N SSSSSSSPSPSSSSPPSSSSSPPSSSSSSSPPSPPSSPSSSSPSPSSSSPPPPSSSPSPPSPPSPSPSSSSSPPPSPPSPSSSPSPPSPPPPSSPPPPPSSSPPPPSSSSP
44 20 F N SSSSSSSPSPPSSSPSSSSSSPPSSSSPSSPPPPSPPSSSSPSSPSSSSPSSSSSSSSPPSPPSPSPSSSSPPPPSPPPPPPSPPPPSPPPSPPSPPPPPPSSPPPSPSPS
45 20 F N SS SSSSP PPS SPPSPSSSPSSSSS PSPSPPSSPSSSSPSPSSSSSPSSSPSSSSSPPSSSSPPSSS PPPSPSPSPSPPSPPSSPSPSPSPPPPSSSPPSSSSSSP
46 30 F N SS SSSP P SPPS SS PPS SSS SP PPSSP SSSPS S S SPSS SSSSSPSPSSPSS SSS SSSPP PSSPSPPPSSSSPSP PPP PS PSPSSSSSS
47 20 F N SSSSSSSPSPPPPSPPSPSSSPPPPPSPPSPSPPSSPPSSPPPPPSPSPPSSSPSSSSPPPPPPPSPPPPSSPPPSPSPPPSPPPPPSPPPPPPPPPPPSSPPPPSSSSS
48 20 F N SSPSSSSSSPSSSSPPSSSSSPPSSSSSSSSPSSPSSPSSSSPSPSPSSSPSSSSSSSSSSPPPSPSSPSSSSSPPSSPS PSSPPPSPSSPPSSSSPPPPPSSPPPPPSSSSS
49 20 F N SSSSSSSPSPPSPSPPSSSSSPPSSSSSSSSPSPPSSPSSSSSSSSSSSSSSSSSSSSSSSPSPPPSSPPPSSPPPPSPSSPPSPPPPPSSPPPPPSSPPPPSSSPS
50 20 F N SSSSSSPPPPSSSSPPSSSSSPPPSPSPPPPPPPPSPPPSSSSSPPSSSSSSSSSSSSSSSSSPPSSPSPPPSSPPPSSPSPPPPPPPPPPSSPPPPPPPPPPPPSPPPPPSSS
E SSPPSSPPPPPPSSPPPPSSPPPPPPSPPPPPPPPSSPPSPPPPPPPPPPPPPPPPPPPPPPPPPSPPPPSPPPPSPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPSSPP
F 442134213421344213442442134132424443434234231342143232132432123243212413214243123223124321233123234232312344 32
G 00240021414200112400210242044214110014022341242223444440224200000000000000000000000000000000000000000000020000
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
NNNNNNNNNNYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
NNYNNNYYNYNYNNYYYNNNYYNYNYNNNYYNYYNNYNNYYYNYYNYYYYNNNNNNYYNYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNYNNNN
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
NNNYNNNNNYNNNNNNNNYNNNNYNYNNYYNNYNNNNNYNNNNYNNNNYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

Appendix 4.6.- Copy of the instrument.

TEST DE PERCEPCION DEL PLURAL (PPT.- SECOND EXPERIMENT)
(CORPUS CLAVE)

1.- las capas reales
2.- larguísimos
3.- papá
4.- capas
5.- adultos
6.- problema
7.- tarjetas
8.- manos
9.- clase
10.- ácidas
11.- actividades continuas
12.- cosas electrónicas
13.- los cafés africanos
14.- ciencia
15.- clásicas
16.- carreras
17.- electrónicas
18.- las frutas ácidas
19.- las arepitas
20.- tarjetas
21.- caminos
22.- frutas
23.- clases
24.- mis hijos
25.- los mismos caminos
26.- estudios
27.- las dos carreras
28.- con las manos
29.- papás
30.- hijos
31.- populares
32.- los lápices amarillos
33.- preparados
34.- los idiomas
35.- novelas de vanguardia
36.- capas
37.- amarillos
38.- los lugares más chiquitos
39.- existenciales
40.- entradas
41.- africanos
42.- capa
43.- idiomas
44.- chiquitos
45.- psicológicos
46.- drogas
47.- pacientes
48.- problemas
49.- abiertas
50.- de habitantes
51.- mis estudios

52.- compositores bien preparados
53.- las cartas abiertas
54.- las escuelas místicas o religiosas
55.- obras clásicas
56.- unas tarjetas
57.- aplausos larguísimos
58.- cartas
59.- droga
60.- continuas
61.- ciencias físicas
62.- realistas
63.- las cartas
64.- muchas entradas
65.- esas cosas
66.- puras claves
67.- cosas
68.- drogas
69.- las novelas de Sabato
70.- unos aplausos larguísimos
71.- libros
72.- pinturas de Dali
73.- estudios bastante interesantes
74.- las frutas tropicales
75.- libro
76.- propios problemas
77.- pocas palabras
78.- sus propios problemas
79.- tarjetas
80.- lados distintos
81.- corrientes que son casi místicas o religiosas
82.- frutas
83.- físicas
84.- manos
85.- muchos lados distintos
86.- distintos
87.- tarjeta
88.- bien preparados
89.- manos
90.- las frutas
91.- algunos discípulos
92.- amigos
93.- estudios bastante interesantes
94.- idioma
95.- 40 y pico de años
96.- años
97.- las frutas ácidas
98.- pinturas
99.- interesantes
100.- manos
101.- místicas
102.- mis hijos
103.- hijos
104.- problemas

Appendix 4.7.- Test 2

25 isolated words and the contexts from which they were extracted.

	Isolated Words			Context		
		Y	N		Y	N
1	(4) capas	18.1%	77.4%	(1) las capas reales	88.4%	11.6%
2	(60) continuas	3.9	93.5	(11) actividades continuas	71.6%	24.5%
3	(17) electrónicas	2.6%	97.4%	(12) cosas electrónicas	52.3%	37.4%
4	(41) africanos	14.8%	85.2%	(13) los cafés africanos	84.5%	13.5%
5	(22) frutas	23.2%	74.8%	(18) las frutas ácidas	84.5%	13.5%
6	(10) ácidas	85.2%	9.0%			
7	(21) caminos	68.4%	31.6%	(25) los mismos caminos	81.9%	11.0%
8	(8) manos	7.7%	78.1%	(28) con las manos	3.2%	93.5%
9	(37) amarillos	29.0%	70.3%	(32) los lápices amarillos	94.2%	3.2%
10	(44) chiquitos	9.0%	90.3%	(38) los lugares más chiquitos	58.7%	36.8%
11	(33) preparados	30.3%	68.4%	(52) compositores bien preparados	26.5%	49.0%
12	(58) cartas	5.8%	94.2%	(53) las cartas abiertas	94.2%	3.9%
				(63) las cartas	85.8%	9.7%
13	(2) larguísimos	8.4%	29.7%	(70) mas aplausos larguísimos	89.0%	7.1%
14	(83) físicas	10.3%	89.7%	(61) ciencias físicas	22.6%	76.8%
15	(99) interesantes	58.1%	41.3%	(73) estudios bastante interesantes	45.8%	52.9%
16	(82) frutas	30.3%	69.7%	(74) las frutas tropicales	97.4%	2.4%
17	(86) distintos	15.5%	77.4%	(85) muchos lados distintos	80.0%	14.8%
18	(96) años	35.5%	58.1%	(95) 40 y pico de años	69.0%	27.1%
19	(15) clásicas	2.6%	96.8%	(55) obras clásicas	70.3%	27.7%
20	(20) tarjetas	19.4%	74.8%	(56) unas tarjetas	28.4%	67.7%
21	(43) idiomas	10.3%	80.6%	(34) los idiomas	36.1%	29.7%
22	(40) entradas	18.7%	66.5%	(64) muchos entrades	91.6%	5.8%
23	(67) cosas	16.1%	80.0%	(62) esas cosas	8.4%	83.2%
24	(101) místicas	6.5%	76.1%	(54) las escuelas místicas o religiosas	39.4%	30.3%
25	(103) hijos	41.3%	56.8%	(102) mis hijos	91.0%	5.2%

Appendix 4.8.- Instructions Test 2

INSTRUCCIONES.

Llene los datos correspondiente a edad, sexo y procedencia, note que su nombre no es importante para los efectos de esta investigación.

A continuación Ud. oirá una lista de palabras y frases leidas por varias personas. Cada frase/palabra será leida dos veces.

Todo lo que Ud. tiene que hacer es identificar, primero, si lo que la - persona está diciendo se refiere a una cosa o a varias cosas y luego, señalar su impresión en el espacio indicado. En caso de duda señale su impresión en la casi lla marcada. [?]

Los espacios están numerados, de acuerdo a los items presentados. Recuer de que cada item es dado dos veces.

GRACIAS POR SU COLABORACION

Appendix 4.9.- Answer sheet Test 2

SUBJ. Nº ☐☐☐

PROCEDENCIA:

CARACAS ☐

OTRO ☐

SEXO:

F ☐

M ☐

EDAD:

MENOR DE 20 ☐

ENTRE 20-30 ☐

MAYOR DE 30 ☐

	S	P	?
1.-			
2.-			
3.-			
4.-			
5.-			
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	S	P	?
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81.-			
82.-			
83.-			
84.-			
85.-			
86.-			

	S	P	?
87.-			
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89.-			
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92.-			
93.-			
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95.-			
96.-			
97.-			
98.-			
99.-			
100.-			
101.-			
102.-			
103.-			
104.-			

Appendix 4.10.- Test 2 Data.

A= Subject
B= Age
C= Sex
D= Origin (Caracas: Y; NonCaracas: N)
E= Key answer
F= Speaker
G= Variant type

