



Faculty Publications

2005-10-01

Descriptive Adequacy vs. Psychological Reality: The Case of Two Restrictions on Spanish Stress Placement

Scott M. Alvord
salvord@byu.edu

Timothy L. Face

Follow this and additional works at: <https://scholarsarchive.byu.edu/facpub>



Part of the [Spanish and Portuguese Language and Literature Commons](#)

Original Publication Citation

Alvord, Scott M. and Timothy L. Face. 25. Descriptive adequacy vs. psychological reality: The case of two restrictions on Spanish stress. *Studies in the Linguistic Sciences* 32:2 1-16.

BYU ScholarsArchive Citation

Alvord, Scott M. and Face, Timothy L., "Descriptive Adequacy vs. Psychological Reality: The Case of Two Restrictions on Spanish Stress Placement" (2005). *Faculty Publications*. 349.
<https://scholarsarchive.byu.edu/facpub/349>

This Peer-Reviewed Article is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Faculty Publications by an authorized administrator of BYU ScholarsArchive. For more information, please contact ellen_amatangelo@byu.edu.

STUDIES IN THE LINGUISTIC SCIENCES
(ISSN 0049-2388)

PUBLICATION OF THE DEPARTMENT OF LINGUISTICS
WITH SUPPORT OF THE HUMANITIES COUNCIL IN THE
COLLEGE OF LIBERAL ARTS AND SCIENCES OF THE
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

MANAGING EDITOR: Peter Lasersohn
EDITORIAL ASSISTANTS: Hee Youn Cho, Aimee Johansen

EDITORIAL BOARD: Elmer Antonsen, Karlos Arregi, Elabbas Benmamoun, Rakesh Bhatt, Eyamba G. Bokamba, Chin-Chuan Cheng, Jennifer S. Cole, Georgia M. Green, Hans Henrich Hock, José I. Hualde, Braj B. Kachru, Yamuna Kachru, Chin-W. Kim, Charles W. Kisseberth, Peter Lasersohn, Molly Mack, Howard Maclay, Jerry L. Morgan, Rajeshwari Pandharipande, Chilin Shih, Richard Sproat, James H. Yoon, and Ladislav Zgusta.

AIM: *SLS* is intended as a forum for the presentation of the latest original research by the faculty and students of the Department of Linguistics, University of Illinois, Urbana-Champaign. Scholars outside the Department and from other institutions are also cordially invited to submit original linguistic research for consideration. In all cases, articles submitted for publication will be reviewed by a panel of at least two experts in the appropriate field to determine suitability for publication. Copyright remains with the individual authors. Authors of articles will receive one copy of the particular issue and 10 offprints of their individual contributions.

SLS appears twice a year, and one issue is traditionally devoted to restricted, specialized topics. A complete list of available back issues is on the last page of this issue.

BOOKS FOR REVIEW: Review copies of books may be sent to:
Review Editor, *Studies in the Linguistic Sciences*
Department of Linguistics, 4080 For. Lang. Bldg.,
University of Illinois
707 S. Mathews.
Urbana, IL 61801, USA

SUBSCRIPTION: Requests for subscriptions should be addressed to *SLS* Subscriptions, Department of Linguistics, 4080 Foreign Languages Building, University of Illinois, 707 South Mathews, Urbana, Illinois 61801.

Price: \$20.00 per single issue.

e-mail address: slingsci@uiuc.edu
Telephone: (217) 333-3563
Fax: (217) 244-8430

Homepage: <http://www.linguistics.uiuc.edu/sls/index.html>

Studies in the Linguistic Sciences
Volume 32, Number 2 (Fall 2002)

**DESCRIPTIVE ADEQUACY VS. PSYCHOLOGICAL REALITY: THE
CASE OF TWO RESTRICTIONS ON SPANISH STRESS PLACEMENT***

Timothy L. Face and Scott M. Alvord
University of Minnesota
facex002@umn.edu, alvor002@umn.edu

This paper examines two supposed restrictions on Spanish stress placement: 1) the heavy penult condition, which prohibits stress leftward of the penultimate syllable if the penultimate syllable is heavy, and 2) the three-syllable window condition, which prohibits stress other than on one of the final three syllables of a word. While these two conditions are clearly descriptively adequate generalizations about the lexicon, this study sets out to determine whether they are psychologically real restrictions, serving as constraints that prohibit words that violate them. The results of a perception study indicate that neither of these conditions is a psychologically real restriction on Spanish stress placement. While the present study adds another type of evidence to recent claims that Spanish is not quantity sensitive, it goes a step further with respect to the heavy penult condition by claiming that words that violate this condition are not disallowed by Spanish at all. With respect to the three-syllable window condition, this study is the first to claim that this exceptionless generalization about Spanish stress is nothing more than a generalization over words in the lexicon, and is not a true restriction on Spanish stress placement.

