

(1980/2017). In A. Bungler (Ed.), *Special volume: Reissue of Innovations in Linguistic Education Volume 1. IULC Working Papers in Linguistics*, Vol. 17, No. 2.

A PROBLEM IN CONTRASTIVE ANALYSIS

by

Fred R. Eckman

University of Wisconsin-Milwaukee

1.0 Introduction

The Contrastive Analysis Hypothesis (CAH) claims that the areas of ease and difficulty in second language learning correspond, respectively, to the similarities and differences between the native language (NL) and the target language (TL). Assuming that difficulty is reflected in terms of the errors that a learner makes, the CAH can be tested by examining utterances produced by a second language learner to determine whether the errors are explainable in terms of the differences between the NL and TL involved. To the extent that second language errors are explained wholly in terms of the differences between the NL and TL, the CAH is supported.

An alternative to the CAH is the Interlanguage Hypothesis (ILH), which claims that a second language learner internalizes a system called an interlanguage (IL) which may be independent of both the NL and TL. Thus, the ILH allows for the possibility that some aspects of second language data can be explained only by postulating rules or other constructs which are not motivated for either the NL or the TL. To the extent that such independent constructs can be motivated for IL's, the ILH receives support.

The purpose of this problem is to provide a test of these two hypotheses. The data for this problem focus on obstruent voice contrasts in Spanish, which is the NL, and English, which is the TL. The data from these languages are given in Tables 1 and 2; data elicited from two Spanish speakers learning English as a second language are given in Table 3.

The problem should be given to students in two parts. For the first part of the problem students should be given the data from Spanish and English, on which they should base their phonological analysis of the respective obstruent systems. After the phonological analyses are completed, a comparison is made along the lines of the CAH. The areas of difference between the NL and TL are noted, and the areas of difficulty are inferred on the basis of these differences. The data in Table 3 should then be given as the second part of the problem in order to test whether the areas of difficulty deducible from the CAH are in fact the areas in which the errors occur.

2.0 Analysis

A phonemic analysis of the forms in Tables 1 and 2 reveals the following:

1. Spanish has the following obstruent phonemes:
/p t k b d g f s x ʧ/;¹
2. Spanish has a superficial voice contrast only in stops;²
3. Spanish has a superficial voice contrast in stops only in word-initial position;
4. Spanish /b d g/ have spirant allophones [β ð γ], respectively, which occur following a continuant and preceding a vowel;
5. Spanish /s/ has [z] as an allophone, which occurs only before voiced consonants, and [s], which occurs elsewhere;
6. English has the following obstruent phonemes:
/p t k b d g f v θ ð s z ʃ ʒ ʧ ʤ/;
7. English has a voice contrast in both stops, fricatives and affricates;
8. English has these voice contrasts in word-initial, -medial and -final position.

A description of the data in Tables 1 and 2 within the framework of generative phonology yields the following:

1. Spanish has the following systematic phonemes:
/p t k b d g f s x ʧ/;
2. Spanish exhibits a voice contrast, at both the underlying and phonetic level, in stops only;
3. Spanish has a voice contrast in stops in word-initial and -medial position at the underlying level, and in only word-initial position at the phonetic level;
4. The grammar of Spanish contains the following phonological rules:

Spirantization³

$$\begin{bmatrix} -\text{sonorant} \\ +\text{voice} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{continuant} \\ +\text{voice} \end{bmatrix} / \begin{bmatrix} +\text{continuant} \\ _ \end{bmatrix} \begin{bmatrix} +\text{syllabic} \end{bmatrix}$$

(Voiced obstruents are continuant between a continuant and a vowel.)

S-voicing

$$\left[\begin{array}{l} +\text{coronal} \\ +\text{continuant} \\ +\text{strident} \end{array} \right] \rightarrow [+voice] / \text{---} \left[\begin{array}{l} +\text{consonantal} \\ +\text{voice} \end{array} \right]$$

(/s/ is voiced before a voiced consonant.)

5. English has the following systematic phonemes:
/p t k b d g f v θ ð s z ʃ ʒ č ʝ/;
6. No phonological rules for English are motivated on the basis of these data.