A	B	C	D		
1	30	F	Y	P	SSSSPSSPSPSSS SPSSSPSPPSPSPPPPSPPPPPPPPS SSPSSPSPSPPPPPPSSSSPPPPSPSPPSSPSPPPPSPPSSPSSPPPPPPSPSPPSPSPSP
2	30	F	Y	PSSS	SPPSPPSPSS SPPSSPSPPSSPPPPPP PPPSP SSSSPPPPPSSSPPPPSSSSSSPPPPPPSPPSPPSSPPPPPPSPPSSPSSPPPPPSPPPPPPPPPP
3	30	F	Y	P	SSSSPSSPPPPPSSSSPPSPSSPPSPSPSPPPSSPPPPSSPPPSPPPPPSPPPPPPSSSPSPPPPPPSPPSPPSPPPPSPSSSPSSSPPPPPSPPPPPPSPPP
4	30	F	Y	P	SSSSPSSPPPPSS SPPSSSSPPSPSPSSPSSSPSPPSSSSSSPPSPSPSPSPPPSSSSSPPPSSPSPSSSPSPPPPSPSSSPSSSPPPPSSPSPPSSSPSP
5	30	M	N	P	SP SP S PPPSS	SPPSPPSPPS SSSPPSPPPPP SSSSSSP SPPPSPPPPPPSSSSSPPSPSPSPSSPPSSPSPSPSSSPSSSPPPPSSPPPPPSSPSP
6	30	M	N	P	SSSSPSSPPPPSS	SPPSSSSPPSSSPSPPS SPSPPSSSSSSPSSSSPPPPPPSSSSSSPPPPSPSPSSSPSPPPPSPSSSP SSPPPP SPPPPSS PSP
7	30	M	N	P	SSSSPSSPPPPSS	SSSPPSSPPSSSPPPPPPSPSPPPSSPPSPSPPSP PPPPSPSSSSPPPPSSSPPSPPSPPPPSPPSSPSPSPSPPPSPPPPSPSPPP
8	30	M	Y	P	SSSSPSSPPSPSS	SPPPPPPPPSPSPPPPPPPPPP PSSSPPPPPPPSPPPPPPSSSSPPPPPPSPPPPPSPPPPSPPSSPPS PPPPPSPPPPPPSPPP
9	30	M	Y	SPSSSPPSSPSSPSSPSP	SPSSPSSPSPPPPPPSSSPPPPSPSSPSSSPPSP PPPSSSPSPPPPSPSPSSSPSPPPPSPSSSPSSSPPPPSSSSPPSPSPPS
10	30	M	Y	P SS	SPSSPSPSSS SP SSSSPPS	SPSPPSPPPSPPSSSSSSP P P PPSSSSS PP PSPSP SPPSPPPPSPSSSPSSSPSPPPSPSPPSS PSP
11	30	M	Y	P	SSSSPSSPPPPSS SPPSPSSPPS	SPSPPSPSSSSPSSSSSSPPSP PSPPP SSS SSPPPSSPSPSSSPSSP PSPSSSPSSSPSSPSSSSSPPP SPS
12	20	M	Y	P	SSSSPSSPPPPSS SPPSPSSPPS	SPSPPS SSSPPPSSSSSPSSPSPPPSPSSSSSSPPSSPSPSPSSSPSPPPPSPSSSPSSSPPPPPSPSPPPS PSP
13	20	M	Y	PSSPSSPSSPPSPSSSSPPSPPSPPPSSPPSPSSSSPSSSSSSSPPSSPSPSPSSSPSSSPSPPPPPPSPSSPPSPPPPSPSSSPPSSPPPPPSPPPPPSSPPS
14	20	M	Y	PSSPSSPSSPPPPSP	SPPPSSSPPSS PPPPS SPSPPPSSSSSP PPS SP PSPSSSPSPPPPPPSPPSPPSPPPPSPSSSPSSSPPPPPSPPPPPPSPPP
15	20	M	N	SPSSSSSSSPPPPSS	SPPPPSSPPSSSPSPPSS PSSS SSSSSPPSP P PPSSPSSSSSPPPPSPSPPSSPSPPPPSPSSSPSSSPSPPPSPSPPSSSPPP
16	20	M	N	P SPSSPSSPPSPSSPSPPS	PPPSSPSSPPPSSPSPPPS PPPPSSSSSSSSPPPPPPSPPPSPSPPPPSPPSSPSSSPSPSPSSSPPPPSPSP
17	20	M	N	PSSSSSPSSPPSPSSSSPPPPPSPPSSPPPSPSSSPSSP SSPSSPPSPS PPSPSSSSSSSPPPPPPSPSSSPSPPPPSSSSSPSSSPPPPSSPPPPSSPPP
18	10	F	Y	P SSSSPSS PS SS S	PSPSSPSSPSSSPPP SSSSPPSSSSSPPPS PPP PSPSSSPSPPPPPPSPS SPSSPSPSPSSSPSSSPSPPSSSSPPPPSPSS
19	20	F	Y	PSSSSSPSSPPPPSSSSPPSPPSPPSPSPPPPSPSPPPPSSSSSSPSPPSPSPSPSPPSSSSPPPPPPSPPSPPSPPPPPPPPSPSSSPPPPSPPPPPPPPPP
20	20	F	Y	PPSSSSPSSSSPPSS	SPPSPSSPPSSSPSPPSSPSSSPSSSSSSSPPSPSPSPSPSSSSSSSPPSPSPSPSSSPSSPSPSPSSS SSSPPPPPSPSPPPSSPSP
21	20	F	Y	PPSSSSPSSPSPPSS	SSPSPSSPPSSSSSPPSSPSSSPSSSSSSSPPSPSPSP PSSSSSPSPPSP PSSPSSPSSPPPSPSSSPSSSPPPPPSSSSPPSSPSS
22	20	F	Y	PSSSSSPSSPPSSSSSSPPSPSSPPSSSPSSPSPSPSPSSSSSSSPPPSPSPSP	PSPSSSSS PSPSPSPSSSPSSPSPSSSSSPSSSP PPSSSSPPPSSPPS
23	20	F	Y	PPSSSSPSSPSSPSS	SPPSPSSPPSSSPPPPS SPSPP SSSSSPPSPPSSPPSSSSSSSSPPSSSPPPSSSPSSPPPSPSSSPSSSPPPPSSSSSPPSSSPPP
24	20	F	Y	PSSSSSPSSP	SSSSSSPPPPSSPPSPSPSS SPPPS SSSSSSSPPSPSSS PSSSSSSSS PP SPS SSSPSS SPSSSSS SSSP PPSSPSSPPSS PP
25	20	F	Y	P SSSSPSSPPSPSS	SPPSPPPPPS SPSPPSPSPSPPSPSSSSPPSSSP P PSPSSSPSPPPPSPSPSPPPSPPPPSSPSSPSSSPPPPPSPSPPSPSPSP
26	30	F	Y	SS PSSSSS S PSS	SPPSSSSP S SPSSPP SPSSP SSSSSPPSSS PSSSSSSSSSP SSSPSPPSSPSSSSSPSPSSSSSSSPP PSSSSPPPSSPP
27	30	F	Y	PSSPSSPSSPPSPSSSSPPSSPSPPSPSPPPPPSSPSPPSSSSPSPSPPSSSPSSPSSSSSSSPPPSPPSPPSPPSPPPPSPSSSPPSSPPPPSSSPPPSPSPPP
28	10	F	N	P SSSSPSSPPPPSS	SPPPPSSPPSSSPSPPPS SSPSPSSPSSPPSPS SPPPSPSSSSSPPPSSPPPPPPSSPPPPSPPSSPPSSPPPPPSPPPPPSSPPS
29	20	F	N	S SPSSPSSPSSPSSPSPPSPSSPPSPSPSPPS	SPSPPSPS SSPPSP PSSSSSSSSSPP S PSPSSSPSSPPPSPSSSPSSSPSSPSSPSPPSSSPSP
30	20	F	N	P SSSSPSSPSSPSS	SPPPSSSPPS SPSPPS SSPPSSSSSPPPSSS SP SSSSSSSSSP SPSPSSSPSSPSPSSSSSPSSSPSPPPSSSPPPSSPSS
31	20	F	N	SSSSSSSSSPPSPSSSSPPSPSSPPSSSSSPSSSSSSSPSSSSSSSPPSSSPSSSPSSSSSSSPPPSSPSSSSSPSSSPPSPSSSSSSSPSSPSSSSSPPSSSSSP	
32	20	F	N	P SSSSPSSPPSPSSSSPPSSSSPPSSSPSPPSSPPSPPSSSSSSSPPSPSSPPSPSSSSSSSP	PPSPP PSSPSSPPP PSSS PSSPSSP SSS PPS P
33	30	F	N	P SPSSPSSSSPSSSSSPPSSPSPPSSSPSPPSSSPSSPSSSSSSSPSSPSPSPPPPSSSSSSPPPPSPSPPSSPSPPPPSSSSSPSSSPPPPSSPSPPSSSPSP	
34	10	F	N	P SSSSPSSPPSPSSS	SPPSSSPPPP SPPPPPPSPPPPPSSSSSSPPPPS SPPSPSSSSSSPP PSPPPPSSPSPPSPPPPSSPPSSPPPPSSPPSPSPSPPP
35	10	F	N	PSSSSSP	SPPPPSSSSPPSSSSPPSPSPSSPSPSSSPPSSSSSSPSSSSPSPPSSPSSSSSPPPPSPSPSSSPSPSSPSPSSSPSSSPSPPSSSSPPSSSPSP
0	20	F	N	P PP PS PS SPP	PSSPPSP PP PPP PPPPPP PPPPPPSPPS SPPPPPPPPPP SSPSSSPPPPPSPPPPSPPPPPP PPSSPSPPP SSSPPPPP
37	20	F	N	P SPSSPPSPSPPSS	SPPSPPSPPSPSPPPPSPPPPPPPSSPSPPPPPSPSPPSPPSSSSSPPSSSPPPPSSPSPPPSPPSSPPSSPPPPSSPPPPSSSPSP
38	20	F	N	PSSSSSPSSSPPSSS	SPPSSSSPPSSSPSPPPPPPSPPSSSSSSPPSSSPPPSSSPSSSSSPPSPSPSPPPSPSPPPPSPSSPSSPPPPSSPSSPSS PSP
39	10	F	Y	PSSSSSPSSPPPPSSSSPPSPSSPPSSSPSPPPPSPSPPSSSSSPPPSPSSPPPPSPSSSPSPPPPSPSPSSPPSPPPPPPSSSPPSSPSPPPSPSPPPSSPSP	
40	10	F	Y	P SS SPPSPPPPSS	SPPSSSSPPSSSPSPPSPPPSPPSSSSSSSPPSP PSPPSSPSSSSSPPSPSPPPSSPPSSPPPSPSSSPSSSPPPPPSPPPPPSSPPP
41	20	F	Y	P SSSSSSSPPPPSS	SPSSPSSPPSSSPSPPPPPPPPPPPSSSSPPSSS PPPPS SSSPSPPSPSPSPSSPPSSPPPPSSSSPSSSPPPPPSPSPPSPSPPP
42	20	F	Y	P SPSSPSSP SPSS SPP PSSPP	SPP PS PPSPPPSS SSPSSPS SPPSSPSSSSSSPPPSPSPPSSPSPPPPSPSSSSSSSPSPPPSPPPPSSSPSP
43	20	F	Y	PSSSSSPSSPPPPSSSSPPSSSSPPSSSPSPPSPSPPPPSSSSSSPSSPSSSPPPSPSSSSSPPPPSPPPPSPPSPPPPSPSSSPSSSPPPPPSPPPPSPSPSP	
44	30	F	Y	P SP SPSSPPPPSP	PPPPPSSPPPSSPSPPSPSPPPPSPSSSSPSSPSSSPPPPPSSSSSPPPPSPPPPSSPSPPPPSPPPSPPSSPPPPPSPPPPPPPPPP
45	30	F	Y	P SSSSPSSPPPPSSSSPPSSSSPPSPSPSPPSPSPSPSSSSSSSSPPSSSPPPPPPPSSSSSPPPPSPSPPSPPPPSPSSSPSSSPSPPSSPPPPSPSPPP	
46	10	M	N	P SSSSPSSPPPSSS	SPPSSSSPPSSSPSPPPPSPPPSSSSSSSP SP PPPPSSSSSSSSPSPSPSPSSSPSSPPPSPSSSP SSPPPPSSPSPPPS PSP
47	20	M	N	P SS SP S PSPSS	SPPSSSSPPS SPSPPS SPSPSSSSSSSP SSS PPPSPSSSSSPPPPSPSSSSSPSPPPPSPSSSPPSSPPSPPSPSPPSSSPSS
48	20	M	N	P SSSSPSSPPPPSSSSPPSSSSPPS	SPSPPSPPPPPPSSSSSSPSSPSSSPPPSSSSSSSPPPPSPSPSSPPSPPPPPPSSSPSSSPPPPPSSSPPSSPSP
49	20	M	N	PPSSSSPPSPPPPSSPSPPSPPSPPSSSPPPPSPSPPPPPSSPSPPPPPSSSPPSPPSSSPPSSPPSPSPPSPPSPPPPSPPSSPSSSPPPPPSPPPPPPPPPP	
50	20	M	N	P SSSSPSSPPSPSS	SPPSSSSPPS SSSPPP SPPPPPSSSSSPPSPS PPPPPPSSSS PPSPSPSPSSSPSPPPPPPSSSPSSPPPPPPSPPPPPSSPSP
51	20	M	N	P SSSSS SPPPPSS	SPPSSSSPPS SSS PPPPSSPPSSSPSSPPSSSSSPPPSPSPPSSPPP SPPPSSSPSPPPPSPSSSPSSSPPPPSSP PPSSSPSP
0	20	M	Y	SSPP PSSPPSSSPP	PSSPPSPSSS PSPSSSSS PSSPSPSPPSSPSP SSSSPSPPSPSSSSSSPSPSS SSPPSPSSSSPPSSPSSSSSPSSPSSSSPSSP
53	20	M	Y	PSSPPSPSSPPPPSSSSPSPSSSPPSPPSSPPPPPSSPPSPSSSSPPPSPPPPPSSPSSSSSSPSPPPSSSSSSSSPPPSSSSSPSSSPPSPSSSPPPPSSSPP	
54	20	M	Y	PSSSSSPSSPPPPSS	SPPPSSSPPSSSPSSPSPSPSPPSSSSSSPSSPS SPPPSPSSSSSPPSPSPSPSSPPSPPPPSPSSSPSSSPPPPPSPPPPSSSPSP
55	20	M	Y	P SSSSP	SPPSPSSSS PSSSSPPS SSSPPSP S SSSSSSPSSS PP PSSSSS P P PP S SPS PS SSSPSSSP PSS PPSS S
56	30	M	N	P SSSSPSSPPPPSSPSPSSSSSPPS	SPPPPSPSPSPPSSSSSSPSSP PSPPSPPSSSPSPPSPSPSPPSPSSPPPPSPSSSPSSSPPPPPSP PPPPSPPP
57	10	M	Y	P SSSSPSSPPSPSSSSPPSPSSPPSSSPSPPS	SPSPSPSSSSSPSSSSS PSPSPSSSSSPPPPSPPPSSPPSPPPPSPSSSPSSSPPPPPSSP PSSSPSS
58	10	M	Y	P SSSSPSSPPPPSS	SPPSPSSPPS SSPPPSPSSPPPPSPSSSSPPSSSPPP PSPSSSPSPPPPSPSPS PPSSPPPSSSSSPSSSPPPPPSPSPPPS PPS
59	10	M	N	P SSSSPSSPP PSS	SPPSPPSPPS SPPPP P PSP SPSSSSPSSP S PSSSSSSSPPPPSPSPS PPS PPPSPSSSPSSSPPPPPSSSPPSS PSP