1. Introduction

In the quest to explain the Spanish stress system, at least two major restrictions on Spanish stress placement have been taken for granted by many investigators: 1) the heavy penult condition, and 2) the three-syllable window condition. The heavy penult condition states that Spanish does not allow words with stress on the antepenultimate syllable if the penultimate syllable is heavy (i.e., *'CVC.CVC.CV). While the heavy penult condition is often tied to the role of quantity sensitivity in Spanish stress assignment, which has been a topic of debate over the last several years (e.g., Alvord 2003; Bárkányi 2002; Face 2000, 2004; Harris 1983; Lipski 1997; Roca 1990), the heavy penult condition itself has almost always been considered a productive restriction on Spanish stress placement, whether explained by quantity sensitivity or in another way.¹ The evidence in

* We would like to thank an anonymous reviewer as well as the audience at the 7th Hispanic Linguistics Symposium (Albuquerque, 16-18 October 2003) for useful comments and suggestions on an earlier version of this paper.

¹ We want to be clear in our distinction here. The term *quantity sensitivity* is often used in Spanish to refer to the lack of stress leftward of a heavy penultimate syllable. However, quantity sensitivity is merely an

support of the heavy penult condition is that, with the exception of a few toponyms and borrowings, Spanish has no words in violation of this condition. The three-syllable window condition has also been taken as an indisputable restriction on Spanish stress placement. The evidence for the three-syllable window condition is that there exist no Spanish words where stress falls outside of the last three syllables (e.g., * 'CV.CV.CV.CV). Apparent exceptions to this in the orthographical system are the result of one or more enclitic pronouns being attached to the lexical word in orthography (e.g., *dígamelo* 'tell me it'). But no lexical word violates the three-syllable window condition.

While these apparent restrictions on Spanish stress placement are descriptively true, not all descriptively true statements about a language are representative of the psychological reality of the speakers of that language. Kiparsky (1982) puts it quite clearly in discussing Hale's (1973) findings for passive formation in Maori (further discussed in Hualde 2000), that the simplest analysis of the data do not represent the behavior of speakers in cases of borrowings, change in progress, etc. The relevant data are shown in (1).

(1)	<i>verb</i>	<i>passive</i>	<i>verb</i>	<i>passive</i>
	awhi	awhitia 'to embrace'	mau	mauria 'to carry'
	hopu	hopukia 'to catch'	wero	werohia 'to stab'
	aru	arumia 'to follow'	patu	patua 'to strike, kill'
	tohu	tohuria 'to point out'	kite	kitea 'to see, find'

Kiparsky (1982:68) states that:

If we wanted an 'A' on our exam, we would, of course, say that the underlying forms are /awhit/, /hopuk/, /maur/, etc., and that the suffix is /ia/....If someone were to say that the underlying forms are /awhi/, /hopu/, /mau/, etc., he'd flunk. What Hale shows is that Maori children learning their language flunk this 'exam'....There is strong evidence that the 'clever' analysis is not psychologically correct. The psychologically correct grammar of Maori has /tia/ as the basic ending and /kia/, /ria/ etc., as a set of allomorphs used in verbs that have to be lexically marked as taking them.

The Maori data are just one example of cases where descriptively true statements do not correspond to psychological realities. This has been discussed by many linguists, including a growing number of studies on Spanish (Morin 2002 for coronal and velar softening, Aske 1990 and Face 2003 for stress rules, Bárkányi 2002 and Alvord 2003 for quantity sensitivity, Bybee & Pardo 1981 for diphthongization, Pensado 1997 for nasal and lateral depalatalization, Eddington 2001 for epenthesis, and others). These cases highlight the necessity of pursuing

explanation for why stress does not exist leftward of a heavy penultimate syllable. That is to say, quantity sensitivity may (attempt to) explain the heavy penult condition, but it is not itself the heavy penult condition. We take the heavy penult condition as the apparent restriction on stress leftward of a heavy penultimate syllable, regardless of what explanation (quantity sensitivity or otherwise) may be given for its existence.

not only descriptive adequacy in formulating phonological statements, but in assuring that these statements reflect psychological reality. As Hualde (2000:175) puts it,

Our task, thus, is to discover which generalizations have reality for the speakers of a language, as reflected by their linguistic behavior, without being misled by preconceived notions of simplicity.

In the current paper, then, the task is to determine whether the heavy penult condition and the three-syllable window condition are psychologically real in addition to being descriptively adequate, or whether they are descriptively adequate but lack reality for speakers of Spanish. In order for these two conditions to be considered psychologically real, they must not only describe the data accurately, which they clearly do, but they must be shown to serve as constraints prohibiting words that violate them.

The current paper presents the results of a perception experiment testing the psychological reality of the heavy penult condition and the three-syllable window condition in Spanish. Previous research on the heavy penult condition and the three-syllable window condition is discussed in Section 2. Section 3 presents experimental methodology. The results are presented and discussed in Section 4. And finally, Section 5 contains the conclusions drawn from the present study.

2. Previous research

2.1. Heavy penult condition

Attempts to explain the synchronic processes that native Spanish speakers use to assign stress to words have sometimes used diachronic evidence gleaned from the Spanish language's development from Latin (e.g., Saltarelli 1997). The major stress-related phenomenon that has been taken from Latin and applied to Spanish is quantity sensitivity, which its proponents use to explain the lack of words violating the heavy penult condition.

