

INTERLANGUAGE WITHIN OPTIMALITY THEORY: THE ACQUISITION OF SPANISH VOICED STOP SPIRANTIZATION*

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1.0 Introduction

When speakers learn a second language, they begin with an initial state, the grammar of their first language (L1). Their goal, or final state, is the grammar of the second language (L2). Interlanguage (IL) is the intermediate or developing state between the first language and the acquisition of the second language (Archibald and Libben 1995). This paper examines the characterization of a learner's interlanguage within the framework of Optimality Theory (OT) (Prince and Smolensky 1993). The learner in this case will be a speaker whose first language is English and who is learning Spanish as a second language. The process of acquiring voiced stop spirantization in Spanish and the influences of the learner's L1 and of universals will all be expressed in terms of the ranking of violable constraints. It will be shown that this process of acquiring voiced stop spirantization is the result of the gradual promotion of the phonotactic constraint which prevents /b/ from occurring postvocally in Spanish.

1.1 Spirantization of voiced stops in Spanish

Standard dialects of Latin American Spanish include in their phonemic inventories the voiced stops /b d g/. Voiced stop spirantization is an obligatory process whereby /b d g/ are pronounced as the spirants /β ð ɣ/ postvocally (Stockwell and Bowen 1965, Zampini 1997). In the case of the bilabial voiced stop, certain alternations occur. The voiced stop occurs word initially and the voiced bilabial fricative occurs postvocally.

(1)	boa	[bóa]	boba	[bóβa]
	salía	[salía]	saliva	[salíβa]
	pulicaría	[pulikaría]	publicaría	[puβlikaría]

(Stockwell & Bowen 1965:48)

This paper will examine how the learner proceeds from his/her initial state in English through an interlanguage state in order to attempt to acquire the rule of spirantization in Spanish. The changes will be characterized in terms of changes in the ranking of violable constraints.

2.0 Interlanguage

When second language learners enter into the process of acquiring a second language, they are not simply acquiring items that are different from their first language. They are trying to make sense out of the new linguistic information being presented to them. Learning an L2 involves the creative process of building a grammatical system which has a structurally intermediate and distinct status between that of the initial state, the L1 grammar, and that of the desired state, the L2 grammar. This separate developing state is known as an interlanguage (Brown 1994:203, Archibald and Libben 1995:134).

2.1 Influence of L1

In this model of language acquisition, both the L1 and the L2 influence the learner's interlanguage. In this paper, one area of investigation will concentrate on the effects of the L1. The influence of the learner's L1 phonology is apparent when the learner uses L2 vocabulary but speaks using L1 phonological rules, resulting in accented speech. For example, Spanish speakers learning English retain a rule of *e* epenthesis in word initial /s/ + stop clusters. In Spanish, the word for 'write' is *escribe*, pronounced [eskriβe]. When a Spanish speaker is first learning English, and encounters a word such as *scribble*, it will be pronounced as something like [eskriβl] with an epenthetic [e] inserted as in Spanish. The Spanish learner has retained the epenthesis rule from L1 and

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applied it in the use of the L2. This interference from the L1 is known as *transfer* (Archibald & Libben 1995:147, Lombardi 1998:1).

The transfer effect can also be observed in the acquisition of the voiced spirants by English speakers learning Spanish. English speakers in the process of learning that /b/ → [β] post-vocally begin by using the sounds from their L1 in that environment. In learning how to pronounce *saber* [saβer], 'know', the learners will pronounce either [saber] or [saver]. Both /b/ and /v/ are in the consonant inventory of English and may occur in postvocalic position. In Spanish, [b] is prohibited postvocally. In addition, /v/ is not in the consonant inventory of Spanish. It is likely that the learners are using the sounds from their L1 in the speech production of the L2.

2.2 Influence of Universal Grammar and markedness

In generative grammar, first language learners are assumed to be innately equipped to learn language. In its initial state, the language faculty that we are born with is referred to as Universal Grammar (UG) (Archibald and Libben 1995:161). Within UG exist innate principles which limit the possible structures in human language. In this way, a child is constrained as to the number of hypotheses that can be made about the structure of its language. In addition, a set of parameters is made available by UG and as a child acquires its language, certain parameters are set to reflect the structure of that language and to distinguish it from other languages.

The description of grammars in terms of parameter settings makes an explicit and organic connection between developmental factors in language acquisition and distributional, typological properties of languages. (Broselow 1988:201)

As with children learning their first language, interlanguage grammars do not violate the principles which govern natural languages (Broselow 1988:203). In particular, constraints on markedness are obeyed, where less marked structures are acquired before more marked structures (Archibald and Libben 1995:167–80). For example, children acquire stops, which are relatively unmarked, before they acquire fricatives, which are considered more marked (Lombardi 1998:3). This pattern is also exhibited in the order of the acquisition of voiced spirants by English learners of Spanish. The learners begin by pronouncing /b/ as [b], the least marked case, in the postvocalic environment. As acquisition proceeds, they are observed to change the pronunciation to [v], which is slightly more marked than [b]. The target pronunciation is [β], the most marked segment of the set.