A	B	C	D
60	10	M	N
61	20	M	Y
62	20	M	N
63	20	M	N
64	20	M	Y
65	20	M	Y
66	20	M	Y
67	20	M	Y
68	20	F	Y
69	20	F	Y
70	20	F	N
71	20	F	Y
72	20	F	Y
73	10	F	N
74	10	F	N
75	10	F	Y
76	10	F	Y
77	10	F	Y
78	10	F	Y
79	20	F	N
80	20	F	N
81	20	M	N
82	20	M	N
83	20	M	N
84	20	M	N
85	20	M	N
86	20	M	N
87	20	M	N
88	10	M	Y
89	10	M	Y
90	10	M	N
91	10	M	N
92	20	M	Y
93	20	M	Y
94	20	M	Y
95	20	M	Y
96	20	M	Y
97	20	M	N
98	10	F	Y
99	10	F	Y
100	10	F	Y
101	20	F	Y
102	20	F	Y
103	20	F	Y
104	20	F	Y
105	20	F	Y
106	20	F	Y
107	20	F	Y
108	20	F	Y
109	20	F	Y
110	20	F	Y
111	20	F	Y
112	20	F	Y
113	20	F	Y
114	20	F	Y
115	10	F	Y
116	20	F	Y
117	10	F	N
118	10	F	N
119	10	F	N
120	10	F	N
121	20	F	N
122	20	F	N
123	20	F	N
124	20	F	N
125	20	F	N
126	20	F	N
127	20	F	N
128	20	F	N
129	20	F	N
130	20	F	N
131	20	F	N
132	20	F	N

```
 A  B C D
133 30 F N  P SPSSPSSPPPPSS SPP PSPPPP SPPSPP PPSS  SSSSSP PP  PPPSS SSSPSPPPPSPPPPPSPSPPPPSPPSSP SSPPPPPSP PPPP PPP
134 30 F N  P SSSSPSSPPSPSS SPS PSSPP  SPPPPPSPPPPSPPSSSSPPPPPS SPPPSSSS SSPPPPSPSPPPPPSSPPPSPPSSP SSPPPPPS  PP P PPP
135 30 F N  P SS SPSSPPPPSSSSSPSPSSPPSSSPSPPS SPSPPSSSSSSPSSSSSSPSPPPSSSSSPPSPSPSPPSSPSSPPPSPSSSSSSSPSPPPSPSPPSPSPSP
136 30 F N  PSSSSSPSSPPSPSSSSPPSPPSPPPSSPPPPSPSPSPPSSSSSSPPSPSPSPSPSSSSSSSPPPPSPSPSPPPSPPPPSPPSSPSSSPPPPSSPSPPSPSPPS
137 30 F Y  P SP SPSSPSPPSS SP PPPSPPSPSPPSPP  PPS SSSSSSPPPP   P PPPPSSSSPPPPPPPSPPSPPSSPPPPPPPPSPPSSPPPPPSPPPPPPPPPP
138 30 F Y  P SSSSPSSPSPPSS SPPSPPSPPSSSPPPPP PPPSPPSSSPSPPSPSSPP PPPSSSPSPPSPSPSPPSSPSPPPPSPSPSPSSSPPPPSSPPPPSP PPP
139 30 F Y  P SSSSPSSPPPPSP PPSPPPSPPPPSPPPPSSSPPPP SSSSPPPPP PSPPPS SSSSSPPPPSPSPPSPPSPPPPSSSSSPSSSPPPPPSPPPPPPSPPP
140 20 M Y  P SSSSPSSPPPPSSSSPPSPSSPSS SPPPPPPSPSPPSSSSSSPSSSSSPPPPSPSSSSSSPSPSPPPSSSPSSPPPSPSSSPSSSPPPPSPPPPSSSPSS
141 20 M Y  P SSSSPSSPP PSS SPPSPSSPPSSSSSPPSPSSSPSSSSSSSPSSSSS PPSPSSSSSSPP SSPSPSSPPSSPSPPPSSSPSSSPSSSPSPSPPSSSPSS
  0 20 M Y  SPP PPSPPSSSSSP PS SSPPSPP P P S   SPS  PPPPPS PS   P PPSPPPPPSSSPSSPPP PSPPPSSPSSPPSSPPSPSSPPPSSSPS  P
143 20 M Y  P SSSSPSSPPPPSS SPSSPSSPPSPSPPPPSSSPPPPSSSSSSPSSPSS PPSPSSSSSSPPPSSPSSP PPSPPPP PSSS  SSPPSPPSPSPPSPSPPP
144 20 M Y  P SSSSSSSSPPPSSSSPPSPSSPPSSSPPPPS SPSSPSSSSSSPSSSSS PSPSPSSPSSPPPSSPSPPSSPSSPPPSPSSSSSSSPPPPSSPPPPSPSPPP
145 20 M Y  P SSSSP SPSSPSS SPSSSSSPPSPSPSPPPS PSPPSSSSSSPSSPSPPPPPPSSSS SPPPPSPSPSSPPS PPPPPSSSPSSSP PPPSPSPPPSSPSP
146 10 M Y  PSSPSSPSSPPSSSS SS SPSSP S SPSPPSS SS PSSSSSSPSSP PSP  SSSSSS  P SSPSPS  PS PPP PSSS SSSPSSP SPSPPPS  S
147 10 M Y  P S SSP SPP PSS SPPSPSSP SSSSSSPS  SS PSSSSSSPPSS P P PPPSSPSPPPPPSPSPSSPPSSPPP PSSSPSSSPPPPPSPSPPSSSPSS
148 10 M Y  P SSSSP SPP PSS SP SP S  S SSSSPS  SSS SSSSSSPSSP  SSPPSSSSSS   SSSPSPSSPPS   PS SSS SSSP  PSSPS PSSS SS
149 20 M N  P SS SPSSP SPPSSSPPPPSSPSSSSSPPPPSSSSSPPSSSSPPPPP PPPSSPSSSPSPPPSSPSPP PPSSPPPSPPSSPSSPPPPPSSPPPPSPSPPP
150 10 M N  PSSPSSPSSPPPSSS SPPSSSSPPSPSPPPPPSPPSPPSSSSSPPPSPSPSPSPPPPSSSSSPPSPSPSPPPPPSSPPPSPSSSPSSSPPPPPSPSPPPSSPPP
151 30 M N  P SSSSSSSPP PSS SP PSSSP S SPPSPS SPSS  SSSSSPSSSS SP SSPSSSSSPPPSPP PS SPSSPSPSSPSSSSSSPPSPPSP PPSP P P
152 10 M N  PSSSSSPPSPPPPSSSSPPSPSSPPPSSPSPPPSSPPSPSPS PSPPSPSSPPSSSPSSPSSPPPPPPSPPSSPSPPPPSPPPSPPSSPPPPPSPPPPPPPPPP
153 20 M N  P SSSSPSSPPSSSSSS SSSSSPSSSSPSPPSSSPPSSSPSSSPPSSPSSSPSP SSSSSSPSSPSPSPSSPPSSSPPSSSPSPSSSPSSPSSPSPPPSSPPS
154 20 M N  P S      PPSPSS SPPSPPPPPPPSPPPPP  PPPP SS SPPPPP P P PPPSSPPPPPPPSPSPPSPPSPPPPSPPPSP SPPPPPPSPPPPPPPPPP
155 30 M Y  S SS SPSSPSPPSS SP SPPSPPS SPSSSSS PPPSSSSSSSPPPSP  SPPPSPSSSSSPPSPSPSPSSSPSSPPPSPSSSP SSPSSPPSSPPPSSSPPP
156 30 M Y  P SSSSPSPPPPPSS SP SSSPPPSPSPSPPSPPPSPPSSSSSPPPSPSP P PPSSSSSSPP PSPSPSSPPSPPPPSPSSSPSSSPPPPPSPSPPPSSPSS
157 30 M Y  P SPSSP SPSPPSS SPSPSPPPPPPSPPPPS PPSPP SSPSSPSPPSPPPPPPPPSSPSPPPPPPSPPPPPSPPPPSPPPSPPSSSPPPPSPPPPPPPPPP
158 30 M Y  P S  SPSSSP PSS SPP PPSP P SPPPPP SPSPP SSSSSP PP  SP PS SS P PPPPPPS PSSPSPPPP PSSSPSSSPPPPPSP PPPPSPPP
E PPSPPSPPSPPPPSPPPPPPPPPPPPPPPPPPPPPPPPPPPPSPPPPPPPPPPPPPPPPSPPPPPPPPPPPPPPPSPPPPPPPPPPPSPPPPPPSPPPPPPPPPP
F 52451312452154231521254121324325213452315412343452125321254232512124324325432342353422424524242254243114
G 02044012010000224001222002003440400320424044211220000000020402000021002000000010024402001001000201124023
  YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
  YNNNNNNNNNYNYNNNNNNNNNNNYNYNNNYYNYNNNYYNNNNNNNNNNYNYNNNNNNNNNNNNNNNNYNNNYNNNNNNYNNNNNNNNNYNNNYNNNNNNNNN
  NYNNNNYYNYNNNNYYNNNYYYYNNYNNYNNNNNNNYYNNYNNNNYYYYYNNNNNNNNYNNNYNNNNYYNNYNNNNNNNYNNYNNNYNNYNNYNNNYNYYYNNYY
  NNNNNNNNNNNYNNNNNNYYNNNNYNNNYNNNNNNNYNNNNNNNNNNNNNNNYNNYYYYNNNYNYYYYNNYNNYYNNYYNNYNNNNYNNYNYNNYNNNYNNNNYNN
  NNNYYNNNNNNNNNNNYNNNNNNNNNNNNYNNYNNNNNNNYNYYNNNNNNNNNNNNNNYNNNNNNNNNNNNNNNNNNNNNNYYNNNNNNNNNNNNNNNYNNN
  NNNNNNNNNNNNNNNNNYNNNNNYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNYYNNNNNNNNYNNNNNNNNNNYNNYYNNNNNNNNNNNNYNNNNNYNNNNYNN


```

Appendix 4.11.- Responses according to variable Origin.