Quantity sensitivity is a term used to describe the stress patterns in languages whose syllable structure, particularly the phonological "weight" of the syllable, directly affects how stress is assigned. Stress assignment in Spanish has traditionally been traced to the classical accentuation system of Latin, which has been one of the basic examples of quantity sensitive languages. Latin accentuation has been accepted to be entirely predictable. The rule for Latin stress, in words with at least three syllables, calls for stress on the penultimate syllable if it is heavy, and on the antepenultimate syllable if the penultimate syllable is light. A syllable's weight depends on the phonetic makeup of its rime. Latin syllables are heavy if they contain either a long vowel or a coda consonant; the rime of a light syllable contains only a short vowel. The Latin stress rule indicates that a heavy penultimate syllable will "attract" stress, preventing it from falling on the antepenultimate syllable. Quantity sensitivity is just that: stress is sensitive to syllable weight, and therefore a heavy syllable will attract stress.

The many attempts in generative phonology to formalize stress placement in Spanish non-verbs have disagreed on whether quantity sensitivity actually plays a role in the synchronic process. In one of the most notable works on Spanish stress, Harris (1983) uses quantity sensitivity as one of the conditions for his stress assignment algorithm, as he does in later work as well (Harris 1992). He notes that, as in Latin, no Spanish words with antepenultimate stress have a heavy penult (e.g., * 'CVC.CVC.CV), citing the unacceptability of nonce words such as **reléfosno* and **átasca*. Roca (1990), on the other hand, rejects Spanish quantity sensitivity, as did Larramendi (1729) more than two centuries earlier, and proposes an alternate analysis to explain the lack of words violating the heavy penult condition. He argues that the existence of loan words with heavy penultimate syllables and antepenultimate stress (e.g., *Wáshington*, *Mánchester*, *rémington* 'type of rifle') contradicts the presence of quantity sensitivity in Spanish. He argues that Spanish speakers who produce these loan words with the foreign stress pattern have no knowledge of the source language. Anecdotally, it has been noted, however, that native Spanish speakers with extensive contact with English can change the stress patterns of these loan words to fit a more Spanish-like pronunciation (e.g., *Washingtón*, *Manchestér*) (Núñez Cedeño, personal communication).

In a view somewhere in between those of Harris (1983, 1992) and Roca (1990, 1999), Lipski (1997) claims that it is possible that Spanish is losing its quantity sensitivity and that in the future it may become completely quantity insensitive. He points out the importance of one difference between Latin and Spanish: Spanish has no distinction between long and short vowels or between geminate and non-geminate consonants. In its evolution from Latin, Spanish lost the distinction of vowel and consonant length. The fact that Spanish does not distinguish between short and long vowels or consonants 'inherently weakens the system of quantity sensitivity' (Lipski 1997:577).

More recently a different approach in the attempt to find evidence for or against the existence of quantity sensitivity in Spanish has emerged. A variety of experimental studies have examined the role of quantity sensitivity in the assignment of Spanish stress. Face (2000, 2004a) performed perception experiments on Spanish stress placement. Both studies were performed using synthesized nonce words where the acoustic correlates to stress were neutralized. In the first study, Face (2000:8) found that 'syllable weight has a very real cognitive effect: A heavy syllable is far more likely to be perceived as stressed... than is a light syllable'. It was found later, however, that the nonce words used in this first study were not completely neutralized and in fact contained durational cues to stress. The duration of vowels, but not of syllables, was neutralized, and therefore the coda consonant of heavy syllables added duration in addition to phonological weight. After correcting this 'error of experimental design (Face 2004a) by neutralizing syllable durations as opposed to vowel durations, the

previous study was replicated with completely neutralized nonce words.² Results from this study were found to contradict the previous findings. Face (2004) concluded that Spanish is not quantity sensitive. Similar conclusions have been reached by researchers using different types of experimental data.

Bárkányi (2002) used a paper and pencil test with nonce words in which she asked informants to mark orthographically where they would stress each nonce word. The unmarked stress pattern (i.e., stress the last syllable if the word ends in a consonant or the penultimate syllable if the word ends in a vowel) emerged the most often in her data, as expected. However, a considerable number of words with heavy penultimate syllables were assigned antepenultimate stress, and this number was nearly as high as in cases with a light penultimate syllable. This led Bárkányi to conclude that quantity sensitivity is not an active process for native Spanish speakers and that stress is most likely assigned using analogy to known words in the lexicon, which in this case are borrowing such as *bádminton* 'badminton' and *rémington* 'type of rifle'.

In a similar study, Alvord (2003) presented Spanish-speaking subjects with a written list of nonce words with orthographic accents written in. Participants were asked to judge each word as either possible or impossible in Spanish. Nonce words that were presented with antepenultimate stress and heavy penults (e.g., *támpunlo*) were overwhelmingly accepted as possible Spanish words (94%). Alvord (2003) not only concluded that Spanish is not quantity sensitive, but also questioned whether the oft-cited restrictions on antepenultimate stress in words with a heavy penultimate syllable might not be productive restrictions at all, but rather the results of historical developments, as also argued in Roca (1990). While the quantity sensitivity explanation for the heavy penult condition has been a matter of debate, Alvord goes beyond rejecting quantity sensitivity as the reason for the heavy penult condition, as he questions whether the heavy penult condition is even a restriction on Spanish stress placement at all. The conclusion that there is no restriction on having stress on the antepenultimate syllable when the penultimate syllable is heavy is of significant interest, and merits further investigation using other experimental designs.

