

THE EFFECT OF L1 USE ON FOREIGN ACCENT RATINGS IN QUICHUA-SPANISH BILINGUALS

Susan G. Guion, James E. Flege*, Jonathan D. Loftin*

*The University of Alabama at Birmingham, *University of Texas at Austin

ABSTRACT

This study assessed the hypothesis that degree of L1 activation influences L2 production accuracy by examining bilinguals who used their L1 on a regular basis in a bilingual setting: Otavalo, Ecuador. Thirty native Quichua speakers who had begun to learn Spanish between the ages of 6-8 years were recruited to form three groups differing in self-reported L1 use. The three groups repeated five aurally presented Spanish sentences. Native Spanish listeners rated the blocked, randomly presented Spanish sentences for degree of Quichua accent. The High L1 Use group had stronger Quichua accents than the Low L1 Use group. The more the Quichua subjects used their L1, the less Spanish-like their sentences were judged to be. This finding supports the proposal that the amount of L1 use influences production in the L2, indicating that factors other than neurological maturation influence the success of L2 learning.

1. INTRODUCTION

Many recent investigations have focused on the effect of variation in the age of second language (L2) acquisition (AOA) on the production and perception of an L2. The findings of these studies indicate that the earlier in life a second language is learned, the more native-like the pronunciation of the L2 will be [1, 4, 8, 10, 12].

Recently, Flege, Frieda, and Nozawa [3] investigated the effect of variation in the amount of self-reported use of the first language (L1) on L2 production accuracy. They found that the more the L1 (Italian) was used, the stronger the perceived foreign accent was in the L2 (English). This finding is of potentially great importance for theories of second language acquisition and bilingualism. In AOA-based studies, age is often interpreted as a surrogate for neurological maturation, e.g., plasticity at the time of L2 learning. The findings from Flege et al. [3] indicate that some factor(s) other than just neurological maturation at the time of L2 learning influence L2 production capabilities. It suggests that the interaction of the L1 and the L2 can affect production and influence the ultimate degree of success in pronunciation of the L2.

Flege et al. [3] proposed that the bilinguals' degree of L1 "activation" influenced L2 production accuracy. The authors discussed their findings in terms of a "single system hypothesis." According to the single system hypothesis bilinguals are unable to fully isolate the L1 and L2 phonetic systems. The phonic elements of the L1 subsystem necessarily influence phonic elements in the L2 system, and vice versa. The nature and strength of the influence of the L1 and the L2 on one another may be dependent on several factors, including the nature of the L1 and L2 phonetic systems (e.g., how many and what types of

phonetic categories they possess) and the amount and circumstances of L1 and L2 use [5, 7].

Although interesting, the L1 use effect described in Flege et al. [3] is far from being clearly established. The study needs to be replicated and the design extended before the L1 use effect on L2 production can be fully accepted. Two design aspects of the study might be questioned. First, the study was a post-hoc analysis. The sentences analyzed were drawn from data collected for an earlier study. The L1 use effect should be studied with a data set that has the participants' amount of L1 use as a design variable to allow planned comparisons between groups differing in L1 use.

Second, in the Flege et al. [3] study, the low L1 use group reported using Italian so infrequently (3% of the time) that it is uncertain whether they actually had an *active* L1 system. That is, it is uncertain if the low L1 use participants could actually speak Italian at the time they were tested. No evaluation of the participants' Italian capabilities was performed. Given the low use of Italian and the limited domains in which Italian was reported to be spoken, it is possible that some of the subjects tested never developed a full competence or had lost production proficiency in Italian. The loss of production proficiency is not an unreasonable proposal as the Italians had lived in Canada for 34 years on average and spoken Italian only rarely during that time. Grosjean [6] suggested that language forgetting is "probably as frequent as language learning in adults" (p. 238) and that production is more affected by loss than perception or comprehension. He proposed that people undergoing the language forgetting process can be termed "dormant bilinguals" in that they no longer use one of their languages on a regular basis. Perhaps the L1 use effect found in the Flege et al. [3] study was actually a difference between dormant bilinguals and functioning bilingual speakers. Further investigation into the L1 use effect should be carried out with a population of speakers who use their L1 on a regular basis in a wide variety of contexts. In addition, an assessment of the participants' L1 proficiency should also be conducted.