COUNT %	Caracas	NonCaracas	Row total
ANSWER 1 RIGHT	3760 53.2%	4843 53.5%	8603 53.4%
2 WRONG	2893 40.9%	3628 40.1%	6521 40.5%
3 DON'T KNOW	419 5.9%	577 6.4%	996 6.2%
COLUMN TOTAL	7072 43.9%	9048 56.1%	16120 100%

CHI-SQUARE	D.F.	SIGNIFICANCE
2.05458	2	P= 0.3580

Appendices

Chapter 5

Appendix 5.1.- Linguistic data

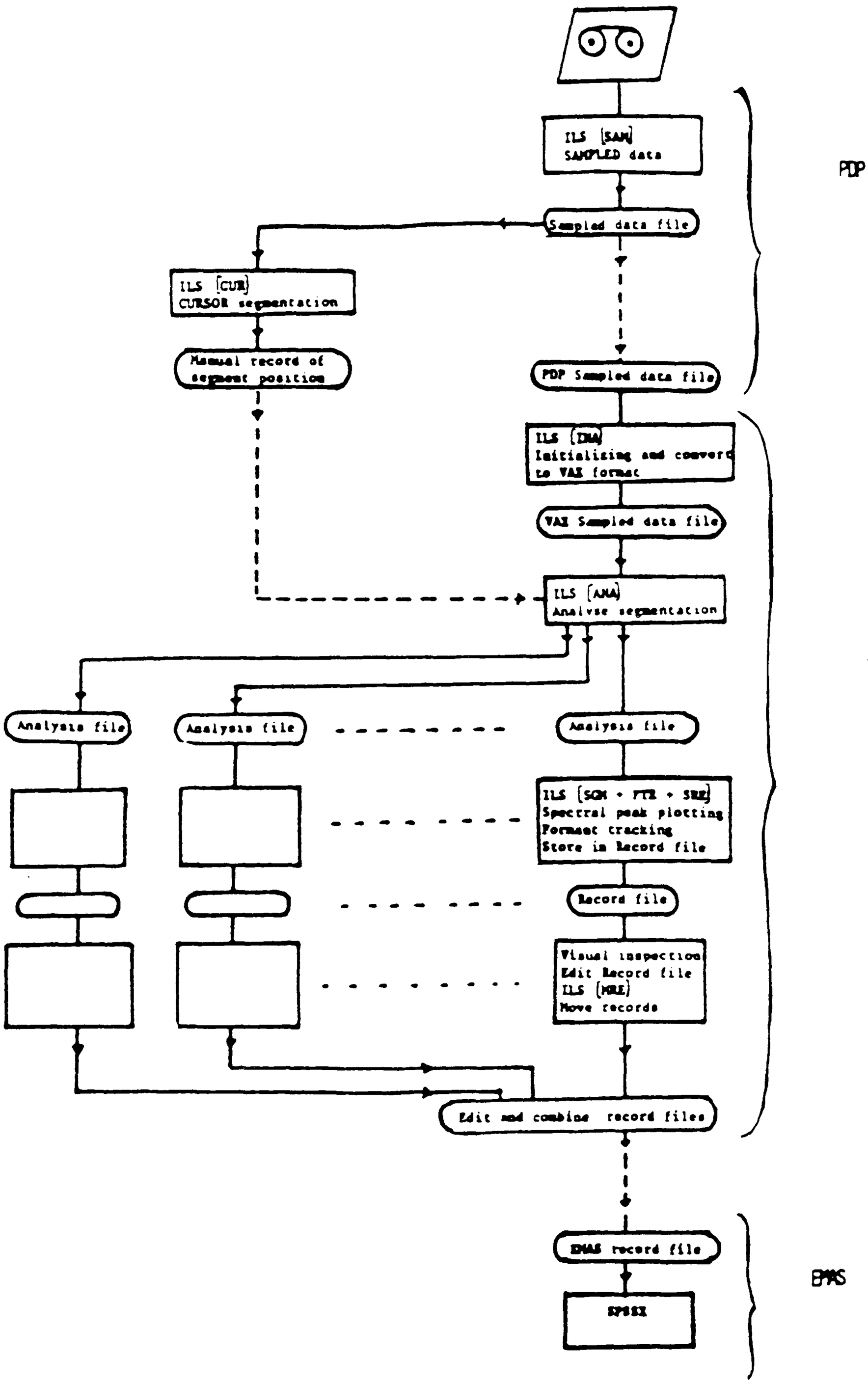
droga	drogas	las drogas	las drogas fuertes
			las drogas adictivas
casa	casas	las casas	las casas grandes
			las casas azules
cama	camas	las camas	las camas viejas
			las camas anchas
capa	capas	las capas	las capas reales
			las capas azules
fruta	frutas	las frutas	las frutas tropicales
			las frutas ácidas
carta	cartas	las cartas	las cartas cerradas
			las cartas abiertas
café	cafés	los cafés	los cafés venezolanos
			los cafés africanos
postal	postales	las postales	las postales grandes
			las postales impresas
lápiz	lápices	los lápices	los lápices verdes
			los lápices amarillos
calle	calles	las calles	las calles solitarias
			las calles anchas
libro	libros	los libros	los libros nuevos
			los libros abiertos
perro	perros	los perros	los perros mansos
			los perros hambrientos
artículo	artículos	los artículos	los artículos cientificos
mes	meses	los meses	los meses pasados
pez	peces	los peces	los peces muertos
			los peces envenenados
luz	luces	las luces	las luces prendidas
			las luces apagadas
voz	voces	las voces	las voces conocidas
			las voces amigas
cruz	cruces	las cruces	las cruces pequeñas
			las cruces altas
oye	oyes	oiga	oigas
come	comes	coma	comas
pide	pides	pida	pidas
lee	lees	lea	leas
cose	coses	cosa	cosas
muerde	muerdes	muerda	muerdas
es	eres	sea	seas
viene	vienes	venga	vengas
bebe	bebes	beba	bebas
pinte	pintes	pinta	pintas
cuente	cuentes	cuenta	cuentas

Appendix 5.2.- ILS Description and Commands used.

ILS software comprises a modular set of functions. These functions have been developed as a set of self contained programs which are utilized serially. Each function is an ILS command which invokes a porogram to execute a specific task. The programs are stored on disc and brought into memory, one at a time by user commands. Each command program works with data generated by previous command and generates further data to be used by further commands.

ANA	provides an estimation of formant frequency values for sampled data.
CUR	cursor command, used with displays.
CTX	context command, used to examined and change the context, i.e. the number of sample points per frame of data.
DSP	display commans, displays the frames of sampled data files.
FIL	file command; specifies and creates data files.
FTR	formant tracking command; used after SGM command.
INA	initializing command; used to specify the file header.
LRE	listing record command.
LSN	listening command; used to listen to the segmentations.
OPN	open file command; used to open and allocate files.
PLR	plot records command; used to plot data from record files.
PRT	printing command; used to print data from files on the line printer.
SAM	sampling command; used to sample data on PDP.
SGM	spectral peak plotting command.
SRE	store records command; used to write records from sampled or analysis files into secondary record file.

ILS file structure



Appendix 5.3.- Duration data
Durational measurements of vowels

A=SUBJECT
B=SP
C=VOWEL
D=DURATION
E=FILE NUMBER

A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
2	1	1	10	10	2	5	1	6	40	2	4	2	7	39	2	5	3	9	60
2	1	1	11	14	2	5	1	10	45	2	4	2	6	40	2	5	3	10	61
2	1	1	11	18	2	5	1	7	46	2	4	2	6	42	2	5	3	8	63
2	1	1	12	22	2	5	1	6	47	2	4	2	5	43	2	5	3	6	64
2	1	1	10	26	2	5	1	9	68	2	4	2	7	46	2	5	3	5	65
2	1	1	8	30	2	5	1	6	69	2	4	2	8	47	2	6	3	8	36
2	1	1	12	66	2	5	1	8	70	2	4	2	6	61	2	6	3	9	37
2	2	1	10	10	2	5	1	9	72	2	4	2	6	64	2	6	3	7	43
2	2	1	8	14	2	5	1	9	73	2	4	2	7	65	2	6	3	7	50
2	2	1	7	18	2	5	1	10	74	2	4	2	5	69	2	6	3	6	51
2	2	1	10	22	2	5	1	8	76	2	4	2	10	70	2	6	3	6	54
2	2	1	8	26	2	5	1	6	77	2	4	2	7	73	2	6	3	5	55
2	2	1	7	30	2	5	1	8	78	2	4	2	10	74	2	6	3	6	58
2	3	1	7	11	2	6	1	7	13	2	4	2	5	77	2	6	3	9	61
2	3	1	8	15	2	6	1	10	20	2	4	2	9	78	2	6	3	6	64
2	3	1	12	19	2	6	1	5	21	2	6	2	7	12	2	6	3	6	65
2	3	1	7	23	2	6	1	7	29	2	6	2	8	16	2	7	2	15	79
2	3	1	8	27	2	6	1	8	33	2	6	2	6	17	2	7	2	13	79
2	3	1	7	31	2	6	1	8	40	2	6	2	9	24	2	7	2	10	81
2	4	1	6	12	2	6	1	8	46	2	6	2	7	25	2	8	2	12	81
2	4	1	10	13	2	6	1	7	47	2	6	2	8	28	2	7	2	12	83
2	4	1	7	16	2	6	1	7	69	2	6	2	8	39	2	8	2	10	83
2	4	1	8	17	2	6	1	12	70	2	6	2	7	42	2	7	2	15	85
2	4	1	8	20	2	6	1	11	73	2	1	3	7	48	2	8	2	17	85
2	4	1	9	21	2	6	1	9	74	2	1	3	11	52	2	7	2	12	89
2	4	1	8	24	2	6	1	11	77	2	1	3	11	56	2	8	2	8	89
2	4	1	9	25	2	6	1	7	78	2	2	3	8	48	2	7	2	13	92
2	4	1	7	28	2	1	2	14	34	2	2	3	9	52	2	8	2	10	92
2	4	1	9	29	2	1	2	10	44	2	2	3	8	56	2	7	2	12	94
2	4	1	5	32	2	1	2	15	59	2	3	3	6	49	2	8	2	11	94
2	4	1	9	33	2	1	2	9	62	2	3	3	11	53	2	7	2	10	98
2	5	1	10	11	2	2	2	12	34	2	3	3	7	57	2	8	2	7	98
2	5	1	10	12	2	2	2	10	38	2	4	3	6	50	2	9	1	11	80
2	5	1	7	13	2	2	2	6	41	2	4	3	7	51	2	10	1	10	80
2	5	1	9	15	2	2	2	7	44	2	4	3	9	54	2	9	1	12	82
2	5	1	7	16	2	2	2	10	59	2	4	3	8	55	2	10	1	10	82
2	5	1	8	17	2	2	2	9	62	2	4	3	7	58	2	9	1	12	84
2	5	1	10	19	2	2	2	8	67	2	5	3	7	35	2	10	1	14	84
2	5	1	7	20	2	2	2	8	71	2	5	3	8	36	2	9	1	13	86
2	5	1	7	21	2	2	2	10	75	2	5	3	7	37	2	10	1	10	86
2	5	1	12	23	2	3	2	11	35	2	5	3	10	41	2	9	1	13	87
2	5	1	8	24	2	3	2	9	38	2	5	3	6	42	2	10	1	10	87
2	5	1	8	25	2	3	2	7	41	2	5	3	6	43	2	9	1	11	90
2	5	1	9	27	2	3	2	8	45	2	5	3	7	49	2	10	1	10	90
2	5	1	8	28	2	3	2	8	60	2	5	3	6	50	2	9	1	14	91

