

Coarticulation in Two Fricative-Vowel Sequences of Latin American Spanish

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Coarticulation in two fricative-vowel sequences of Latin American Spanish



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1. BACKGROUND

Dialectal surveys of Latin American Spanish (Resnick 1975) describe three main pronunciations for *fu* and *fo* sequences: [f], velarized [x], bilabialized [ɸ].

/f/ velarization			/f/ bilabialization		
<i>fumar</i>	smoke	[f], [x]	<i>fumar</i>	smoke	[f], [ɸ]
<i>forma</i>	form	[f], [x]	<i>forma</i>	form	[f], [ɸ]
<i>falla</i>	failure	[f]*[x]	<i>falla</i>	failure	[f]*[ɸ]

While the velar realization has received phonetic and theoretical consideration (Lipski 1995, Mazzaro 2011), little is understood about the voiceless bilabial fricative [ɸ] in Spanish. This paper describes a three-part production study in order to uniformly account for the unfaithful velar and bilabial realizations.

Mazzaro (2011) does so by arguing that listeners misperceive a speaker's intended [fu] as [xu] (or [fo] as [xo]) and will, in subsequent speech, articulate [xu] instead. Coarticulatory accounts would argue that speakers retract the fricative from [f] to [x] or, in the case of bilabial [ɸ], assimilate lip-roundedness.

2. RESEARCH QUESTIONS and PREDICTIONS

- What are the phonetic characteristics of the allophones?
- Are the processes phonetically motivated?

If (mis)perception were the sole motivating factor, we expect discrete points of articulation in the [xu], [xo], [ɸu], and [ɸo] pronunciations, as opposed to a high degree of coarticulation under an assimilatory account.

3. PARTICIPANTS

Experimental (“exp”; assimilation)

Ch	Chile	40, 34	M, M	8th grade, 12th grade	custodians
Mex	Mexico	38, 35	F, M	6th grade, 3rd grade	performer, artisan

Control (“ctr”; no assimilation)

Ch	Chile	40, 28	F, F	technical, university	secretary, student
Mex	Mexico	31, 54	M, F	Master's, preparatory	coach, homemaker

4. METHODOLOGY

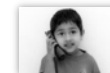
Three production experiments were recorded and analyzed in Praat.

a. Interview (n=10)

¿Cómo celebran Uds. los feriados y los días familiares importantes?

How do you (and your family) celebrate important family holidays?

c. Picture description (n=85)



teléfono ‘telephone’

b. Sentence reading (Chile only; n=200)

Nadar en los ríos profundos puede ser peligroso si uno no tiene cuidado.

Swimming in deep rivers can be dangerous if one is not careful.

5. RESULTS

1. Data

Total *n* fricatives × group

	Ch.		Mex.		Total
	Exp.	Ctr.	Exp.	Ctr.	
[f]	186	325	8	143	662
[ɸ]	157		49		206
[x]	208	211	64	106	589
Total	551	536	121	249	1457

[ɸ] *futura*



[f] *café*



[ɸ] *aforismo*



[f] *beneficios*



2. Center of gravity

(research question a)

Mean frequency
in frication

Ch.	Exp.		Ctr.
	/f/	/x/	
[f]	2801		4280
[ɸ]	802		
[x]	514	751	1149

Mex.	Exp.		Ctr.
	/f/	/x/	
[f]	2691		3409
[ɸ]	456		
[x]	213	556	1238

country insignificant:
F(1,4.88)=4.937; p=0.078

*group significant:
F(1,4.879)=24.933; p=0.004

3. Locus equation

(research question b)

↑ slope=↑ coarticulation

	/fu/	/fo/	/fi/	/fe/	/fa/
Ch. exp.	0.85	0.77	0.41	0.13	-0.40
Mex. exp.	0.96	0.93	-0.16	0.42	-0.07
Mean	0.90	0.85	0.13	0.27	-0.23
Ch. ctr.	0.77	0.83	0.15	-0.10	0.05
Mex. ctr.	0.63	0.56	0.37	0.20	0.16
Mean	0.70	0.70	0.26	0.05	0.10

*/u, o/, /i, e, a/ significant:
F(1, 69.706)=92.887; p<0.001

	[f]		[ɸ]		[x]		Total /f/	
	n	%	n	%	n	%	n	%
[a]	34	51	33	49	0	0	67	100
[e]	44	60	29	40	0	0	73	100
[i]	61	80	15	20	0	0	76	100
[o]	12	21	46	79	0	0	58	100
[u]	22	23	67	71	5	5	94	100

*/u, o/, /i, e/ significant:
F(4, 362)=16.247; p<0.001

6. CONCLUSIONS

a. What are the phonetic characteristics of the allophones?

Center of gravity measurements and visual cues identified three distinct /f/ allophones: [f], [x] and [ɸ]

b. Are the processes phonetically motivated?

Yes; locus equations show gestural coarticulation in /fu/ and /fo/ sequences, but not in /fi/, /fe/ and /fa/ sequences.