2.2. Three-syllable window condition

There is not much to report by way of research into the three-syllable window condition. The primary evidence cited for the existence of this condition in Spanish is the simple absence of words that have stress in any syllable other than the last three. The most interesting evidence that can be found is the pluralization of singular words with antepenultimate stress that also end in a consonant (Hualde 2000, Morales-Front 1999). Generally, when singular words in Spanish are pluralized, the same syllable is stressed in the plural as in the singular. Examples of this can be seen in (2a). However, in cases where the singular has

² José Ignacio Hualde pointed out that neither neutralizing vowel duration or syllable duration is truly representative of natural speech, as in heavy syllables the rime is longer than in light syllables, though the vowel itself is shorter. For the purpose of controlling factors in the perception studies, however, this type of neutralization is necessary.

antepenultimate stress and a final consonant, stress shifts so that it remains within the three-syllable window, although the location of stress in the plural varies. Examples of this shift can be seen in (2b).

- (2) a. péra~péras 'pear~pears'
 tabú~tabúes 'taboo~taboos'
 camión~camiónes 'truck~trucks'
- b. régimen~regímenes 'diet~diets'
 ómicron~omicrónes 'omicron~omicrons'

The three-syllable window condition is clearly descriptively true and its productivity has never been questioned. However, since descriptively adequate statements about language do not always represent psychologically real restrictions on the language, and especially in light of Alvord's (2003) claim that the heavy penult condition may not be psychologically real, all apparent restrictions on Spanish stress placement, including the three-syllable window condition need to be re-examined.

3. Methodology

The experiment carried out for the present study was designed to further test the claim in Alvord (2003) that the heavy penult condition is not a psychologically real and productive restriction on Spanish stress, and also to experimentally test whether the three-syllable window condition is a psychologically real and productive restriction or the artifact of other factors. The experiment seeks to investigate these issues through a perception test in which subjects were asked to judge the acceptability of synthesized nonce words.

In order to test the psychological reality of these two descriptively adequate potential restrictions on Spanish stress placement, a perception test was designed that looks closely at both of the environments described above. Since the evidence cited for the heavy penult condition is the absence of Spanish words with antepenultimate stress and a heavy penultimate syllable, nonce words with these characteristics (i.e., 'CVC.CVC.CV) were included. Similarly, the evidence for the existence of the three-syllable window condition is the absence of Spanish words with stress earlier in the word than the final three syllables, and therefore nonce words with stress on the fourth-to-last syllable (i.e., 'CV.CV.CV.CV) were included in the perception test.

In all, 100 nonce words were created (see Appendix) and synthesized using the MBROLI speech synthesizer. Since stress is the main focus of the study, special care was taken in the synthesis process to encode stress. The fundamental frequency (F0) and the duration of segments were manipulated in order to synthesize the acoustic presence of stress. While the MBROLI speech synthesizer allows for manipulation of the F0 and duration, it does not allow for the manipulation of intensity. However, experimental studies investigating the acoustic correlates of stress from both the production and perception perspectives have found that F0 and duration are by far the most important acoustic correlates

of Spanish stress, with intensity having a minimal role, if any, in communicating Spanish stress (e.g., Enríquez, Casado, & Santos 1989; Llisterri et al. 2003, 2004; Quilis 1971).³

All words were designed not only to fit the target structures for syllables and stress, but also to follow Hochberg's (1988) guidelines for segmental composition to avoid close similarity to real Spanish words. This was done to avoid the existence of a similar real word influencing the acceptability judgments on the experimental words through the association of existing words and their stress patterns (cf. Face 2004a). In order to ensure that the nonce words were indeed not too similar to existing words, the list of nonce words was checked by a native Spanish speaker, and any words that were found to resemble actual words too closely were subsequently changed.

The 100 synthesized nonce words consist of four different groups of words, with each group having a different function in the experiment. There were two experimental groups and two control groups. The first experimental group (N=20), was created in order to test the psychological reality of the heavy penult condition. This group consists of nonce words, following the phonotactic patterns of Spanish, with heavy penultimate syllables which were synthesized to carry antepenultimate stress (e.g., *gántirpo*). As explained above, this type of word has been claimed not to be possible in Spanish, existing only in a few toponyms and borrowings. This claim, however, has been brought into question by Alvord (2003). Acceptance of the words in the heavy penult group would support Alvord's claim that the heavy penult condition is not a psychologically real restriction on Spanish stress placement. Rejection of these nonce words would support the traditional view that there is a restriction on this type of word in Spanish.

The second experimental group (N=20) was designed to test the psychological reality of the three-syllable window condition. This group consists of nonce words with four syllables and stress falling on the first (e.g., *tópuneta*). In order to test the psychological reality of the three-syllable window condition, it is important that the nonce words be analyzable only as whole lexical words and not combinations of a lexical word plus enclitic pronoun, since at least orthographically these cases appear to violate the three-syllable window condition. Because of this, care was taken in designing the nonce words so that the last syllable would not be interpretable as a clitic pronoun (e.g., *te, me, se, lo, la, le*). Acceptance of the nonce words in the three-syllable window group would call into question the psychological reality of the three-syllable window condition as a productive restriction on Spanish stress placement. The rejection of these nonce words would indicate that the lack of words violating the three-syllable window condition in Spanish is indeed due to this condition being a productive restriction on stress placement.