A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
2	5	1	8	29	2	3	2	6	63	2	5	3	7	51	2	10	1	13	91
2	5	1	7	31	2	3	2	6	68	2	5	3	8	53	2	9	1	12	93
2	5	1	7	32	2	3	2	7	72	2	5	3	7	54	2	10	1	9	93
2	5	1	6	33	2	3	2	7	76	2	5	3	7	55	2	9	1	12	95
2	5	1	7	38	2	4	2	8	36	2	5	3	6	57	2	10	1	12	95
2	5	1	6	39	2	4	2	6	37	2	5	3	8	58	2	9	1	12	97
2	9	1	12	99	3	5	1	7	33	3	4	2	7	30	3	5	3	5	47
3	1	1	9	10	3	5	1	5	37	3	4	2	6	32	3	5	3	8	48
3	1	1	7	13	3	5	1	7	38	3	4	2	5	33	3	5	3	7	49
3	1	1	10	16	3	5	1	7	39	3	4	2	10	35	3	5	3	6	50
3	1	1	11	19	3	5	1	9	53	3	4	2	7	36	3	5	3	8	51
3	1	1	11	22	3	5	1	6	54	3	4	2	6	38	3	5	3	5	52
3	1	1	10	25	3	5	1	6	55	3	4	2	5	39	3	6	3	8	29
3	2	1	9	10	3	5	1	8	56	3	4	2	5	49	3	6	3	5	30
3	2	1	11	13	3	5	1	8	57	3	4	2	6	51	3	6	3	5	36
3	2	1	8	16	3	5	1	7	58	3	4	2	5	52	3	6	3	10	41
3	2	1	8	19	3	5	1	8	59	3	4	2	5	54	3	6	3	5	42
3	2	1	8	22	3	5	1	4	60	3	4	2	7	55	3	6	3	5	44
3	2	1	7	25	3	5	1	5	61	3	4	2	5	57	3	6	3	4	45
3	3	1	9	10	3	6	1	6	12	3	4	2	6	58	3	6	3	3	47
3	3	1	7	13	3	6	1	8	17	3	4	2	6	60	3	6	3	5	49
3	3	1	7	16	3	6	1	3	18	3	4	2	6	61	3	6	3	7	51
3	3	1	6	19	3	6	1	6	24	3	6	2	4	11	3	6	3	5	52
3	3	1	5	22	3	6	1	9	26	3	6	2	6	14	3	7	2	7	62
3	3	1	7	25	3	6	1	6	27	3	6	2	5	15	3	8	2	6	62
3	4	1	7	11	3	6	1	7	33	3	6	2	6	20	3	7	2	10	63
3	4	1	7	12	3	6	1	5	38	3	6	2	5	21	3	8	2	15	63
3	4	1	7	14	3	6	1	4	39	3	6	2	7	23	3	7	2	8	64
3	4	1	11	15	3	6	1	5	54	3	6	2	5	31	3	8	2	7	64
3	4	1	6	17	3	6	1	4	55	3	6	2	5	35	3	7	2	16	65
3	4	1	6	18	3	6	1	6	57	3	1	3	11	40	3	8	2	10	65
3	4	1	8	20	3	6	1	5	58	3	1	3	14	43	3	7	2	6	66
3	4	1	8	21	3	6	1	6	60	3	1	3	7	46	3	8	2	5	66
3	4	1	9	23	3	6	1	3	63	3	2	3	8	40	3	7	2	7	67
3	4	1	7	24	3	1	2	15	28	3	2	3	8	43	3	8	2	8	67
3	4	1	6	26	3	1	2	9	37	3	2	3	7	46	3	7	2	8	69
3	4	1	8	27	3	1	2	15	48	3	3	3	8	40	3	8	2	7	69
3	5	1	9	10	3	1	2	15	50	3	3	3	6	43	3	7	2	15	70
3	5	1	5	11	3	2	2	11	28	3	3	3	6	46	3	7	2	12	70
3	5	1	8	12	3	2	2	5	31	3	4	3	9	41	3	7	2	7	71
3	5	1	6	13	3	2	2	8	34	3	4	3	7	42	3	8	2	8	71
3	5	1	4	14	3	2	2	8	37	3	4	3	7	44	3	7	2	5	72
3	5	1	8	15	3	2	2	7	48	3	4	3	8	45	3	8	2	6	72
3	5	1	6	16	3	2	2	4	50	3	4	3	5	47	3	9	1	7	62
3	5	1	3	17	3	2	2	6	53	3	5	3	7	28	3	10	1	6	62
3	5	1	5	18	3	2	2	6	56	3	5	3	5	29	3	9	1	9	63
3	5	1	7	19	3	2	2	6	59	3	5	3	5	30	3	10	1	8	63
3	5	1	6	20	3	3	2	10	28	3	5	3	7	34	3	9	1	7	64
3	5	1	4	21	3	3	2	4	31	3	5	3	5	35	3	10	1	7	64
3	5	1	6	22	3	3	2	6	34	3	5	3	5	36	3	9	1	14	65
3	5	1	8	23	3	3	2	8	37	3	5	3	10	40	3	10	1	11	65
3	5	1	6	24	3	3	2	6	48	3	5	3	8	41	3	9	1	8	66
3	5	1	6	25	3	3	2	5	50	3	5	3	8	42	3	10	1	4	66
3	5	1	10	26	3	3	2	8	53	3	5	3	4	43	3	9	1	7	67
3	5	1	7	27	3	3	2	4	56	3	5	3	5	44	3	10	1	6	67
3	5	1	7	31	3	3	2	8	59	3	5	3	5	45	3	9	1	10	68
3	5	1	7	32	3	4	2	10	29	3	5	3	8	46	3	10	1	9	68

A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
3	10	1	5	69	1	5	1	8	53	1	3	2	9	86	1	5	3	8	75
3	9	1	7	70	1	5	1	10	56	1	4	2	9	58	1	5	3	5	76
3	10	1	6	70	1	5	1	5	43	1	4	2	9	55	1	5	3	10	77
3	9	1	8	71	1	5	1	7	54	1	4	2	10	59	1	5	3	5	78
3	10	1	5	71	1	5	1	8	59	1	4	2	17	66	1	5	3	6	79
3	9	1	5	72	1	5	1	7	60	1	4	2	10	60	1	6	3	10	58
3	10	1	2	72	1	5	1	8	64	1	4	2	9	62	1	6	3	12	55
1	1	1	10	40	1	5	1	10	65	1	4	2	5	63	1	6	3	7	63
1	1	1	7	41	1	5	1	10	66	1	4	2	10	65	1	6	3	11	68
1	1	1	6	27	1	5	1	10	80	1	4	2	6	76	1	6	3	9	69
1	1	1	12	29	1	5	1	9	81	1	4	2	5	78	1	6	3	10	71
1	1	1	10	44	1	5	1	6	82	1	4	2	5	79	1	6	3	5	72
1	1	1	10	50	1	5	1	10	83	1	4	2	5	81	1	6	3	10	74
1	2	1	12	40	1	5	1	10	84	1	4	2	6	82	1	6	3	11	76
1	2	1	2	41	1	5	1	8	86	1	4	2	8	84	1	6	3	7	78
1	2	1	10	27	1	5	1	6	87	1	4	2	6	87	1	6	3	10	79
1	2	1	10	29	1	5	1	6	88	1	4	2	10	88	1	7	2	13	89
1	2	1	10	44	1	6	1	11	45	1	6	2	10	47	1	8	2	7	89
1	2	1	11	50	1	6	1	9	46	1	6	2	11	48	1	7	2	10	90
1	3	1	10	40	1	6	1	15	51	1	6	2	15	49	1	8	2	9	90
1	3	1	13	41	1	6	1	7	52	1	6	2	10	43	1	7	2	14	91
1	3	1	10	27	1	6	1	5	56	1	6	2	10	61	1	8	2	13	91
1	3	1	10	29	1	6	1	6	54	1	6	2	10	59	1	7	2	15	92
1	3	1	10	44	1	6	1	9	60	1	1	3	10	67	1	8	2	8	92
1	3	1	11	50	1	6	1	8	65	1	1	3	14	70	1	7	2	10	93
1	4	1	10	28	1	6	1	8	66	1	1	3	10	73	1	8	2	9	93
1	4	1	8	42	1	6	1	10	81	1	2	3	12	67	1	7	2	11	94
1	4	1	5	45	1	6	1	10	82	1	2	3	12	70	1	8	2	10	94
1	4	1	10	46	1	6	1	9	84	1	2	3	9	73	1	7	2	11	96
1	4	1	6	47	1	6	1	8	87	1	3	3	20	67	1	8	2	10	96
1	4	1	9	48	1	6	1	6	88	1	3	3	11	70	1	7	2	8	97
1	4	1	5	49	1	1	2	18	57	1	3	3	10	73	1	8	2	9	97
1	4	1	5	51	1	1	2	9	64	1	4	3	8	68	1	7	2	11	98
1	4	1	7	52	1	1	2	15	75	1	4	3	10	69	1	8	2	9	98
1	4	1	5	56	1	1	2	13	77	1	4	3	7	71	1	9	1	11	89
1	4	1	10	43	1	2	2	13	57	1	4	3	7	72	1	10	1	7	89
1	4	1	13	54	1	2	2	10	64	1	4	3	10	74	1	9	1	11	90
1	5	1	9	40	1	2	2	16	53	1	5	3	9	57	1	10	1	11	90
1	5	1	9	41	1	2	2	7	59	1	5	3	6	58	1	9	1	14	91
1	5	1	5	28	1	2	2	8	75	1	5	3	10	61	1	10	1	12	91
1	5	1	10	29	1	2	2	7	77	1	5	3	10	55	1	9	1	10	92
1	5	1	5	42	1	2	2	9	80	1	5	3	8	62	1	10	1	10	92
1	5	1	10	44	1	2	2	8	83	1	5	3	10	67	1	9	1	12	93
1	5	1	5	45	1	2	2	9	86	1	5	3	10	63	1	10	1	10	93
1	5	1	5	46	1	3	2	11	57	1	5	3	7	68	1	9	1	12	94
1	5	1	7	47	1	3	2	8	64	1	5	3	8	69	1	10	1	8	94
1	5	1	6	48	1	3	2	10	61	1	5	3	7	70	1	9	1	12	96
1	5	1	10	49	1	3	2	10	75	1	5	3	6	71	1	10	1	8	96
1	5	1	7	50	1	3	2	10	77	1	5	3	5	72	1	10	1	8	97
1	5	1	8	51	1	3	2	8	80	1	5	3	10	73	1	9	1	14	98
1	5	1	6	52	1	3	2	8	83	1	5	3	5	74	1	10	1	10	98

FINISH

Appendix 5.4.- SPSSX instructions.

```
TITLE DURATION
DATA LIST / SUB 1 SP 2-3 VOWEL 4-5 DURATION 6-8 FIL 9-11
BREAKDOWN VARIABLES=DURATION SUB(1,3) SP(1,10) VOWEL(1,3)
TABLES=DURATION BY SUB BY SP BY VOWEL
STATISTICS 1,2
OPTIONS 4

MANOVA DURATION BY SUB(1,3) SP(1,10) VOWEL(1,3)
/PRINT=CELLINFOMEANS
/PRINT=HOMOGENEITY


ANOVA DURATION BY SP(1,10) VOWEL(1,3)
STATISTICS 2,3
OPTIONS 10,11
```

Appendix 5.5.- Formant data.
Formant frequency measurements of vowels.