3.0 Contrastive Analysis

Based on the above phonological analyses, one would infer from the CAH that the areas of difficulty for a Spanish speaker learning English would correspond to the areas of difference between Spanish and English. To make more specific predictions, the CAH incorporates the following auxiliary assumptions:

- (1) A learner transfers his/her whole sound system to the TL (Lado 1957:24);
- (2) A learner encounters maximum difficulty when he/she has to learn to contrast in the TL two or more segments which are allophones in the NL (Lado 1957:15).

Given these assumptions, along with the phonemic analysis, one would deduce:

1. English voice contrasts in fricatives represent an area of difficulty;
2. English voice contrasts in stops word-medially and -finally represent an area of difficulty;
3. English /d/~ð/ contrast represents an area of difficulty;
4. English /s~/z/ contrast represents an area of difficulty;
5. English /ʃ/ represents an area of difficulty.

On the basis of the generative phonological analysis, it is not clear what some of the predicted areas of difficulty would be. For example, English and Spanish are similar in that they both have a voice contrast in stops at the underlying level in initial and medial position. However,

they differ in that Spanish does not maintain this contrast in medial position at the phonetic level because of the application of Spirantization. What is not clear along the lines of the CAH is whether underlying contrasts carry more weight than phonetic contrasts, or vice versa, in attempting to deduce areas of difficulty.

Likewise, it is not clear whether the rules of Spirantization or S-voicing will pose a problem because they will be difficult to suppress. If these rules are transferred to the interlanguage by the learner, then their effect will be to neutralize the /d/~/ð/ and /s/~z/ contrasts which exist in English, and will therefore be a source of errors.

4.0 Discussion

Examination of the data in Table 3 reveals that some of the predictions of the CAH are borne out, and that others are not.

Within the traditional phonemic analysis the following CAH predictions are supported:

1. English /s~/z/ contrast is difficult;
2. English /d~/ð/ contrast is difficult;
3. English /ʃ/ is difficult;
4. English word-final contrasts are an area of difficulty.

The predictions which are not borne out are:

1. Not all English fricatives present problems, since both subjects maintain a contrast between /f/ and /v/;
2. Word-medial voice contrasts present no apparent difficulty.

Within the framework of generative phonology, we note that there is limited transfer of the Spanish rule of Spirantization. Specifically, intervocalic /d/ is spirantized, but intervocalic /b/ and /g/ are not. The fact that the subjects do not evidence difficulty with word-medial contrasts might be explainable by the fact that the NL has an underlying voice contrast in this position, even though it lacks this contrast at the phonetic level. However, since there have been no proposals concerning the relationship between underlying and phonetic contrasts, on the one hand, and difficulty in second language learning, on the other hand, it is difficult to know which aspects of a generative phonological analysis support the CAH and which do not.

That aspect of the interlanguage data which is not explainable by the CAH, whether the analysis is done within the traditional phonemic framework or within that of generative phonology, is the existence of morpho-

phonemic alternations between some word-final voiceless obstruents and word-medial voiced ones. Such alternations exist in neither the NL nor the TL, and therefore cannot be explained by either language transfer or the learning of a TL rule.

It has already been pointed out that the NL lacks a superficial voice contrast in both medial and final position, whereas the TL maintains such a contrast in both of these positions. Consequently, a Spanish speaker learning English must learn to make a voice contrast in both of these positions. What is apparently evidenced in the interlanguage data is a stage of learning in which the learner has learned to make a medial voice contrast, but not a final voice contrast. In order for this to be explained by the CAH, there must be some principled way to determine that medial voice contrasts are easier to learn than final voice contrasts, and therefore will be acquired prior to final voice contrasts.

As presently formulated, the CAH has no principled way of assigning such a measure of degree of difficulty. However, in Eckman (1977) it was argued that such a measure of difficulty can be determined. Specifically, it was argued that degree of difficulty in language learning corresponds to the notion of typological markedness, which can be defined as follows:

Markedness

A phenomenon A in some language is more marked relative to some other phenomenon B if, cross-linguistically, the presence of A in a language necessarily implies the presence of B, but the presence of B does not necessarily imply the presence of A.

Given this notion, difficulty in second language learning can be predicted by the following hypothesis:

Markedness Differential Hypothesis (MDH)

Those areas of the TL which will be difficult are those areas which are

- (1) different from the NL;
- (2) relatively more marked than the NL.

