

The Intervocalic Voicing of /s/ in Ecuadorian Spanish

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1. Introduction

The occurrence of Ecuadorian /s/ voicing in intervocalic environments, e.g. the pronunciation of *comes helado* ‘you eat ice cream’ as [ko.me.ze.la.ðo], has gone largely unstudied. While previous research has drawn attention to the phenomenon (Canfield 1981, Lipski 1989, 1994, Robinson 1979, Toscano 1953), none has analyzed this case of dialectal variation in depth. The most thorough analysis is that of Robinson (1979), who argues that the voicing phenomenon categorically occurs before word boundaries in the Quito dialect, e.g. *es él* ‘it is him,’ as a remnant of the medieval /s/ and /z/ phonological contrast, but he claims that the voicing does not appear in any other intervocalic environments. This study provides the first quantitative analysis of that claim. In accordance with Robinson, this study also finds word boundaries to be the most significant predictor of intervocalic /s/ voicing, but the [s] - [z] distribution cannot be labeled as an exceptionless case of complementary distribution. Intervocalic /s/ voicing does not categorically occur at word boundaries in the Quito dialect, and the voiced variant appears in word-medial position as well, highlighting the inadequacy of any complementary distribution analysis espousing categorical application of the rule.

2. Literature Review

Ecuadorian intervocalic /s/ voicing has gone largely unstudied and has been the subject of only a handful of research endeavors (Canfield 1981, Lipski 1989, 1994, Robinson 1979, Toscano 1953). Most of these have treated the occurrence not from a variationist’s perspective, but rather from a dialectological standpoint, in which the phenomenon is briefly mentioned and dismissed. For example, Lipski (1994) writes that in Quito, “Syllable-final /s/ is retained as a sibilant, and when occurring word-finally before a vowel-initial word, voicing to [z] is routine, e.g. *los amigos* [lozamiyos] ‘the friends’ (248), but he provides no additional information.

Toscano’s 1953 study incorporates both dialectology and theory. He notes that intervocalic /s/ voicing occurs at the word boundary in the regions surrounding Quito and la Sierra, but certain mysterious cases of word-medial voicings have also been observed, particularly in Cuenca. He does not actually explain what causes the phenomenon, but briefly documents its occurrence:

La s final de palabra (aspirada en la Costa), cuando precede a una palabra que comienza por vocal, se pronuncia sonora en Quito y la Sierra (*loz hombres*, como en francés *les hommes*). En el Norte de la Sierra (Tulcán), como en el Sur de la Sierra colombiana, se pronuncia con s sorda, como es normal en español. La s intervocálica de palabras como *deshilar*, *deshierbar*, etc., se pronuncia en todo el país sorda, pero en casos aislados, numerosos sobre todo en Cuenca, se pronuncia sonora (79).

‘The final /s/ in a word (aspirated on the coast), when followed by a word that begins with a vowel, is voiced in Quito and la Sierra (*loz hombres* ‘the men,’ like *les hommes* in French). In the north of la Sierra (Tulcán), like in the south of the Columbian Sierra, /s/ is voiceless, which is standard in Spanish. The intervocalic /s/

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of words like *deshilar* ‘to unspin/unstring,’ *deshobar* ‘to weed,’ etc. are not voiced in the entire country, but in isolated cases are sonorous, most commonly in Cuenca.’

Although Toscano offers an extensive dialectological view of Ecuadorian speech in general, he leaves many questions, particularly the *porqués* of the intervocalic /s/ phenomenon, unanswered.

The most thorough in his analysis is Robinson (1979), who discusses the environmental conditions limiting the occurrence of the voiced variant, as well as a diachronic explanation for its historical evolution. He claims that there are three discrete dialects within Ecuador, each handling the /s/ voicing in a different way: the region surrounding Loja does not voice intervocalic /s/ in any environment, the Cuenca highlands voice intervocalic /s/ both word-finally and where a word-medial syllable boundary is perceived, and the area encompassing Quito, running from Imbabura to Riobamba, voices /s/ at word boundaries but not syllable boundaries, as shown below in Robinson’s original table.