A=SUBJECT
B=SP
C=VOWEL
D=FILE NUMBER

A	B	C	D	F1	F2	F3
1	5	1	110	456.8	1571.4	2076.3
1	6	2	110	682.0	1994.3	2475.0
1	4	1	120	974.6	1557.8	2503.7
1	1	1	130	669.2	1556.6	2476.8
1	5	1	130	1650.8	1675.0	2383.3
1	5	1	140	883.4	1805.3	2262.0
1	6	2	140	409.4	2037.2	2739.8
1	2	1	160	993.4	1553.6	2622.0
1	3	1	160	1131.0	1550.5	2525.7
1	4	1	170	445.8	1023.4	2362.3
1	5	1	180	654.3	1678.8	2242.3
1	6	1	180	874.6	1759.8	2301.2
1	2	1	190	799.0	1414.7	2347.0
1	3	1	190	1110.4	1661.4	2562.0
1	4	1	210	898.3	1479.0	2382.8
1	1	1	220	640.0	1488.0	2360.7
1	5	1	220	630.0	1410.0	2401.0
1	5	1	230	785.0	1565.2	2583.7
1	6	2	230	424.7	1865.0	2525.5
1	4	1	240	582.0	1577.5	2326.6
1	1	1	250	460.3	1607.0	2474.7
1	5	1	250	914.0	1621.0	1848.8
1	5	1	260	843.5	1722.0	2511.2
1	6	1	260	695.8	1508.7	2565.8
1	4	1	270	644.0	1006.3	1536.6
1	1	2	280	469.7	1905.8	2506.3
1	5	3	280	521.2	1125.3	2388.8
1	5	3	290	966.0	1931.0	2752.0
1	6	3	290	442.8	1174.7	2255.3
1	4	2	300	467.4	1896.0	2452.2
1	2	2	310	362.0	1881.0	2549.0
1	3	2	310	377.2	1834.0	2537.5
1	4	2	320	460.2	1950.3	2469.3
1	5	1	600	889.6	1568.0	2259.7
1	6	1	600	817.2	1545.0	2536.7
1	2	2	610	353.7	1954.8	2554.3
1	3	2	610	345.0	1557.2	2609.4
1	4	2	620	454.0	1744.0	2574.0
1	5	3	630	316.0	1380.0	2455.4
1	6	3	630	384.3	1286.3	2217.0
1	2	2	640	573.5	1983.1	2618.8
1	3	2	640	626.6	1936.7	2662.5
1	4	2	650	460.7	1730.8	2636.0
1	5	1	660	1027.8	1705.0	2708.0
1	6	1	660	771.0	1829.0	2503.8
1	2	3	670	422.0	1103.7	2624.3
1	3	3	670	404.2	1168.0	2490.8
1	4	3	680	360.3	1172.0	2647.3
1	5	3	690	479.0	1151.0	2342.6

A	B	C	D	F1	F2	F3
1	4	1	110	555.7	1473.2	2322.7
1	5	1	120	702.0	1540.4	2508.3
1	6	1	120	570.6	1520.4	2383.6
1	2	1	130	827.0	1542.5	2533.0
1	3	1	130	531.3	1528.2	2458.5
1	4	1	140	552.2	1568.6	2535.0
1	1	1	160	935.5	1342.5	2868.0
1	5	1	160	911.4	1573.0	2418.7
1	5	1	170	812.2	1660.0	2201.4
1	6	1	170	806.4	1545.3	2397.5
1	4	1	180	526.0	1451.1	2912.7
1	1	1	190	1069.7	1422.5	2497.3
1	5	1	190	828.1	1512.0	2235.0
1	5	1	210	876.7	1670.0	2587.0
1	6	2	210	402.8	2027.0	2795.3
1	2	1	220	354.0	1182.3	2383.0
1	3	1	220	668.5	1520.0	2438.0
1	4	1	230	475.0	1349.3	2610.3
1	5	1	240	634.7	1437.6	2499.5
1	6	1	240	817.7	1641.8	2360.3
1	2	1	250	1458.0	2605.0	0.0
1	3	1	250	1095.7	1988.5	2579.4
1	4	1	260	481.7	1475.8	2542.0
1	5	1	270	680.5	1726.6	2502.0
1	6	1	270	549.3	1634.7	2486.8
1	2	2	280	429.2	2078.3	2525.8
1	3	2	280	388.0	2070.0	2724.3
1	4	2	290	469.0	1910.3	2483.3
1	5	3	300	471.0	1260.5	2407.0
1	6	3	300	456.5	1305.5	2176.5
1	5	1	310	816.0	1537.5	2384.8
1	5	1	320	972.0	1541.0	2626.0
1	6	2	320	439.8	1801.2	2514.0
1	4	2	600	462.3	1810.5	2770.0
1	1	4	610	666.8	2144.0	2682.3
1	5	3	610	473.8	1068.7	2273.0
1	5	3	620	465.6	1256.2	2345.8
1	6	2	620	369.2	1939.0	2411.8
1	4	2	630	472.8	1812.8	2509.6
1	1	2	640	336.2	1137.0	2798.0
1	5	1	640	777.7	1661.0	2296.6
1	5	1	650	951.2	1681.3	2613.1
1	6	1	650	844.0	1634.0	2499.3
1	4	2	660	500.2	1906.5	2592.6
1	1	3	670	481.2	1084.0	2300.0
1	5	3	670	470.0	1149.0	2396.0
1	5	3	680	464.3	1240.9	2342.5
1	6	3	680	401.8	904.5	2346.2
1	4	3	690	544.2	1233.3	2233.3

A	B	C	D	F1	F2	F3	A	B	C	D	F1	F2	F3
1	6	3	690	438.2	1066.0	2479.2	1	1	3	700	543.2	1822.3	2518.0
1	2	3	700	480.7	1960.3	2457.0	1	5	3	700	514.0	1116.8	2362.7
1	3	3	700	512.3	1932.3	2328.6	1	5	3	710	611.0	1334.8	2363.5
1	4	3	710	503.2	1094.3	2255.8	1	6	3	710	1022.2	2128.0	2797.7
1	5	3	720	462.7	1099.0	2260.0	1	4	3	720	1137.5	1761.8	2438.8
1	6	3	720	892.0	1879.2	2672.9	1	1	3	730	415.6	1043.4	2358.5
1	2	3	730	372.2	1093.8	2560.7	1	5	3	730	567.2	1032.7	2383.7
1	3	3	730	424.0	1130.5	2331.6	1	5	3	740	606.0	1202.2	2309.4
1	4	3	740	1239.3	1269.8	2540.8	1	6	3	740	602.2	1176.4	2247.3
1	1	2	750	408.7	2060.0	2635.3	1	2	2	750	461.0	1879.4	2583.0
1	5	3	750	499.5	1096.3	2243.7	1	3	2	750	382.2	1880.0	2577.7
1	5	3	760	510.0	1131.8	2293.8	1	4	2	760	442.3	1728.5	2325.8
1	6	3	760	397.4	1048.7	2575.8	1	1	2	770	457.0	1992.5	2671.3
1	2	2	770	395.0	1853.6	2476.0	1	5	3	770	515.0	1138.4	2213.0
1	3	2	770	391.0	1840.7	2664.7	1	5	3	780	458.6	1127.4	2404.4
1	4	2	780	406.4	1445.2	2332.4	1	6	3	780	423.5	1171.7	2521.0
1	5	3	790	452.5	1109.3	2211.0	1	4	2	790	437.5	1868.3	2593.0
1	6	3	790	476.7	1148.6	2488.0	1	1	5	800	387.4	998.7	2132.0
1	2	2	800	439.2	1785.8	2379.3	1	5	1	800	631.0	1579.8	2600.0
1	3	2	800	394.0	1955.8	2465.8	1	5	1	810	576.2	1589.0	2559.3
1	4	2	810	411.8	1652.5	2410.0	1	6	1	810	937.0	1549.2	2721.3
1	5	1	820	577.7	1654.3	2463.3	1	4	2	820	634.3	1656.3	2523.5
1	6	1	820	769.2	1517.0	2514.2	1	1	3	830	466.2	923.0	2455.0
1	2	2	830	408.2	1821.4	2502.5	1	5	1	830	641.5	1549.5	2470.0
1	3	2	830	391.0	1783.8	2467.0	1	5	1	840	607.0	1335.7	2468.9
1	4	2	840	403.0	1630.0	2475.7	1	6	1	840	459.0	1436.2	2500.9
1	5	1	870	643.7	1591.0	2373.6	1	4	2	870	396.0	1688.0	2345.3
1	6	1	870	496.7	1635.0	2696.3	1	5	1	880	522.7	1797.3	0.0
1	4	2	880	401.0	1782.0	2473.9	1	6	1	880	776.3	1646.3	2549.0
1	7	2	890	344.6	1400.3	2641.7	1	8	2	890	409.0	1969.4	2647.0
1	7	1	890	783.7	1555.8	2264.0	1	8	1	890	691.7	1636.7	2483.4
1	8	2	900	386.0	1918.8	2489.6	1	7	1	900	835.0	1518.8	2713.3
1	8	1	900	719.0	1576.0	2827.0	1	7	2	910	385.2	1942.4	2643.0
1	8	2	910	405.2	1952.2	2617.8	1	7	1	910	960.0	1608.7	2618.6
1	8	1	910	665.9	1619.6	2462.0	1	7	2	920	368.5	2125.0	2614.3
1	8	2	920	349.5	1989.8	2683.0	1	7	1	920	854.0	1606.3	2381.5
1	8	1	920	688.2	1644.2	2487.8	1	7	2	930	291.5	1928.0	2563.4
1	8	2	930	337.5	1804.0	2549.0	1	7	1	930	1539.5	1538.0	2678.5
1	8	1	930	499.0	1465.8	2418.4	1	7	2	940	504.2	1968.3	2574.0
1	8	2	940	383.7	1874.3	2499.8	1	7	1	940	692.5	1572.3	2398.1
1	8	1	940	824.5	1583.0	2495.6	1	7	2	960	320.9	1073.3	2814.8
1	8	2	960	336.8	2045.5	2559.5	1	7	1	960	565.4	1605.2	2355.8
1	8	1	960	622.2	1603.8	2280.6	1	7	2	970	623.0	1538.5	2394.0
1	8	2	970	389.0	1876.0	2538.5	1	8	1	970	522.0	1579.0	2506.3
1	7	2	980	728.6	1989.1	2754.2	1	8	2	980	305.0	1926.0	2547.7
1	7	1	980	993.8	1573.9	2639.4	1	8	1	980	801.1	1441.8	2543.1
2	5	1	110	677.8	1494.8	2496.7	2	3	1	110	556.0	1473.6	2068.0
2	5	1	120	717.7	1523.3	2535.7	2	4	1	120	623.3	1204.3	2067.5
2	6	2	120	371.0	1713.6	2554.3	2	5	1	130	670.2	1486.4	2528.1
2	4	1	130	666.9	1449.0	2401.0	2	6	1	130	482.4	1395.6	2433.7
2	1	1	140	620.3	1476.6	2420.3	2	2	1	140	634.7	1464.0	2577.5
2	5	1	150	727.6	1526.6	2419.0	2	3	1	150	596.5	1490.4	2485.3
2	5	1	160	786.7	1580.5	2457.0	2	4	1	160	667.7	1508.2	2092.9
2	6	2	160	436.0	1813.0	2553.0	2	5	1	170	724.0	1600.7	2424.0
2	4	1	170	752.8	1446.6	2425.2	2	6	2	170	563.3	1703.4	2382.7
2	1	1	180	683.0	1358.5	2320.1	2	2	1	180	722.7	1438.5	2721.1
2	5	1	190	688.6	1516.0	2337.8	2	3	1	190	714.7	1364.3	2553.9