The aim of the present study was to replicate and extend the study by Flege et al. [3]. The bilinguals studied here continued to use their L1 on a regular basis and were assessed for L1 proficiency. They lived in a bilingual community that is characterized by widespread, societal bilingualism: Otavalo, Ecuador. In addition, we examined the effect of L1 use on L2 production by investigating three groups of bilinguals who differed in L1 use. Replication of the earlier finding would confirm the effect of L1 use on L2 production, supporting the single system hypothesis. A failure to replicate the Flege et al. [3] study might suggest that the reported L1 use effect was actually a difference between dormant bilinguals and functioning bilingual speakers.

2. METHOD

2.1. Participants

The Quichua-Spanish participants were from indigenous bilingual communities in and around Otavalo, a small city in the Andes of Ecuador. All of them learned Quichua as a first language at home. They learned Spanish later as an L2 when they began school or work. All of the participants recorded for this experiment came from the Otavalo subdialect of the Imbabura dialect of Ecuadorian Quichua [9].

Thirty Quichua-Spanish bilinguals were recruited and assigned to one of three subgroups on the basis of their self-reported Quichua (i.e., L1) use. Five Quichua near-monolinguals and five Spanish monolinguals were also recruited.

Amount of L1 use was determined from responses to a language background questionnaire (LBQ). The LBQ was administered to the Quichua speakers orally in Quichua. A Quichua-speaking field assistant read the questions and recorded the participants' responses. In addition to basic biographical data, the participants were asked the age at which they learned Spanish and queried on language use. The questions on language use were combined to assess L1 use. A seven-point scale was constructed (7 = maximum L1 use). The three groups of Quichua-Spanish bilinguals differed significantly in their use of Quichua, $F(2,27) = 61.4$, $p < .01$. Tukey's tests indicated that all three groups differed significantly ($p < .01$). Mean L1 use values and standard deviations for the three groups are presented in Table 1.

The participants in the three bilingual groups reported learning Spanish between the ages of 5 and 8 when they began school. They had been speaking Spanish for an average of 16.5 years at the time of testing. The groups did not differ significantly in years of Spanish use, $F(2,17) = 3.1$, $p > .10$, chronological age, $F(2,17) = 3.1$, $p > .10$, or their self-reported age of Spanish acquisition, $F(2,17) = 1.0$, $p > .10$. See Table 1 for means and standard deviations for these three variables.

	L1 Use	LOU	Age	AOA
Low	2.9 (.9)	14.9 (5.1)	21.6 (5.6)	6.7 (.9)
Mid	4.5 (.5)	14.7 (4.6)	20.8 (4.9)	6.1 (.7)
High	6.4 (.6)	19.9 (5.9)	26.4 (5.8)	6.5 (1.1)

Table 1. Characteristics of the 3 groups of Native Quichua speakers (Low, Mid and High L1 use). L1 Use = self estimated Quichua use (7-point scale); LOU = length of Spanish use (in years); Age = chronological age at the time of testing (in years); AOA = age of Spanish acquisition (in years).

2.2. Procedure

The participants' repetitions of sentences in Quichua and Spanish were recorded. The order of presentation for the languages was counterbalanced for the bilingual speakers. The monolingual speakers repeated sentences in just one language.

The five Quichua and five Spanish sentences were roughly balanced in terms of number of syllables (the Spanish sentences had an average of 8.5 syllables, the Quichua sentences an average of 9 syllables). All sentences contained familiar words.

The sentences were presented to the participants in a mini-dialogue format. Pairs of native speakers recorded the Quichua

and Spanish mini-dialogues. The participants heard a question followed by an answer. The question was then repeated and the participants responded with the same answer. These answers were recorded. The answer sentences are listed in Table 2. Each target sentence was elicited twice in the same manner. There were two practice sentences at the beginning of the set.

Quichua Sentences

Ñuca paicunata catigrini.	I'm going to follow them.
Taita Jusimi catishca.	Elder Jose followed (me).
Sucu fachalinata jatugrini.	I'm going to sell a gray shawl.
Paica casi tiyajurca.	He/she was sitting quietly.
Chairami quiqui llucshijun.	The immature ears of corn are just coming out.

Spanish Sentences

Hace más calor en la costa.	It is hotter on the coast.
Me dieron un vaso de jugo.	They gave me a glass of juice.
Es una cosa muy bella.	It is a very beautiful thing.
Compré un buso rojo.	I bought a red sweater.
Busco la Calle Maldonado.	I am looking for Maldonado Street.

Table 2. Quichua and Spanish sentences repeated by the participants. Quichua sentences are presented in the Unified Quichua orthography.