Now, it was also argued in Eckman (1977) that final voice contrasts are more marked than medial voice contrasts, and therefore, should be more difficult. On this basis, then, it is possible to explain the observed morphophonemic alternations in the interlanguage data. Since voice contrasts are more difficult word-finally than word-medially, final contrasts will be learned subsequent to medial contrasts. This produces a stage of learning in which the interlanguage exhibits a voice contrast medially, but not finally. Thus, this stage produces alternations which, in turn, motivate a rule of Terminal Devoicing, formulated as follows:

Terminal Devoicing

[-sonorant] → [-voice] / ____ #

(Word-final obstruents are voiceless.)

The resultant rule of Terminal Devoicing, being motivated for neither the NL nor the TL, is an independent rule of the interlanguage system. This conclusion supports, on empirical grounds, the contention of Selinker (1972) that interlanguages are independent systems.

APPENDIX

Table 1 Spanish

	<u>Phonetic</u> <u>Representation</u>	<u>Gloss</u>		<u>Phonetic</u> <u>Representation</u>	<u>Gloss</u>
1.	[beso]	kiss	27.	[puta]	prostitute
2.	[por]	for	28.	[bato]	simpleton
3.	[pesa]	weight	29.	[este]	this
4.	[bola]	ball	30.	[sako]	bag
5.	[loβa]	ridge	31.	[kasa]	house
6.	[kaβa]	wine cellar	32.	[mas]	more
7.	[sopa]	soup	33.	[tos]	cough
8.	[kapon]	eunuch	34.	[foko]	focus
9.	[kampo]	field	35.	[fomes]	lust
10.	[tamba]	inn	36.	[befar]	to mock
11.	[ezβelta]	slender	37.	[kafe]	coffee
12.	[espeke]	handspike	38.	[čeke]	check
13.	[gota]	drop	39.	[čupa]	jacket
14.	[gasa]	gauze	40.	[koče]	coach
15.	[kon]	with	41.	[ničo]	niche
16.	[toγa]	toga	42.	[xiβe]	hump
17.	[sayα]	witch	43.	[xunta]	council
18.	[poko]	little	44.	[koxo]	lame
19.	[maŋgo]	handle	45.	[fixar]	to fasten
20.	[taŋke]	tank			
21.	[azyo]	I grasp			
22.	[asko]	nausea			
23.	[donde]	where			
24.	[dezðe]	since			
25.	[teŋgo]	I hold			
26.	[toðo]	all			

Table 2 English

	<u>Phonetic Representation</u>	<u>Orthographic Representation</u>		<u>Phonetic Representation</u>	<u>Orthographic Representation</u>
1.	[pɪt]	pit	22.	[bæd]	bad
2.	[bɪt]	bit	23.	[ni:t]	neat
3.	[peɪl]	pail	24.	[ni:d]	need
4.	[beɪl]	bail	25.	[ɡeɪm]	game
5.	[ræpɪd]	rapid	26.	[keɪm]	came
6.	[steɪpəl]	staple	27.	[kəʊld]	cold
7.	[ræbɪd]	rabid	28.	[ɡəʊld]	gold
8.	[steɪbəl]	stable	29.	[sæɡɪŋ]	sagging
9.	[tæp]	tap	30.	[sækɪŋ]	sacking
10.	[rɪp]	rip	31.	[tʌɡɪŋ]	tugging
11.	[rɪb]	rib	32.	[tʌkɪŋ]	tucking
12.	[tæb]	tab	33.	[faɪn]	fine
13.	[ten]	ten	34.	[fæn]	fan
14.	[taɪ]	tie	35.	[vaɪn]	vine
15.	[daɪ]	die	36.	[væn]	van
16.	[den]	den	37.	[rɪfju:z]	refuse
17.	[si:tɪŋ]	seating	38.	[rɪvɪyuz]	reviews
18.	[si:ɪŋ]	seeding	39.	[seɪfər]	safer
19.	[pætɪŋ]	patting	40.	[seɪvər]	savor
20.	[pædɪŋ]	padding	41.	[pru:f]	proof
21.	[bæt]	bat	42.	[pru:v]	prove