A	B	C	D	F1	F2	F3	A	B	C	D	F1	F2	F3
2	5	1	200	648.0	1592.1	1954.7	2	4	1	200	674.4	1334.0	2410.3
2	6	1	200	570.7	1501.0	2400.0	2	5	1	210	691.4	1558.3	2372.5
2	4	1	210	687.8	1349.3	2367.8	2	6	1	210	671.0	1644.6	2591.0
2	1	1	220	739.2	1468.5	2693.7	2	2	1	220	786.7	1418.4	2519.9
2	5	1	230	733.0	1532.7	2431.0	2	3	1	230	668.0	1428.0	2402.3
2	5	1	240	730.0	1563.0	2304.0	2	4	1	240	665.7	1460.0	2344.7
2	6	2	240	502.0	1912.8	2558.2	2	5	1	250	710.2	1568.0	2295.0
2	4	1	250	837.0	1442.4	2407.4	2	6	2	250	275.0	1487.0	2338.8
2	1	1	260	760.2	1445.6	2723.8	2	2	1	260	795.2	1480.3	2574.3
2	5	1	270	691.0	1417.6	2421.7	2	3	1	270	648.7	1465.7	2515.3
2	5	1	280	721.3	1473.5	2350.8	2	4	1	280	444.0	1404.2	2550.4
2	6	2	280	511.2	1819.0	2427.3	2	5	1	290	692.6	1433.0	2504.4
2	4	1	290	684.4	1403.5	2368.8	2	6	1	290	647.0	1524.0	2528.8
2	1	1	300	724.2	1524.2	2469.3	2	2	1	300	594.6	1532.3	2645.7
2	5	1	310	690.8	1496.0	2217.0	2	3	1	310	762.3	1485.6	2524.2
2	5	1	320	756.4	1668.3	2484.4	2	4	1	320	539.8	1385.6	2542.4
2	6	1	320	0.0	0.0	0.0	2	5	1	330	691.4	1593.0	2329.8
2	4	1	330	732.0	1420.7	2413.6	2	6	1	330	773.0	1525.4	2621.7
2	1	2	340	499.5	2161.3	2514.7	2	2	2	340	392.1	1995.5	2492.5
2	5	3	350	628.3	1396.4	2431.3	2	3	2	350	397.6	1980.3	2471.5
2	5	3	360	655.0	1027.8	2228.4	2	4	2	360	463.5	1730.0	2276.1
2	6	3	360	692.0	1601.3	2458.6	2	5	3	370	510.7	1082.1	2163.0
2	4	2	370	462.5	1832.2	2405.5	2	6	3	370	759.4	1578.8	2651.0
2	2	2	380	520.0	1980.5	2656.1	2	5	1	380	674.0	1442.3	2315.8
2	3	2	380	643.5	1829.7	2509.0	2	5	1	390	755.5	1432.5	2349.3
2	4	2	390	440.3	1944.7	2483.5	2	6	2	390	372.5	1780.5	2596.1
2	5	1	400	671.2	1436.7	2276.0	2	4	2	400	433.8	2045.0	2599.0
2	3	1	400	666.7	1543.3	2499.3	2	2	2	410	554.3	1729.5	2748.8
2	5	3	410	477.0	1044.8	2176.7	2	3	2	410	394.7	1906.5	2725.1
2	5	3	420	462.2	1234.5	2199.6	2	4	2	420	429.5	1714.7	2554.3
2	6	2	420	442.2	1637.7	2471.5	2	5	3	430	425.0	1251.7	2130.5
2	4	2	430	537.3	1799.3	2605.3	2	6	3	430	326.3	1478.0	2271.0
2	1	2	440	0.0	2125.3	2784.5	2	2	2	440	384.5	2040.3	2673.0
2	5	1	450	739.7	1581.5	2315.5	2	3	2	450	382.7	2073.2	2619.3
2	5	1	460	788.0	1656.6	2264.2	2	4	2	460	364.4	1933.5	2725.3
2	6	1	460	594.2	1734.3	2424.4	2	5	1	470	715.7	1632.8	2344.0
2	4	2	470	564.9	1997.1	2391.4	2	6	1	470	733.7	1713.2	2599.2
2	1	3	480	514.7	1136.5	2184.5	2	2	3	480	422.7	1290.4	2225.2
2	5	3	490	468.5	1137.3	2144.7	2	3	3	490	453.0	1252.5	2223.5
2	5	3	500	502.7	1130.5	2107.7	2	4	3	500	657.0	1273.8	2678.7
2	6	3	500	470.1	1746.5	2603.5	2	5	3	510	459.7	1348.9	2105.7
2	4	3	510	658.5	1114.3	2088.3	2	6	3	510	380.5	1284.0	2450.8
2	1	3	520	524.2	1446.2	2377.9	2	2	3	520	446.0	988.0	1791.6
2	5	3	530	566.0	1104.4	2321.3	2	3	3	530	433.0	1066.7	1687.3
2	5	3	540	702.0	1271.0	2299.3	2	4	3	540	606.2	991.7	1870.7
2	6	3	540	410.5	1146.0	2411.0	2	5	3	550	420.5	1135.0	2142.2
2	4	3	550	695.0	1081.0	2286.3	2	6	3	550	399.6	1293.5	2415.5
2	1	3	560	669.7	1143.4	2093.4	2	2	3	560	591.3	1183.9	1953.3
2	5	3	570	537.3	951.0	2261.8	2	3	3	570	653.0	1427.4	2792.5
2	5	3	580	489.6	1335.3	2179.0	2	4	3	580	376.2	1069.8	2386.8
2	6	3	580	518.7	1219.7	2299.7	2	1	2	590	554.0	2188.8	2643.6
2	2	2	590	559.2	1775.5	2685.0	2	5	3	600	572.2	1084.8	2193.8
2	3	2	600	345.7	1761.4	2575.0	2	5	3	630	742.0	1118.9	2455.9
2	3	2	630	340.0	1741.3	2621.0	2	5	3	640	801.4	2193.2	2326.5
2	4	2	640	633.5	1747.2	2661.0	2	6	3	640	422.7	1174.3	2556.8
2	5	3	650	488.3	1288.6	2433.2	2	4	2	650	684.3	1956.7	2684.5
2	6	3	650	436.8	381.4	2676.8	2	1	5	670	239.7	857.0	2220.5

A	B	C	D	F1	F2	F3	A	B	C	D	F1	F2	F3
2	2	2	670	251.3	1743.3	2578.3	2	5	1	680	618.6	1556.2	2340.0
2	3	2	680	372.5	1656.8	2422.2	2	5	1	690	612.0	1601.3	2320.2
2	4	2	690	347.3	1610.6	1925.8	2	6	1	690	511.0	1459.0	2500.0
2	5	1	700	540.7	1559.8	2331.5	2	4	2	700	509.7	1678.8	2524.0
2	6	1	700	620.5	1346.4	2560.0	2	1	3	710	466.5	786.0	2293.6
2	2	2	710	466.0	885.7	2288.8	2	5	1	720	784.2	1390.8	2361.0
2	3	2	720	388.0	1643.3	2424.8	2	5	1	730	673.0	1431.5	2366.0
2	4	2	730	447.5	1640.3	2253.5	2	6	1	730	525.0	1496.7	2514.5
2	5	1	740	750.4	1257.2	2388.8	2	4	2	740	462.2	1626.5	2554.3
2	6	1	740	524.2	1564.0	2502.6	2	1	5	750	264.9	1087.1	2125.3
2	2	2	750	312.3	1011.2	2095.3	2	5	1	760	687.2	1557.0	2345.5
2	3	2	760	425.9	1689.9	2561.7	2	5	1	770	698.0	1635.5	2352.7
2	4	2	770	437.4	1565.6	2409.4	2	6	1	770	622.1	1853.4	2699.0
2	5	1	780	668.0	1643.3	2492.2	2	4	2	780	454.3	1753.0	2612.2
2	6	1	780	714.6	1512.3	2551.3	2	7	1	800	685.4	1492.5	2517.2
2	8	1	800	740.2	1612.2	2517.0	2	7	1	820	660.5	1374.3	2657.0
2	8	1	820	681.5	1392.7	2672.7	2	7	2	830	357.0	2093.8	2589.5
2	8	2	830	350.6	1808.3	2616.5	2	7	1	840	720.6	1497.3	2569.4
2	8	1	840	562.6	1575.1	2605.3	2	7	2	850	388.7	2088.1	2575.7
2	8	2	850	380.5	2114.0	2572.7	2	7	1	860	709.5	1424.7	2362.0
2	8	1	860	698.0	1590.7	2441.0	2	7	1	870	686.8	1428.0	2446.0
2	8	1	870	679.2	1378.3	2602.3	2	7	1	900	694.0	1422.0	2508.5
2	8	1	900	594.7	1478.0	2454.3	2	7	1	910	709.3	1525.0	2334.0
2	8	1	910	782.0	1617.7	2449.3	2	7	2	920	493.5	2096.8	2752.8
2	8	2	920	762.1	1967.2	2890.3	2	7	1	930	663.2	1586.4	2377.7
2	8	1	930	780.0	1634.0	2518.8	2	7	2	940	384.4	2008.3	2578.3
2	8	2	940	366.0	1951.5	2706.7	2	7	1	950	714.6	1448.4	2308.8
2	8	1	950	731.7	1381.8	2365.8	2	7	1	970	675.5	1528.0	2440.0
2	8	1	970	706.4	1586.0	2585.0	2	7	2	980	482.8	1991.8	2722.0
2	8	2	980	292.4	1765.5	2637.1	2	7	1	990	671.4	1470.1	2600.1
3	1	1	100	574.5	1454.7	2343.7	3	2	1	100	557.5	1465.5	2243.3
3	5	1	100	526.8	1404.5	2494.8	3	3	1	100	543.0	1459.0	2276.3
3	5	1	110	557.5	1394.5	2513.5	3	4	1	110	535.0	1404.0	2343.0
3	6	2	110	396.5	1481.0	2293.0	3	5	1	120	594.0	1414.3	2482.7
3	4	1	120	538.5	1394.5	2297.0	3	6	1	120	389.0	1320.3	2140.3
3	1	1	130	745.3	1463.7	2284.5	3	2	1	130	539.7	1460.8	2466.0
3	5	1	130	860.0	1421.0	2400.5	3	3	1	130	494.5	1370.8	2447.0
3	5	1	140	876.5	1526.0	2491.0	3	4	1	140	599.7	1442.8	2103.3
3	6	2	140	705.5	1955.0	2577.3	3	5	1	150	834.7	1665.0	2288.0
3	4	1	150	797.0	1396.5	2616.0	3	6	2	150	407.3	1690.0	2319.5
3	1	1	160	704.6	1424.3	2082.5	3	2	1	160	687.0	1403.8	2756.5
3	5	1	160	666.7	1404.5	2550.8	3	3	1	160	625.4	1334.0	2005.0
3	5	1	170	643.7	1406.0	2494.0	3	4	1	170	763.0	1387.3	2353.0
3	6	1	170	334.0	1465.5	2232.5	3	5	1	180	788.0	1454.0	2534.3
3	4	1	180	779.3	1280.7	2558.0	3	6	1	180	550.5	1526.0	2357.3
3	1	1	190	580.3	1402.0	2185.3	3	2	1	190	649.8	1409.6	2337.7
3	5	1	190	610.2	1465.3	2427.0	3	3	1	190	513.0	1333.0	2243.1
3	5	1	200	696.0	1441.5	2580.8	3	4	1	200	554.2	1401.0	2366.0
3	6	2	200	1734.7	1746.0	2353.6	3	5	1	210	706.2	1526.8	2488.0
3	4	1	210	827.3	1363.8	2350.5	3	6	2	210	369.0	1309.7	2286.5
3	1	1	220	548.7	1380.0	2522.7	3	2	1	220	511.2	1405.7	2496.4
3	5	1	220	510.5	1374.8	2494.8	3	3	1	220	510.7	1474.3	2365.3
3	5	1	230	563.7	1401.0	2454.7	3	4	1	230	476.2	1454.1	2465.2
3	6	2	230	326.7	1718.3	2477.0	3	5	1	240	545.0	1323.5	2367.3
3	4	1	240	493.9	1397.7	2500.6	3	6	1	240	465.7	1521.1	2304.3
3	1	1	250	493.6	1434.5	2438.3	3	2	1	250	609.0	1393.3	2433.5
3	5	1	250	725.0	1458.3	2305.0	3	3	1	250	529.0	1467.6	2497.6