³ This same view had been maintained for English, but Beckman (1986) shows that intensity actually provides a strong cue for stress when correctly evaluated (i.e., when integrated with duration).

The other two groups of nonce words were included as a measure of control. The first control group (N=30) consisting of only obviously possible Spanish words, with each containing phonotactic and stress patterns that actually exist in real Spanish words. The second control group (N=30), on the other hand, contained nonce words that were designed to be obviously impossible Spanish words, going against Spanish phonotactic patterns, generally by containing consonant clusters disallowed in Spanish. These two groups of words served as a measure of control to ensure that the subjects could differentiate between possible and impossible Spanish words, since this ability is essential if the results for the experimental groups are to be meaningful. At least 80% accuracy on the control groups was required for the data of potential subjects to be counted in the analysis of the experimental groups.

The 100 nonce words were randomized and recorded as individual .CDA files onto a compact disc with 3 seconds of silence between each word. The CD was played on a Panasonic SL-S262 portable CD player and listened to via Panasonic stereo headphones. Before beginning the official test, a practice set of five words was presented to the subjects so that they could adjust their ear to the synthesized voice and the rhythm of the presentation. Subjects were allowed to listen to the practice session as many times as they wanted to in order to feel comfortable in completing the task. After the subjects listened to the practice section, the test words were presented, and no repetition was permitted. The subjects recorded their judgments on a sheet of paper numbered from 1 to 100 with the words *si* and *no* written next to each number. For each word heard, subjects were asked to circle the appropriate answer according to whether or not the word they heard was a possible Spanish word. The notion of "possible Spanish word" was explained to subjects by telling them that while none of the words they would hear were real Spanish words, the question they needed to answer was whether each word could be a Spanish word if a new word was needed for a concept not communicated by any existing Spanish word.

Since any claim in the present study about the psychological reality of the heavy penult condition and the three-syllable window condition as restrictions on Spanish stress placement hinges on the acceptance or rejection of nonce words based on their acoustically marked stress, it is imperative that the subjects be able to identify the acoustically stressed syllable in these synthesized nonce words. As an additional measure of control, a post-test was administered to the subjects in which 20 of the synthesized words from the "possible" group were re-presented and the subjects were asked to indicate which syllable they heard as stressed. Subjects recorded their answers on a sheet of paper numbered from 1 to 20, with each number followed by the numbers 1, 2, and 3. Subjects circled the number of the syllable perceived to be stressed. This post-test was administered immediately following the completion of the main experiment, and this ordering was chosen to avoid directing the subjects' attention to stress as the main interest of the study before completing the acceptability judgments. Subjects were required to perceive stress with at least 75% accuracy to have their results included in the study. The

average score on the post-test was 85%, indicating that the subjects were very accurate in identifying the acoustically stressed syllable of the synthesized nonce words.

Subjects were 10 native speakers of Spanish attending graduate school in the United States who were naïve with respect to the purposes of the study. All grew up monolingual speakers of Spanish and none had lived in the U.S. prior to attending graduate school. While the subjects speak different varieties of Spanish, this mixture of Spanish dialects does not pose any problem for the present study since the apparent restrictions on stress patterns being tested are consistent across Spanish.

4. Results and discussion

Table 1 shows the results of the perception test. Nonce words in the two control groups were accepted or rejected as would be expected. Nonce words in the "possible" group were accepted at a rate of 81% and the words from the "impossible" group were rejected at a rate of 89%. More interesting are the results for the two experimental groups. Subjects accepted nonce words in the heavy penult group at a rate of 67% (133 of 200) and those in the three-syllable window group at a rate of 62% (123 of 200).

Table 1. Acceptability judgments by nonce word group

	Yes		No		Totals
	#	%	#	%	
Heavy Penult	133	67%	67	34%	200
3 Syllable Window	123	62%	77	39%	200
Possible	244	81%	56	19%	300
Impossible	32	11%	268	89%	300
Totals	532	53%	468	47%	1000

The result in Table 1, as well as in Figure 1, that stands out is that both experimental groups were accepted more often than they were rejected, and far more often than the impossible group. While the experimental groups were not accepted as often as the possible group, it is clear that their rate of acceptance is more similar to that of the possible group than to that of the impossible group. Overall, nonce words in both experimental groups are accepted as possible Spanish words.

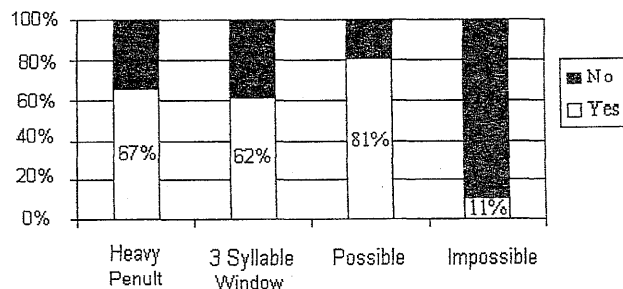


Figure 1. Acceptability judgments by nonce word group.