We will now see how these observations about interlanguage are expressed within OT.

3.0 An Optimality Theoretic account of transfer and universals in Interlanguage

3.1 An overview of Optimality Theory

Optimality Theory proposes a Universal Grammar which consists of a universal set of violable *constraints* on language, CON. There are two functions: GEN(erate), which creates a set of potential outputs, and EVAL(uate), which selects the optimal candidate from the set created by GEN. The grammar of a language includes basic forms for morphemes, from which inputs are built, and a language-specific ranking for the constraints in CON (Archangeli 1997:16).

Language variation is expressed in terms of different constraint rankings for each language. We can say that for the English learner of Spanish, his/her L1 (English) will have one constraint ranking and his/her L2 (Spanish) will have a different ranking. Similarly, then, the learner's interlanguage will also have a unique constraint ranking since an interlanguage is considered to be a unique grammatical system.

Universals are present in the model as the violable constraints. They are universal because they are common to all languages, but can be ranked in different ways to reflect different grammars. Universally, the voiced bilabial fricative [β] is more marked than the voiced stop [b]. In all languages, [β] will always be higher ranked than [b] in terms of markedness. This ranking is a harmonic, or invariant, ranking. However, in Spanish, [β] is permitted in the inventory to avoid violating a higher ranked constraint which prohibits voiced stops following a vowel.

In English, though, [β] is not permitted because the constraint prohibiting it is ranked higher than the constraint prohibiting the voiced stop. The different rankings of the constraint prohibiting the voiced stop is an example of a variable ranking of a constraint (Pulleyblank 1997:69).

Transfer, as noted above in 2.1, is an instance of interference from the grammar of the L1 on the learner's developing L2 system. In Optimality Theory terms, this means that the learner is still using the constraint ranking of the L1 to produce the L2 (Lombardi 1998).

3.2 A learner's interlanguage in OT

This section of the paper will demonstrate how a learner's interlanguage system is expressed within Optimality Theory. In particular, the influences of transfer and universals, normally viewed as two separate phenomena in the field of second language acquisition, will be shown to be simply a matter of constraint rankings. The IL of an English speaker learning Latin American Spanish will be expressed in terms of changing constraint rankings. The target constraint ranking of Spanish will be shown first. This will be followed by the rankings for the stages of IL that the learner is proceeding through as he/she acquires the process of voiced stop spirantization in Spanish.

Recall that in Spanish voiced stop spirantization is an obligatory process whereby /b d g/ are pronounced as the spirants [β ð γ] postvocally. The voiced bilabial stop occurs word initially and the voiced bilabial fricative occurs postvocally. The occurrence of the voiced bilabial stop in initial position reflects a harmonic ranking in which the unmarked sound emerges. The fact that [β] is more marked than [b] can be expressed as in (2).

- (2) b/β Ranking: $*β \gg *b$.

In the following tableau, this ranking allows [b] to emerge in initial position.¹

- (3)

/bamos/	*b	*β	Ident-Manner
☛ bamos	*		
βamos		*!	*

In post-vocalic position, however, [b] is forbidden and the more marked [β] emerges. The positional restriction preventing [b] postvocally can be expressed as *V_{voiced-stop}. The tableau in (4) illustrates how [β] emerges in the optimal candidate.

- (4)

/hablamos/	*V _{voiced-stop}	*β	*b	Ident _{manner}
☛ aβlamos		*		*
ablamos	*!		*	

This ranking, which reflects the grammar of the native Spanish speaker, also happens to be the target of the English speaker who wishes to acquire the Spanish phonological system.

¹ The desired output, given any constraint ranking, will always be a possible result, according to the OT concept of 'the richness of the base', given even a different input. If the input in Tableau (i) was /βamos/, the desired output, /bamos/, would still be derived, as is seen in the tableau:

- (i)

/βamos/	*β	*b	Ident _{manner}
☛ bamos		*	
βamos	*!		*

A native English speaker, on the other hand, begins learning Spanish with only the English phonological system as the initial state. The relevant facts are as follows:

- (5) (a) In North American English, [b] occurs syllable initially, syllable finally, intervocally, and in initial and final clusters (Celce-Murcia *et al.* 1996). There is no prohibition on [b] appearing postvocally.
- (b) The allophone [β] is not in the English consonant inventory.

In the case of a word such as *hablamos*, the learner would retain the postvocalic [b] as a voiced stop. In this grammar, the harmonic ranking $*\beta \gg *b$ is higher-ranked than the positional restriction on postvocalic voiced stops. The unmarked /b/ emerges as the optimal candidate.

(6)

/hablamos/	*β	*b	*V voiced-stop	Ident _{manner}
ablamos		*	*	
aβlamos	*!			*

At some point during acquisition, the learner may stop producing [b] and begin producing [v] in the postvocalic environment (Stockwell & Bowen 1965:47, Zampini 1997:227). At this stage of interlanguage, *hablamos* is produced as [avlamos]. The learner has recognized that the voiced stop is not permitted postvocally, thereby promoting the ranking of $*V$ voiced-stop above that of $*b$. Although the feature [continuant] is recognized as desirable postvocally, the learner is still unable to produce the highly marked [β], which remains ranked above $*V$ voiced-stop.