The procedure was entirely aural; the subjects were given nothing written. This is important because the participants differed in literacy levels. An elicitation process involving written materials could have resulted in better performance for the participants with greater literacy skills.

The sentence repetitions were recorded using a head-mounted microphone (Shure SM10A) and DAT tape recorder (Sony model TCD-D8). The second repetition of the target sentence, if free of mistakes, pauses or repetitions, was used in the analysis. The first repetition was used in case of disfluent second productions (less than 3% of the cases). The sentences were digitized at 22.5 kHz with 16bit resolution, and normalized to 50% peak intensity. They were later presented to listeners who rated them for degree of perceived foreign accent.¹

The Spanish sentences produced by the 35 participants (30 bilinguals and 5 Spanish monolinguals) were presented to five native Spanish listeners. The Quichua sentences produced by 35 individuals (30 bilinguals and 5 Quichua near-monolinguals) were presented to five near-monolingual Quichua listeners. No speaker was also a listener. The five Spanish raters were from the Northern Ecuadorian Sierra and the five Quichua raters were from the Otavalo area. The Quichua raters had all learned Spanish after the age of 15 years and had limited Spanish proficiency. In each rating experiment, there were five separate blocks, one for each of the five sentences. Within each block, the sentences spoken by 35 participants were randomly presented four times each without replacement. A different random order was used for each of the five sentences.

The listeners in both experiments were instructed (in their native language) to rate the sentences for degree of foreign accent. In the case of the Spanish sentences, they were asked to rate for Quichua accent, and in the case of the Quichua sentences, they were asked to rate for Spanish accent. They saw nine buttons on a computer screen and were asked to rate the sentences on a nine-point scale, 1 being most accented and 9 being without accent. The listeners were told to use all nine buttons. The first rating for each sentence was discarded, and only the last three ratings for each sentence were used in the analysis.

3. RESULTS AND DISCUSSION

3.1 Quichua Sentences

Investigation of the intra-rater reliability for the three presentations of the Quichua sentences returned unacceptable correlation coefficients [11], ranging from $\rho = .44$ to $\rho = .73$ for the five listeners ($mean = .64$). The poor reliability could be due to unreliable judges. On the other hand it could be due to the nature of the sentence productions, which apparently had little variability in foreign accent. In the absence of accent variation, the judges could have been responding to other variation in the sentence productions such as voice quality.

An ANOVA examining the ratings obtained for the three bilingual groups was non-significant, $F(2,29)=1.53$, $p > .10$. In addition, the correlation between Spanish usage and the accent ratings for the bilingual speakers was non-significant, $r = -.28$, $df = 28$, $p > .10$.

The null finding just reported has two possible interpretations. Either the Quichua-Spanish bilinguals did not have any detectable Spanish accents when speaking Quichua, or the raters could not perform the rating task. It is at least possible that the scalar rating technique used here was not understood by the near-monolingual Quichua judges, who had an average of just 2.1 years of education (with two judges having no formal education at all).

In order to choose between these two possible interpretations, a small follow-up experiment was carried out. It examined 10 speakers, five of whom had learned Quichua as infants and five of whom had learned Quichua after the age of 15. The same five Quichua sentences used in the original accent rating experiment (elicited in the same manner) were again used. Three of the five raters from the experiment just reported were asked to return to serve as raters in the follow-up experiment.

The later learners of Quichua were given lower ratings than the earlier learners of Quichua, indicating a Spanish accent in their Quichua. A t -test performed on the data returned a significant finding, $t = 3.98$, $df = 9$, $p < .01$. In addition, the intra-rater correlations for the three presentations of the sentences were stronger, reaching acceptable levels, $\rho = .74$ to $\rho = .87$ ($mean = .82$).

The results from the follow-up experiment indicated that the Quichua-dominant raters could hear differences in foreign accent when they were clearly present. This indicated that the previous non-significant finding was not due to the unfamiliarity of the scalar rating task. Thus, the results from the accent ratings for Quichua sentences could best be interpreted as follows: The three groups of Quichua-Spanish bilinguals did not have noticeably different Spanish foreign accents in Quichua as a function of the amount of Quichua (i.e., L1) use. This indicates that L1 use did not have an effect on L1 production. One possible interpretation

for this finding is that the L1, if maintained at any level, is impervious to effects from the L2. Another possibility is that there is a threshold such that L2 will only affect L1 production below a certain threshold of L1 use.