A	B	C	D	F1	F2	F3	A	B	C	D	F1	F2	F3
3	5	1	260	780.9	1545.6	2454.9	3	4	1	260	474.8	1446.5	2552.4
3	6	1	260	573.0	1426.9	2581.6	3	5	1	270	676.9	1486.4	2403.9
3	4	1	270	577.9	1422.8	2679.1	3	6	1	270	458.2	1486.8	2364.8
3	1	2	280	439.4	1593.3	2398.7	3	2	2	280	394.6	1873.0	2360.1
3	5	3	280	444.0	1068.2	2025.0	3	3	2	280	468.4	1863.5	2384.0
3	5	3	290	697.6	1086.3	2493.0	3	4	2	290	465.8	1751.8	2312.3
3	5	3	300	470.5	1085.0	2512.4	3	4	2	300	506.0	1654.6	2258.0
3	6	3	300	532.2	1326.0	2252.8	3	2	2	310	461.3	1665.0	2555.8
3	5	1	310	563.0	1405.3	2561.5	3	3	2	310	409.5	1739.0	2474.3
3	5	1	320	683.0	1404.8	2582.0	3	4	2	320	435.5	1724.7	2451.5
3	6	2	320	431.0	1687.6	2489.6	3	5	1	330	643.6	1405.5	2504.3
3	4	2	330	440.2	1798.4	2622.4	3	6	1	330	478.4	1461.1	2518.4
3	2	2	340	391.0	1663.9	2442.0	3	5	3	340	408.4	1114.0	2393.0
3	3	2	340	425.0	1519.3	2520.5	3	5	3	350	359.0	1223.6	2449.8
3	4	2	350	413.6	1653.0	2482.3	3	6	2	350	341.8	1638.8	2503.6
3	5	3	360	465.8	1018.5	2382.0	3	4	2	360	537.4	1540.9	2532.0
3	6	3	360	308.8	1346.6	2412.3	3	1	2	370	394.9	1899.3	2473.9
3	2	2	370	392.7	1726.9	2630.5	3	5	1	370	710.4	1514.6	2470.0
3	3	2	370	392.0	1917.6	2533.7	3	5	1	380	634.0	1555.9	2426.7
3	4	2	380	393.7	1695.3	2506.3	3	6	1	380	406.3	1591.3	2473.8
3	5	1	390	608.3	1548.9	2341.1	3	4	2	390	517.6	1623.4	2417.4
3	6	1	390	436.0	1548.5	2346.0	3	1	3	400	474.8	1015.0	1997.6
3	2	3	400	453.5	1125.7	2192.5	3	5	3	400	463.4	1087.0	2487.6
3	3	3	400	419.9	1127.8	2354.8	3	5	3	410	394.0	1144.5	2420.7
3	4	3	410	447.7	1147.5	2245.2	3	6	3	410	631.0	1336.1	2123.4
3	5	3	420	404.2	1010.0	2348.5	3	4	3	420	517.1	1176.1	2444.0
3	6	3	420	763.0	1366.8	1756.0	3	1	3	430	470.0	1015.0	789.1
3	2	3	430	425.4	1017.0	2291.3	3	5	3	430	460.7	945.0	2567.8
3	3	3	430	447.0	1112.5	2518.8	3	5	3	440	455.5	1026.8	2630.8
3	4	3	440	484.3	956.6	2282.4	3	6	3	440	383.0	985.0	2177.6
3	5	3	450	515.4	1045.4	2569.4	3	4	3	450	510.7	1046.4	2426.4
3	6	3	450	511.5	1230.8	2247.0	3	1	3	460	401.0	1012.4	2429.0
3	2	3	460	441.4	1090.3	2198.6	3	5	3	460	563.6	1018.5	2416.8
3	3	3	460	396.7	1016.5	2486.5	3	5	3	470	482.4	1120.4	2461.3
3	4	3	470	369.8	1281.0	2584.4	3	3	3	470	433.5	1142.8	2250.8
3	1	2	480	508.0	1945.8	2496.0	3	2	2	480	406.2	1690.8	2464.7
3	5	3	480	418.0	947.6	2494.7	3	3	2	480	390.8	1429.3	2408.8
3	5	3	490	438.7	970.1	2343.1	3	4	2	490	364.4	1631.4	2321.5
3	6	3	490	473.8	954.2	2429.0	3	1	2	500	392.4	1929.5	2382.3
3	2	2	500	397.0	1703.0	2484.8	3	5	3	500	466.0	2488.7	2907.2
3	3	2	500	348.0	1651.8	2450.0	3	5	3	510	449.5	1010.3	2489.3
3	4	2	510	483.3	1659.8	2342.7	3	6	3	510	423.1	1147.6	2511.7
3	5	3	520	469.0	1023.8	2552.8	3	4	2	520	472.8	1588.0	2433.2
3	6	3	520	520.0	991.5	2687.2	3	1	5	530	315.0	857.6	2432.8
3	2	2	530	403.8	1522.0	2343.0	3	5	1	530	611.8	1433.2	2449.7
3	3	2	530	387.6	1610.1	2357.8	3	5	1	540	547.2	1433.2	2459.8
3	4	2	540	388.3	1565.8	2233.2	3	6	1	540	437.2	1477.6	2409.6
3	5	1	550	535.5	1436.2	2491.3	3	4	2	550	504.7	1482.1	2470.0
3	6	1	550	676.2	1353.8	2361.0	3	1	3	560	473.9	886.4	2554.8
3	2	2	560	440.2	1454.3	2449.5	3	5	1	560	537.9	1091.0	2436.9
3	3	2	560	363.7	1674.8	2360.3	3	5	1	570	559.6	1379.4	2494.9
3	4	2	570	436.8	1770.8	1883.4	3	6	1	570	451.7	1452.7	2506.2
3	5	1	580	586.0	1356.6	2383.7	3	4	2	580	464.3	1547.2	2526.7
3	6	1	580	583.0	1541.8	2260.4	3	1	5	590	316.6	897.7	2396.0
3	2	2	590	421.3	1461.8	2418.0	3	5	1	590	551.5	1463.8	2364.7
3	3	2	590	394.1	1527.3	2252.4	3	5	1	600	535.7	1463.0	2218.3
3	4	2	600	395.5	1572.0	2304.8	3	6	1	600	709.8	1807.0	2640.0

A	B	C	D	F1	F2	F3
3	5	1	610	547.0	1467.3	2417.8
3	6	1	610	550.0	1436.5	2372.7
3	8	2	620	397.0	1725.0	2454.5
3	8	2	640	389.5	1700.0	2507.0
3	8	2	650	463.0	1731.9	2505.9
3	8	2	660	397.0	1602.6	2342.8
3	8	2	670	440.0	1565.0	2354.0
3	8	2	690	465.0	982.0	2578.7
3	8	2	700	463.4	1833.8	2366.6
3	8	2	710	417.0	1786.0	2495.9
3	8	2	720	417.8	1697.5	2385.2
3	8	1	800	516.2	1465.7	2232.8
3	8	1	820	472.5	1444.0	2398.3
3	8	1	830	557.4	1426.3	2333.9
3	8	1	840	510.0	1361.3	2294.5
3	8	1	850	456.2	1402.7	2329.8
3	8	1	860	467.3	1661.9	2391.0
3	8	1	870	380.7	1542.0	2360.3
3	8	1	880	547.0	1367.7	2347.0
3	8	1	890	476.0	1416.0	2511.2
3	8	1	900	570.0	1396.0	2297.5

A	B	C	D	F1	F2	F3
3	4	2	610	390.2	1555.8	2419.3
3	7	2	620	468.8	1807.0	2505.0
3	7	2	640	455.4	1697.7	2570.8
3	7	2	650	472.6	1941.2	2564.4
3	7	2	660	423.0	1758.2	2414.0
3	7	2	670	467.0	1697.0	2297.3
3	7	2	690	465.0	1691.9	2550.0
3	7	2	700	468.9	1892.0	2466.8
3	7	2	710	488.3	1410.7	2487.4
3	7	2	720	406.2	1828.2	2318.8
3	7	1	800	469.0	1458.6	2312.0
3	7	1	820	769.6	1481.4	2504.6
3	7	1	830	546.2	1407.8	2545.1
3	7	1	840	516.9	1297.0	2394.3
3	7	1	850	407.9	1298.9	2189.4
3	7	1	860	535.6	1504.8	2486.6
3	7	1	870	541.5	1342.0	2360.9
3	7	1	880	547.5	1438.0	2362.8
3	7	1	890	534.0	1244.8	2461.1
3	7	1	900	476.5	1453.8	2295.5

Appendix 5.6.- SPSS Instructions.

```
TITLE FORM.  FREQ
SET BLANKS=0
DATA LIST FILE=SPEECH/SUB 1-3 SP 4-6 VOWEL 7-9 FIL 10-14 F1 15-23
F2 24-30 F3 31-37
MISSING VALUES ALL (0)
DISCRIMINANT GROUPS=VOWELS (1,3)
VARIABLES F1 TO F3
ANALYSIS F1 TO F3
SAVE=CLASS=PREDVOWEL/
STATISTICS 1,2,4,6,7,10,12,13,14,15,16
OPTIONS 1

CROSSTABS  TABLES=VOWEL  BY  PREDVOWEL  BY  SP/VOWEL  BY  SP  BY
PREDVOWEL/
PREDVOWEL BYSP BY VOWEL
OPTIONS 14,15
STATISTICS 1,4,11

COMPUTE VOWPRED=0
IF (VOWEL EQ 1 AND PREDVOWEL EQ 1) VOWPRED=1
IF (VOWEL EQ 2 AND PREDVOWEL EQ 1) VOWPRED=2
IF (VOWEL EQ 3 AND PREDVOWEL EQ 1) VOWPRED=3
IF (VOWEL EQ 1 AND PREDVOWEL EQ 2) VOWPRED=4
IF (VOWEL EQ 1 AND PREDVOWEL EQ 3) VOWPRED=5
IF (VOWEL EQ 2 AND PREDVOWEL EQ 2) VOWPRED=6
IF (VOWEL EQ 2 AND PREDVOWEL EQ 3) VOWPRED=7
IF (VOWEL EQ 3 AND PREDVOWEL EQ 2) VOWPRED=8
IF (VOWEL EQ 3 AND PREDVOWEL EQ 3) VOWPRED=9
RECODE SP (1=1) (2 THRU 6=2) (7,9=3) (8,10=4)

BREAKDOWN VARIABLES=F1(LO,HI) F2(LO,HI) F3(LO,HI) VOWPRED(1,9) SP(1,4)
/CROSSBREAK=F1  BY  SP/  F1  BY  SP  BY  VOWPRED/F2  BY  SP/  F2  BY  SP  BY
VOWPRED/
F2 BY VOWPRED/ F1 BY VOWPRED

ONEWAY VOWPRED BY SP(1,4)
/RANGES=SNK
OPTIONS 6,10
```

```
STATISTICS=ALL
ONEWAY F2 BY VOWPRED(1,9)
RANGES=SNK
OPTIONS 6,10
STATISTICS ALL
ONEWAY F2 BY SP(1,4)
RANGES=SNK
ONEWAY F1 BY VOWPRED(1,9)
RANGES=SNK
OPTIONS 6,10
STATISTICS ALL
ONEWAY F1 BY SP(1,4)
OPTIONS 6,10
STATIOSTICS ALL

MANOVA FI TO F3 BY VOWPRED(1,9) SP(1,4) VOWEL(1,3)
/PRINT=CELLINFO(MEANS) SIGNIF(ALL)
/DISCRIM=ALL
/DESIGN=VOWPRED SP VOWEL, SP BY VOWEL,SP BY VOWPRED,
PREDVOWEL BY SP BY VOWEL
```

Bibliography

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List of abbreviations

BFUCh	Boletín de Filología de la Universidad de Chile
BR	Bilingual Review
CSIC	Consejo Superior de Investigaciones Científicas
HR	Hispanic Review
JASA	Journal of the Acoustical Society of America
JSHR	Journal of Speech and Hearing Research
LPLP	Language Problem and Language Planning
MOBRAL	Movimento Brasileiro de Alfabetização
MP	Modern Philology
NRFH	Nueva Revista de Filología Hispánica
PMLA	Publications of the Modern Language Association of America.
PUC	Pontifícia Universidade Católica
RFE	Revista de Filología Española
SIL	Studies in Linguistics
SL	Studia Linguistica
UCMM	Universidad Católica Madre y Maestra
UCV	Universidad Central de Venezuela

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