Table 1: Distributions of [s] and [z]

ENVIRONMENT	DIALECT 1 (Medieval)	DIALECT 2 (Cuenca)	DIALECT 3 (Quito)	DIALECT 4 (Modern)
1. V__# hablas	[s]	[s]	[s]	[s]
2. #__V siete	[s]	[s]	[s]	[s]
3. C__ ansia	[s]	[s]	[s]	[s]
4. V__Cvl hasta	[s]	[s]	[s]	[s]
5. V__V passa casa	[s] [z]	[s] [s]	[s] [s]	[s] [s]
6. V__&V desayuno	[z]	[z]	[s]	[s]
7. V__V# es él	[z]	[z]	[z]	[s]
8. V__Cvd mismo	[z]	[z]	[z]	[z]

Table 1: Robinson’s table showing the distributions of the variants in four dialects (138).

Robinson argues that dialects in Ecuador have preserved the Medieval /s/ and /z/ contrast (seen in Dialect 1 of Table 1) that has been lost in the vast majority of the Spanish-speaking world, although [s] and [z] are no longer contrastive. The non-voiced pronunciation dominates Modern Spanish, as shown in Dialect 4; the voiced variant only occurs in environment eight. Navarro specifies in his *Manual de la Pronunciación Española* that

La *s* sonora aparece únicamente, en nuestra lengua, en posición final de sílaba, precediendo inmediatamente a otra consonante sonora; en cualquier otra posición su presencia es anormal y esporádica (1965: 108).

‘The sonorous *s* only appears in our language in the coda position of a syllable, immediately followed by another sonorous consonant; in any other position its presence is abnormal and sporadic.’

However, this generalization does not hold true for all Ecuadorian dialects: speakers from Quito and Cuenca voice /s/ in environments seven and eight (see Table 1), and Cuenqueños may even voice word-medially, as seen in environment six.

Thirty years have passed since Robinson's study, and this author began to question the present-day validity of his analysis after she conducted an interview with a 30-year-old native of Loja, Ecuador. According to Robinson's findings, this particular speaker should have exhibited no signs of intervocalic voicing, but he did voice /s/ both at word boundaries and, occasionally, word-medially. The Loja speaker, much like Robinson's participants in 1979, was entirely unaware of the non-contrastive voicing distinction, and it can therefore be inferred that any potential change has come from below the level of consciousness.¹ To Robinson's credit, he did note in his 1979 article the recent construction of a highway between Loja and the capital, which he believed may lead to accelerated linguistic change. Although it would be difficult to determine the origin of such a change with certainty, the construction of a highway and increased communication among speakers of the two dialects could have led to the emergence of the voiced variant in the speech of Loja natives.

This study does not seek to investigate the present-day status of all three dialects discussed in Robinson's 1979 study; rather it attempts to offer a glimpse of the current status of the Quiteño dialect and the factors influencing the usage of the voiced variant. The researcher hypothesizes that /s/ voicing in Quiteño Spanish does not occur as categorically at the word boundary as previous studies have suggested and that other, previously unnoticed factors may influence /s/ voicing as well.

3. Methods

The data used in this study come from the recorded archives of Quito radio station *Radio la luna*. In total, five interviews that took place between March and April of 2009 were chosen, all of which focused on local issues and events. The interviews, ranging from 30 minutes to one hour in duration, were analyzed with Praat software, and the spectrograms of all the tokens of /s/ realizations from selected sections were reviewed. No data were analyzed before the ten-minute mark of the recordings in the hopes of acquiring a slightly more informal speaking style.²

Initially, 210 tokens of /s/ in all environments were collected to identify any non-standard voicing phenomena in contexts other than intervocalic to better identify the possible environments for voicing. Any voiced /s/ occurring before a voiced nasal or lateral was excluded from analysis, e.g. *mizmo*, *Izrael*, as this constitutes standard voicing assimilation found in most dialects of Spanish. Of these 210 preliminary tokens, the voiced variant constitutes 20% of the total realizations and 38% of the realizations in an intervocalic context. Because the voiced variant only appeared in the standard environment and intervocalically, only occurrences of intervocalic /s/ were coded after 210 tokens.

	All Environments	Intervocalic Environments
Voiced Variant	20% (42/210)	38% (37/98)
Voiceless Variant	80% (168/210)	62% (61/98)
Chi Square = 11.045, Degrees of Freedom = 1, p < 0.0009		

Table 2: Distribution of the voiced and voiceless variant in all environments.

¹ A few days after the sociolinguistic interview, the interviewee's wife apprised him of the true aim of the interview: to study his intervocalic /s/ voicing. When she asked if he was aware of this voicing, he responded, "*Si me hubieras dicho eso, te hubiera dicho que estabas mintiendo*" ('If you had told me that, I would have said you were lying'), further illustrating the unconscious nature of the linguistic phenomenon.