3.2 Spanish Sentences

Investigation of the intra-rater reliability for the three presentations of the Spanish sentences returned acceptable correlation coefficients ranging from $\rho = .84$ to $\rho = .94$ for the five listeners ($mean = .92$). The raters also showed a high degree of reliability. The intraclass correlation for the five raters of $\rho = .96$ (using an algorithm for fixed judges on mean scores; see Strout & Fleiss [11]).

The group of native-Spanish speakers received the highest rating. The mean scores for the three bilingual groups decreased with Quichua usage. These data have been graphed in Figure 1. An ANOVA examining the ratings obtained for the three bilingual groups yielded a significant effect of group, $F(2,29) = 5.5$, $p < .01$. Tukey's tests indicated that there was a significant difference ($p < .01$) between the low L1 use group and high L1 use group. In addition, the correlation between Quichua use and the accent ratings for the bilingual speakers was significant, $r = -.54$, $df = 28$, $p < .01$. This finding indicated that the use of Quichua (L1) affected the perceived degree of foreign accent in the production of Spanish (L2) sentences for Quichua-Spanish bilinguals when age of Spanish acquisition was controlled.

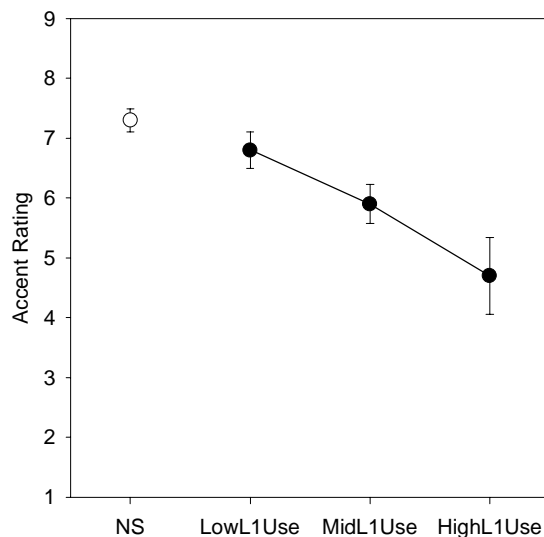


Figure 1. Accent ratings from five judges for five Spanish sentences produced by 35 speakers: five Native Spanish (NS) and 30 Quichua-Spanish bilinguals placed in groups of 10, according to Quichua (L1) usage. Bars represent standard errors.

4. GENERAL DISCUSSION

The results from this study indicated that the amount of L1 use affects L2 speech production accuracy. The participants in the study were Quichua-Spanish bilinguals living in Otavalo, Ecuador, who began learning Spanish between the ages of 5 and 8 and differed in L1 (Quichua) use. The high Quichua use group had significantly stronger foreign accents than the low Quichua use group for L2 (Spanish) sentences. In addition, a significant negative correlation was found between L1 use and accent ratings for L2 sentences. This was probably *not* just a practice effect, for the participants had been speaking Spanish for an average of 17 years.

These results replicated the study by Flege et al. [3] which examined Italian immigrants living in North America. In that study, the group of low-use speakers reported using their L1 only 3% of the time. In addition, no assessment of L1 proficiency was performed. This study differed by investigating speakers in a bilingual community in South America. The participants in this study all used their L1 (Quichua) on a regular basis and had learned Spanish at the same age. In addition, they did not differ in production proficiency in their L1, as assessed by a foreign accent rating experiment. Thus, we can be reasonably sure that the participants had a strong and active L1 (Quichua) system, which was not certain for the earlier study.

The L1 use effect on L2 production found in this study and by Flege et al. [3] for early bilinguals has recently been found in much the same form for a group of late bilinguals [Piske and MacKay, this volume]. They investigated a group of Italian immigrants living in Canada for an average of 35 years.

The L1 use effect found in these studies serves as support for the single system hypothesis [2], which states that bilinguals are unable to fully isolate their L1 and L2 phonetic systems and, therefore, phonic elements of the L1 and L2 subsystems influence one another. We propose that the amount of L1 use determines the strength of L1 influence on L2 production. This assumes that the more the L1 is used, the more activated it will be and the more activated it is, the more it will influence the L2. It will remain for future research to determine the relationship between language use and activation.

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NOTES

1. The term "foreign accent" will be used here, because it is consistent with the extant literature. However, it is not the ideal term for this study. The accents studied here are not foreign, but coexist in the same community.

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