In order to see how the acceptability of each group compares to the other groups, a chi-squared analysis was performed. A chi-squared test comparing all four groups shows that the distribution of acceptance across groups is statistically significant ($p < 0.0001$). This result is to be expected, however, given the presence of the control groups, where the impossible group was required to be rejected and the possible group was required to be accepted. In order to see if the acceptability of the experimental groups differs significantly from the control groups, subsequent chi-squared analyses are needed. These analyses indicate that the rate of acceptance of each of the two experimental groups differs significantly from that of each of the two control groups ($p < 0.001$). Furthermore, another chi-squared analysis indicates that the two experimental groups do not differ significantly from each other in their rate of acceptance ($p = 0.27$). We can interpret these results as meaning that the words in the heavy penult and three-syllable window groups were placed into their own group by subjects in terms of rate of acceptability. We end up, thus, with three groups: 1) the possible group, accepted as possible Spanish words at a very high rate, 2) the experimental groups, accepted more often than not, but less than the possible group, and 3) the impossible group, rarely accepted as possible Spanish words.

The overall acceptability of the heavy penult group lends support to recent experimental studies that claim that Spanish is not quantity sensitive (Alvord 2003, Bárkányi 2002, Face 2004a). In addition, it provides support for Alvord's claim that the heavy penult condition is not a psychologically real and productive restriction on Spanish stress placement.

The acceptability of the three-syllable window group is perhaps more interesting. The descriptive adequacy of the three-syllable window condition cannot be refuted, as Spanish has no words with stress outside of the final three syllables of the word. The results of the present study, however, bring into question the psychological reality of the three-syllable window condition as a true restriction on Spanish stress placement. Hualde (2000:175), while arguing for an analogical model for Spanish stress, explains that Spanish speakers make

generalizations based on patterns in the lexicon. He uses the three-syllable window condition as an example, stating that 'Spanish-speakers know that the plural of *régimen*, *ómicron*, *Júpiter*, whatever it is, cannot be *régimenes*, *ómicrones*, *Júpiteres*'. This generalization on the part of Spanish speakers makes perfect sense given the categorical presence of stress on only the last three syllables of Spanish words. Given the seeming strength of this generalization, it may seem odd that words violating the three-syllable window condition would be judged to be possible Spanish words. If this condition were a psychologically real restriction on Spanish stress placement, one would expect the words in violation to be rejected at a rate similar to the high rate of rejection of the impossible group. Clearly, however, this is not the case.

While the nonce words of the experimental groups were not rejected at a rate similar to the nonce words of the impossible group, and while they were accepted overall, the question of why they were not accepted as often as the nonce words of the possible group must be addressed. This is where the lack of existing words having these patterns comes into play. While the nonce words of the experimental groups are accepted overall, numerous recent studies have shown that an individual's language experience and the frequency of occurrence of words and patterns is an important part of their competence (e.g., Bybee 2001, Bybee & Hopper 2001, and references therein). The fact that Spanish speakers have never heard words with these patterns makes them seem less "Spanish-like" than words that follow familiar patterns. Therefore, while they are not completely rejected in the way that the words in the impossible group are, the relative degree of unfamiliarity of their stress patterns in comparison with those of the nonce words in the possible group results in a somewhat lower rate of acceptance.

One possible explanation is that segmental factors are more salient to listeners than is stress placement in determining whether a nonce word is a possible Spanish word. If this explanation is accurate, the nonce words violating the heavy penult condition and the three-syllable window condition may have sounded "more Spanish-like" than the nonce words whose segmental combinations made them unacceptable (i.e., the impossible group). While this explanation is possible, the huge difference in how the two experimental groups and the impossible group were accepted, along with the overall acceptance of the experimental group, makes this explanation seem unlikely.

The other possibility, indicated by the current results, is that the heavy penult condition and the three-syllable window condition, while descriptively adequate, are not psychologically real restrictions on Spanish stress placement. The concept of descriptive truths not necessarily corresponding with psychological reality is not a new one. In fact, much recent evidence that has been brought forth in favor of such an idea has come from experimental work on Spanish stress (e.g., Aske 1990; Eddington 2000, 2004; Face 2003, 2004a; Hualde 2000; Waltermire 2004).

5. Conclusion

The present study has presented results from a perception experiment examining the psychological reality of two apparent restrictions on Spanish stress placement. The first apparent restriction examined is the apparent prohibition against words with antepenultimate stress that have a heavy penultimate syllable (i.e., the heavy penult condition). The results of the experiment showed that nonce words in violation of this restriction were accepted overall as possible Spanish words. This finding lends support to the growing number of experimental studies that have found that Spanish is not quantity sensitive (e.g., Alvord 2003, Bárkányi 2002, Face 2004), presenting another type of evidence, but also supports the suggestion in Alvord (2003) that the heavy penult condition is not a psychologically real restriction on Spanish stress placement.

The second apparent restriction examined is the apparent prohibition against words with stress outside of the final three syllables (i.e., the three-syllable window condition). The overall acceptance of nonce words stressed on the fourth to last syllable calls into question the psychological reality of the three-syllable window restriction on Spanish stress. As this is the first experimental study to investigate the three-syllable window condition, further examination is certainly required before sweeping conclusions can be drawn. However, the results of the present study indicate that the three-syllable window condition is not a psychologically real restriction on Spanish stress placement.