² Although political radio interviews do not traditionally constitute a register of vernacular-based, informal speech, I operated under the assumption that the interviewees would be slightly more relaxed and therefore slightly less formal after ten minutes of conversation with the interviewer. If the phenomenon is, in fact, a change from below the level of consciousness, the level of formality will not have affected the speakers' production. However, if some speakers are aware of the voicing distinction, the first few minutes of the interview may be skewed towards what speakers view as the more socially accepted variant. More research needs to be conducted on speakers' psychological awareness of intervocalic voicing before a conclusion can be drawn on the issue.

Tokens were counted as [z] when a strong voice bar was present in the Praat program (See Figure 1 below), and those tokens with no strong voice bar, but rather noise dispersed throughout the window, were counted as [s]. In total, 404 tokens of intervocalic /s/ realizations were reviewed, resulting in 120 tokens of voiced [z] (30%) and 285 tokens of voiceless [s] (70%). These tokens were coded for the speaker, the gender of the speaker, the preceding vowel, the following vowel, the position of /s/ compared to word stress, word class, word frequency, and word boundary to determine whether factors other than word boundary contribute to the /s/ voicing phenomenon.

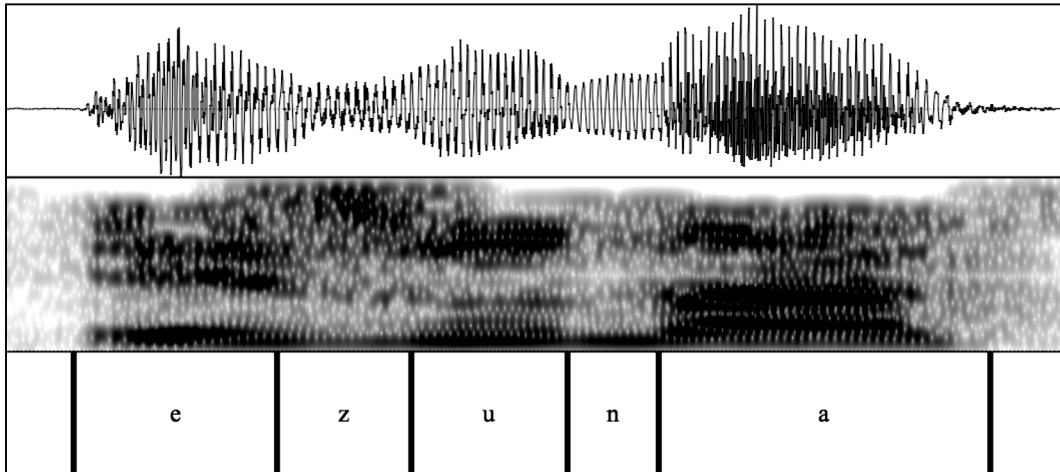


Figure 1. Spectrogram of *es una* ‘it is a’ with a strong voice bar, indicative of the voiced variant.

Finally, to determine which factors influence the voicing of /s/, a variable rule analysis was conducted in GoldVarb, a program specifically designed to analyze poorly distributed linguistic data. The program works by first generating factor specifications for a group of individual tokens, and cells are then created showing the distribution of the raw data. Next, a binomial up-and-down analysis is run, in which the program first “steps up,” adding a factor group at each level to determine which factors most significantly affect the application of the dependent variable, and then “steps down,” removing factor groups in the same way. Finally, Varbrul reports the most successful stepping-up and stepping-down run, which should be identical in their input and factor weights. Their log likelihoods should be identical as well, and the closer the log likelihood is to zero, the more accurately the nature of the data has been captured.

4. Discussion and Results

The distribution of the marginals below captures the variability possible in Quiteño intervocalic /s/ voicing in the word boundary factor group.

	Voiceless Variant	Voiced Variant
At word boundary, first word final	9% (9/100)	91% (91/100)
Word Medial	89% (179/202)	11% (23/202)
At word boundary, second word initial	94% (96/102)	6% (6/102)
Chi Square = 240.122, Degrees of Freedom = 2, p = 0		

Table 3: Distribution of the two variants across the word boundary factor group.