Table 2 (Continued)

	<u>Phonetic Representation</u>	<u>Orthographic Representation</u>		<u>Phonetic Representation</u>	<u>Orthographic Representation</u>
43.	[θay]	thigh	63.	[bež]	beige
44.	[ðay]	thy	64.	[mεš]	mesh
45.	[iθər]	ether	65.	[gəraž]	garage
46.	[iðər]	either	66.	[kræš]	crash
47.	[tiθ]	teeth	67.	[ʃɛst]	jest
48.	[tið]	teethe	68.	[čɛst]	chest
49.	[sɪp]	sip	69.	[ʃɪl]	Jill
50.	[zɪp]	zip	70.	[čɪl]	chill
51.	[su]	sue	71.	[bæčəz]	batches
52.	[zu]	zoo	72.	[bæʃəz]	badges
53.	[resər]	racer	73.	[rɪʃəz]	ridges
54.	[rezər]	razor	74.	[rɪčəz]	riches
55.	[res]	race	75.	[rɪʃ]	ridge
56.	[rez]	raise	76.	[rɪč]	rich
57.	[pis]	peace	77.	[ɛʃ]	edge
58.	[pɪz]	peas	78.	[ɛč]	etch
59.	[mεšɪŋ]	meshing	79.	[θɔt]	thought
60.	[mεžər]	measure	80.	[ðɛn]	then
61.	[lišəz]	leashes	81.	[bæθ]	bath
62.	[ližər]	leisure	82.	[beð]	bathe

Table 3 Interlanguage data

Subject 1

<u>Phonetic Representation</u>	<u>Gloss</u>	<u>Phonetic Representation</u>	<u>Gloss</u>
1. [tæk]	tag	12. [rɛt]	red
2. [rap]	rob	13. [rɛðər]	redder
3. [bæt]	bad	14. [bɪk]	big
4. [fayf]	five	15. [bɪgər]	bigger
5. [ðə]	the	16. [brɛf]	brave
6. [brɪθ]	breathe	17. [brɛvər]	braver
7. [zɒn]	zone	18. [wɛt]	wet
8. [fʌsi]	fuzzy	19. [wɛtər]	wetter
9. [frɪz]	freeze	20. [sɪk]	sick
10. [bɒp]	Bob	21. [sɪkəst]	sickest
11. [bɒbi]	Bobby	22. [sɛfəst]	safest

Subject 2

<u>Phonetic Representation</u>	<u>Gloss</u>	<u>Phonetic Representation</u>	<u>Gloss</u>
1. [rɛt]	red	9. [hatəst]	hottest
2. [rɛðər]	redder	10. [pɪk]	pig
3. [bɒp]	Bob	11. [pɪgi]	piggy
4. [grɛf]	grave	12. [sɛfəst]	safest
5. [grɛvər]	graver	13. [pe]	pay
6. [tek]	take	14. [prɪpe]	prepay
7. [rɪtek]	retake	15. [bɒbi]	Bobby
8. [hat]	hot	16. [ʃɛf]	shave

Footnotes

¹The data in Table 1 do not include any forms with /θ/, since this phoneme exists only in Castilian Spanish. The speakers from whom the interlanguage data were elicited speak Mexican Spanish.

²I am aware of the existence of forms like [axo] 'garlic' and [ayo] 'I do', which do show a superficial voice contrast in fricatives. However, [x] and [ɣ] belong to phonemes which do not contrast minimally in voice, and consequently there is no motivation for postulating voiced and voiceless fricative phonemes.

³This formulation of Spirantization is not meant to express a true generalization about Spanish. For a more descriptively adequate formulation of the rule, see Lozano (1978).

References

- Eckman, Fred R. 1977. Markedness and the Contrastive Analysis Hypothesis. *Language Learning* 27.315-330.
- Lado, Robert. 1957. *Linguistics Across Cultures*. Ann Arbor: University of Michigan Press.
- Lozano, Carmen. 1978. *Stop and Spirant Alternations: Fortition and Spirantization Processes in Phonology*. Bloomington: Indiana University Linguistics Club.
- Selinker, Larry. 1972. Interlanguage. *IRAL* 10.209-31.