In the cases of the heavy penult condition and the three-syllable window condition in Spanish, clearly it is true that, with the exception of a few toponyms and borrowings in the case of the heavy penult condition, the Spanish lexicon consists only of words that follow these conditions. There is no question, then, that they are descriptively adequate generalizations about stress placement in Spanish. But it is one thing to formulate a descriptive generalization over the lexicon and another thing altogether to say that this descriptive generalization functions as a constraint disallowing words that violate it. If a descriptive generalization about the lexicon were indeed shown to be used by speakers of the language as a constraint prohibiting words that violate the generalization, then it would be possible to say that there exists a psychologically real restriction on the language. In the case of the two apparent restrictions on Spanish stress considered in this paper, however, this is clearly not the case. The heavy penult condition and the three-syllable window condition are descriptive generalizations over the Spanish lexicon, but they do not serve as a constraint that prohibits words that go against these generalizations, and therefore they cannot be considered psychologically real restrictions on Spanish stress placement.

An issue deserving of comment is the fact that there are exceptions to the heavy penult condition in borrowings and foreign names (e.g., *Frómista*, *Mánchester*, *rémington* 'type of rifle'), but no exceptions to the three-syllable window condition, despite the fact that there are foreign place names such as Slovak *Brátislava*, which when pronounced in Spanish becomes *Bratisláva*. This is especially interesting since in the present study no significant difference was

found between the status of the nonce words violating the heavy penult condition and those violating the three-syllable window condition. Unfortunately, we have no great insight into why exceptions exist to only the heavy penult condition. One possibility mentioned by an anonymous reviewer is that Spanish has been in contact with Germanic languages, which are the source of the exceptions mentioned above, but not with languages, such as Hungarian, Finnish or Czech, where stress four or more syllables from the end is possible. There are, for example, very few Slovak-Spanish bilinguals who could serve as a model for the correct pronunciation of *Bratislava*. This is a possible explanation for the distribution of exceptions to the two conditions in question, but leaves other questions unanswered. For example, Spanish speakers have a much more difficult time forming the plural of *Júpiter* 'Jupiter' than they do forming the plural of *Saturno* 'Saturn'. Stress is almost always on the same syllable in plurals as in singulars, and this poses no problem in forming *Saturnos* 'Saturns'. However in forming the plural of *Júpiter*, an additional syllable must be added, resulting in the segmental sequence *Jupiteres*. In this case, if stress is left in the same place as in singulars, it falls on the fourth syllable from the end. Yet Spanish speakers do not produce stress on that syllable, but generally struggle in deciding between stressing the penultimate or the antepenultimate syllable. The likely explanation for this difficulty is the lack of model singular-plural pairs, which exist (e.g., *régimen~regímenes* 'diet~diets') but are extremely rare. Of course, there are no examples of words with stress outside of the final three syllables of the word, and this may make speakers even more likely to shift stress in the plural of *Júpiter*, even though the results of the present study indicate that there is no real restriction against a word such as *Júpiteres*. But while the explanation of contact with Germanic languages and not with languages such as Hungarian, Finnish and Czech may explain the existence of exceptions to the heavy penult condition and not the three-syllable window condition, there is no way at this point to determine whether or not this is the correct explanation.

In addition to presenting specific results with respect to the heavy penult condition and the three-syllable window condition in Spanish, the present study adds to the growing body of research that questions the connection between descriptive truths and psychological reality in linguistics. While many descriptively adequate statements are likely to also represent psychological reality for speakers of a language, the results of the present study emphasize that this is not always the case. Care must be taken in linguistic analysis to verify that statements based on descriptive facts about a language are not over-generalized to represent the psychological reality of speakers of that language without proper empirical investigation.

APPENDIX

Heavy Penult Group:

férelpa, támpunlo, pínquensa, cándoide, lárdanta, víntento, péntoslo, tímpelto,
dínputna, ránlinta, gántirpo, zéntolpa, párdungo, mínpurco, rínlambo, nóduita,
lúmponto, zélsimpa, pómpurta, númpatro

Three-syllable Window Group:

gítulopa, pásirenu, bétrana, tópuneta, dáfulona, bílinalis, vólutaso, nólumoda,
étrapolo, rátepano, lópirena, líteslope, ónlapenu, dásecopo, télucepe, cíderoti,
cáfunoli, cábilato, nápulatra, múlofane

Impossible Group:

nequícprta, skrilzareio, chticnarp, sñólprrt, ercbatris, jtcapruts, datbánc, zogpinrp,
chagtjtup, gkimzin, txcopné, llesdtard, sirrímkbi, lopsuvkbi, lopntlist, réncop,
awsilnpt, kpouell, ivumgtra, ustgbro, wóasdpi, vinctzico, fíresnizcp, tvaóí,
btascát, dlpacstp, bcapintrrow, urrachpza, spoiíbt, sanstkípt

Possible Group:

tínaro, quitravo, tablumo, nafraño, dótene, estrínato, pañilpa, módora, cotrona,
cubosta, jarplista, calpemo, gilbresa, mufrismo, sortrinista, tuluván, licuspa,
nolema, lojarra, distropa, lotranó, viteno, pocudín, gatriza, sílzira, atranda, cíblaca,
pulatra, pónlita, blisín