First-word-final intervocalic /s/, e.g. *es un movimiento* ‘it’s a movement’, is overwhelmingly voiced, occurring in 91% of all sibilants in this category. On the contrary, word-medial (e.g. *el municipio* ‘the municipality’) and second-word-initial sibilants (e.g. *debe ger* ‘it must be’) are overwhelmingly voiceless, the voiced variant only occurring in 11% and 6% of the total tokens, respectively. In other words, word-final intervocalic [z] occurs in the marginals across a word boundary far more than word-medially or second-word-initially.

The Varbrul analysis conducted in this study largely justifies Robinson’s findings on the use of the voiced variant in the Quito region as well, showing that the word boundary is by far the most predictive factor of where the voiced variant occurs, with a range of 79 (See Table 4). While word-final /s/ is a highly influential factor, with a factor weight of .99, the fact that the variable rule analysis shows variation at all indicates that the phenomenon is not as categorical as previously claimed.

Factor	n (x/404)	% Voiced	% Total Data	Factor Weight
Word Boundary				
Word 1 Final	99	92% (91/99)	25%	.99
Word Medial/Word 2 Initial	305	10% (29/305)	75%	.20
<i>Range: 79</i>				
Word Class				
Determiner, Adjective	84	43% (36/84)	21%	.61
Noun, complementizer	194	27% (53/194)	48%	.60
Verb, Participle, Adverb	126	25% (31/126)	31%	.25
<i>Range: 36</i>				
Word Frequency				
Frequent	62	29% (18/62)	15%	.79
Not Frequent	342	30% (102/342)	85%	.44
<i>Range: 35</i>				
Following Segment				
Low	71	55% (39/71)	17%	.75
Mid	178	23% (41/178)	44%	.45
High	155	26% (40/155)	39%	.43
<i>Range: 32</i>				
Gender				
Men	236	29% (69/236)	58%	[]
Women	168	30% (51/168)	42%	[]
/s/ in Relation to Stress				
Pretonic	80	41% (33/80)	20%	[]
Tonic	136	14% (19/136)	34%	[]
Posttonic	102	22% (22/102)	25%	[]
Not Near Stressed Syllable	86	53% (46/86)	21%	[]
Morphological Marker				
Yes	67	96% (64/67)	17%	[]
No	312	12% (36/312)	77%	[]
<i>Ser</i> Paradigm	13	69% (9/13)	3%	[]
<i>Nosotros</i> Paradigm	12	92% (11/12)	3%	[]
Preceding Segment				
High	62	8% (5/62)	16%	[]
Mid	255	38% (96/255)	63%	[]
Low	87	23% (20/87)	21%	[]
Input = 0.201 Log likelihood = -105.313 Significance = 0.019				

Table 4: Variable rule analysis results.³

³ Certain factors were collapsed to decrease the degree of poorly distributed data in the variable rule analysis, but an attempt was made to collapse based on linguistic distribution and behavior. First word final /s/ was run against

As Table 4 indicates, the factor groups of word class, word frequency and the following vowel also seem to play a role in the intervocalic /s/ voicing phenomenon, but closer investigation lessens the significance of these results. Determiners, for example, with a factor weight of .61, take either a singular (null) or plural marker. The plural form takes *-s*, which often occurs across a word boundary and will therefore exhibit voicing between vowels. Due to this overlapping data, the variable rule analysis is essentially testing the same independent variable multiple times, making the voicing phenomenon, which is most greatly influenced by word boundary, appear significant across several factor groups. As is evident from this study, when only one factor group is truly significant but the distribution of data creates interaction among factor groups, GoldVarb results may be misleading: they should always be scrutinized for possible interactions and poorly distributed marginals.

Because of these interactions, a second GoldVarb analysis was conducted without the factor groups that interacted with word boundary. When the word class, following vowel and frequent word factor groups were removed from the analysis, the results reveal word boundary to be the only significant factor group, as seen in Table 5.

Factor	n (x/404)	% Voiced	% Total Data	Factor Weight
Word Boundary				
Word 1 Final	99	92% (91/99)	25%	.97
Word Medial/Word 2 Initial	305	10% (29/305)	75%	.24
<i>Range: 73</i>				
Input = 0.249 Log likelihood = -123.606 Significance = 0.097				

Table 5. Variable rule analysis results without the factor groups that interacted with word boundary.