In order to satisfy the need for a segment with a positive value for [continuant], the learner approximates the voiced bilabial fricative with a sound found in his/her L1, [v]. Although [v] is a more marked sound than [b], it is permitted because the optimal candidate obeys the more highly ranked constraint $*V$ voiced-stop, as is shown in (7).

(7)

/hablamos /	*β	*V voiced-stop	*v	*b	Ident _{manner}
avlamos			*		*
ablamos		*!		*	
aβlamos	*!				

To summarize, items (8–10) represent the stages of acquisition that the learner has proceeded through in terms of constraint re-ranking.

- (8) English L1 and early IL stage: $*\beta \gg *b \gg *V$ voiced-stop \gg Ident_{manner}
- (9) Interlanguage: $*\beta \gg *V$ voiced-stop $\gg *v \gg *b \gg$ Ident_{manner}
- (10) Target language–Spanish: $*V$ voiced-stop $\gg *b \gg *β \gg$ Ident_{manner}

We can observe how the phonotactic constraint, $*V$ voiced-stop, gradually gets promoted as the learner acquires the phonology of Spanish.

4.0 Discussion

Although this example shows only two stages of interlanguage, it is possible to imagine that for other

structures, there may be several stages in the developing interlanguage, resulting in a separate constraint ranking for each stage. As the learner acquires more of the structure of the target language, the constraint rankings will more closely resemble the ranking of the target. In a proposal by Tesar (1998), learners are said to use a hypothesized grammar to guess what the structure of an observed overt form is in order to modify their own grammar. As they receive more overt evidence, learners use a repetitive strategy to continually modify their own grammar. Learning occurs when they converge on the correct grammar.

Although Tesar's proposal is made in terms of child language acquisition, the process of acquisition as expressed in Optimality Theoretic terms is very similar for both first and second language learners. Acquisition in both cases is a result of revising existing constraint rankings in order to converge on a ranking which reflects the correct grammar of the target language.²

Tesar refers to this process as *constraint demotion*, whereby the learner's current ranking loses out to the ranking in the target grammar. In the case of the voiced stop spirantization in Spanish, there is the demotion of the constraint *b as the learner acquires the phonological rules of Spanish. However, there is also *constraint promotion*, whereby in the same process, the constraint *V_{voiced-stop} gets promoted above *b and other constraints.

If the learner discussed in 3.2 above had only been able to produce [avlamos], but never [aβlamos], we would say that his/her pronunciation had become fossilized. In terms of OT, we can say that the learner has only been able to acquire a certain level of constraint ranking within the interlanguage. The problem is that while OT can describe the process, it is unclear how the theory can explain why the learner has stopped at that particular constraint ranking.

The constraint rankings are also able to express in one mechanism two separate influences on an interlanguage. Separate theories have been developed to explain the influence of the learner's L1 and to explain the influence of universals. Contrastive Analysis (CA) was developed to explain the influence of the L1, and the Markedness Differential Hypothesis (MDH) was used to explain the influence of universals (Brown 1994:193,202; Archibald and Libben 1995:138,169).

Contrastive Analysis claims that interference from the learner's L1 is the main barrier in the acquisition of the second language. To learn a second language means overcoming the differences between the L1 and the L2 (Brown 1994:193). One of the problems with CA is that many errors that were predicted did not occur and many errors occurred that were not predicted. This is because in CA it is assumed that the L1 is the only source of error (Archibald and Libben 1995:143). MDH, on the other hand, was proposed to help explain why some of the differences between the L1 and the L2 cause errors, while others do not. This theory says that the areas most difficult for the learner will be those that are both different from and more marked than the L1. In terms of phonology, sounds in the L2 that are universally more marked are more likely to cause problems for the learner. This shows the influence of principles of universal grammar on the learning of an L2 (Archibald and Libben 1995:169-71, Brown 1994:202).

In OT, the constraint rankings themselves express the influence of the L1 by showing that the learner is using a ranking that is the same or similar to that of his/her L1 to produce the optimal candidate. The influence of universals is expressed in the constraints themselves, which are all part of Universal Grammar. These separate influences on interlanguage are nicely collapsed within OT as statements of constraints or as ranking of constraints.

5.0 Conclusion

This paper has shown that the interlanguage grammar of a second language learner and the influences of both the L1 and universals on an interlanguage can all be expressed in terms of violable constraints and the ranking of those constraints within the framework of Optimality Theory. This one theory is able to describe these phenomena from different theories of second language acquisition using its existing mechanisms. Optimality Theory has been shown to have a descriptive advantage.

² Although this is beyond the immediate scope of this paper, some consideration needs to be given to the common occurrence of fossilization and non-native accent. Fossilization is the relatively permanent incorporation of incorrect linguistic structures into a learner's second language competence (Brown 1994:217). In terms of acquiring the phonological system of the L2, this results in a non-native accent.

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