Finally, one more GoldVarb analysis was conducted, this time excluding voiced tokens that occurred across word boundaries. Twenty three tokens of [z] occurred word-medially, and since the word boundary factor group strongly disfavors word-medial voicing, it cannot account for these occurrences. A variable rule analysis of word medial tokens alone reveals that other factors may be influential in word-medial voicing, shown in Table 6.⁴

Factor	n (x/202)	% Voiced	% Total Data	Factor Weight
Following Segment				
Other	124	3% (4/124)	61%	.34
o & a	78	24% (19/78)	39%	.74
<i>Range: 40</i>				
Frequent Words				
Not Frequent	142	5% (7/142)	70%	.41
Frequent	60	27% (16/60)	30%	.70
<i>Range: 29</i>				
Input = 0.068 Log likelihood = -58.046 Significance = 0.017				

Table 6: Significant factor groups for the variable rule analysis results of word-medial /s/ tokens.

the two traditionally unvoiced positions; verb, verbal particles and verbal modifiers were combined; nouns and a scarce number of complementizers were collapsed due to distributional properties, as both exhibit a tendency to precede a verb; determiners were collapsed with adjectives since both occur with nouns; all frequent words were run against non-frequent words; and individual vowels were collapsed based on place and manner of articulation.

⁴ The vowels in this Varbrul run were collapsed differently than the vowels in the previous run. Initially the vowels were run individually, and the [-high] [-front] vowels, /o/ and /a/, were found to behave very similarly in this run, allowing for the voiced variant with 25% and 24% frequency, respectively, while /i/, /e/ and /u/ all very rarely allowed for the voiced variant. This analysis was justified by the distribution of the vowels; both /o/ and /a/ are very likely to occur at the end of a word, following a word-medial /s/.

These results indicate that word-medial /s/ voicing may be constrained by entirely different factor groups than /s/ voicing in all contexts, with the following vowel and word frequency playing the biggest roles. Following [-high] [-back] vowels clearly favor /s/ voicing, while the other vowels disfavor it, and specific words are more likely to allow word-medial /s/ voicing than others, e.g. *eso/esa/ese* ‘this,’ *proceso*⁵ ‘process,’ and *nosotros* ‘we.’ A similar analysis is needed for second-word-initial voicing, but this study lacked sufficient tokens for an adequate analysis of the conditioning factors in that particular environment. It is possible that second-word-initial voicing constitutes a reanalysis of the syllable boundary, caused by the proximity of first-word-final and second-word-initial positions, but the voiced variant may also be affected by other independent variables and is in need of further investigation. Also in need of further investigation are the environments that do not require first-word-final voicing across an intervocalic word boundary. One possibility is that focus may play a role: in one token, a speaker places narrow focus on the *es* ‘it is’ of *es actores* ‘it is actors,’ which constituted the only true occurrence of an unvoiced /s/ at the word boundary.

5. Conclusion

This study offers a quantitative glimpse into the environments in which /s/ voicing occurs in the Quiteño dialect and the factors influencing its appearance, finding that intervocalic /s/ voicing at the word boundary is not as categorical as previously claimed and that word-medial intervocalic /s/ voicing in Quiteño Spanish appears to be governed by entirely different constraints. However, research on the topic is far from complete. A more thorough study with a higher number of tokens, more participants and more diverse registers is needed to validate these findings on a broader, more generalizable scale. Sociolinguistic interviews would be invaluable, but it would also be useful to have native Quiteños participate in forced judgment tasks, language attitude assessments and experiments explicitly designed to elicit specific forms, e.g. first-word-final /s/ when that word is in narrow focus. Similar studies should then be repeated for the other two dialects in Robinson’s 1979 study, the region surrounding Cuenca and the region near Loja, to determine the accuracy of Robinson’s claims in those areas as well. A study on a national level might also indicate a potential change in progress, as the construction of new highways has increased interaction and communication among the various regions of Ecuador.

Finally, sociological aspects of the phenomenon should be made a focus in future research. This study indicates that there is no significant difference between men and women’s use of the two variants, but the identity of individuals on the radio is difficult to establish, and therefore social class has not been investigated. Community members’ education, profession and income may play a role in the frequency of the voiced variant, which could offer insight into which groups use the voiced variant most frequently and what, if anything, it signifies on a social level within the community. Along with providing an interesting glimpse into the dialects of Ecuador, research on the intervocalic voicing of /s/ offers a window into an isolated reanalysis of an otherwise antiquated phenomenon.

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⁵ *Proceso* most commonly takes the voiced variant on the second sibilant, but it also appears with the first sibilant in the data.

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