REFERENCES

- ALVORD, Scott M. 2003. The psychological unreality of quantity sensitivity in Spanish: Experimental evidence. *Southwest Journal of Linguistics* 22:2.1-12.
- ASKE, Jon. 1990. Disembodied rules vs. patterns in the lexicon: Testing the psychological reality of Spanish stress rules. In: Hall, Koenig, Meacham, Reinman & Sutton (eds.), 30-45.
- BÁRKÁNYI, Zsuzsanna. 2002. A fresh look at quantity sensitivity in Spanish. *Linguistics* 40.375-94.
- BECKMAN, Mary. 1986. *Stress and Non-Stress Accent*. Dordrecht: Foris.
- BYBEE, Joan. 2001. *Phonology and Language Use*. Cambridge: Cambridge University Press.
- BYBEE, Joan & Paul HOPPER (eds.). 2001. *Frequency and the Emergence of Linguistic Structure*. Amsterdam: John Benjamins.
- BYBEE, Joan & Elly PARDO. 1981. On lexical and morphological conditioning of alternations: A nonce-probe experiment with Spanish verbs. *Linguistics* 19.937-68.
- CAMPOS, Elena Herburger, Alfonso MORALES-FRONT & Thomas J. WALSH (eds.). *Hispanic Linguistics at the Turn of the Millennium.*, Somerville, MA: Cascadilla Press.
- CEDEÑO, Rafael Núñez & Alfonso MORALES-FRONT (eds.). 1999. *Fonología Generativa Contemporánea de la Lengua Española*. Washington, DC: Georgetown University Press.
- EDDINGTON, David. 2000. Spanish stress assignment within Analogical Modeling of Language. *Language* 76.92-109.
- . 2001. Spanish epenthesis: Formal and performance perspectives. *Studies in the Linguistic Sciences* 31:2.33-53.
- . 2004. A computational approach to resolving certain issues in Spanish stress placement. In: Face (ed.).
- ENRÍQUEZ, Emilia V., Celia CASADO & Andrés SANTOS. 1989. La percepción del acento en español. *Lingüística Española Actual* 11.241-69.
- FACE, Timothy L. 2000. The role of syllable weight in the perception of Spanish stress. In: Campos, Herburger, Morales-Front & Walsh (eds.), 1-13.
- . 2003. Where is stress? Synchronic and diachronic Spanish evidence. In Kempchinsky & Piñeros (eds.), 21-39.
- . 2004a. Perceiving what isn't there: Non-acoustic cues for perceiving Spanish stress. In Face (ed.).
- . 2004b. *Laboratory Approaches to Spanish Phonology*. Berlin: Mouton de Gruyter.
- HALE, Kenneth. 1973. Deep-surface canonical disparities in relation to analysis and change: An Australian example. In: Sebeok (ed.), 401-58.
- HALL, Kira, Jean-Pierre KOENIG, Michael MEACHAM, Sondra REINMAN & Laurel A. SUTTON (eds.). 1990. *Proceedings of the Sixteenth Annual Meeting of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society.

- HARRIS, James W. 1983. *Syllable Structure and Stress in Spanish*. Cambridge, MA: MIT Press.
- . 1992. *Spanish Stress: The Extrametricality Issue*. Bloomington, IN: Indiana University Linguistics Club.
- HOCHBERG, Judith G. 1988. Learning Spanish stress: Developmental and theoretical perspectives. *Language* 64.683-706.
- HUALDE, José Ignacio. 2000. How general are linguistic generalizations? *CLS* 36.167-77.
- KEMPCZYNSKY, Paula & Carlos Eduardo PIÑEROS (eds.). 2003. *Theory, Practice, and Acquisition*. Somerville, MA: Cascadilla Press.
- KIPARSKY, Paul. 1982. *Explanation in Phonology*. Dordrecht: Foris.
- LIPSKI, John. 1997. Spanish stress: The interaction of moras and minimality. In: Martínez-Gil & Morales-Front (eds.), 559-93.
- LLISTERRI, Joaquim, María MACHUCA, Carme DE LA MOTA, Montserrat RIERA & Antonio RÍOS. To appear. *La percepción del acento léxico en español*. In: Homenaje a Antonio Quilis. Universidad de Valladolid, Consejo Superior de Investigaciones Científicas, and Universidad Nacional de Educación a Distancia.
- . 2003. The perception of lexical stress in Spanish. *Proceedings of the 15th International Congress of Phonetic Sciences*, 2023-6. Barcelona: Universitat Autònoma de Barcelona.
- MARTÍNEZ-GIL, Fernando & Alfonso MORALES-FRONT (eds.). 1997. *Issues in the Phonology and Morphology of the Major Iberian Languages*. Washington, DC: Georgetown University Press.
- MORALES-FRONT, Alfonso. 1999. El acento. In: Cedeño & Morales-Front (eds.), 203-30.
- MORIN, Regina. 2002. Coronal and velar softening in Spanish: Theoretical, historical and empirical evidence of lexicalization. *Southwest Journal of Linguistics* 21:1.137-63.
- PENSADO, Carmen. 1997. On the Spanish depalatalization of /ñ/ and /ʎ/ in rhymes. In Martínez-Gil & Morales-Front (eds.), 595-618.
- QUILIS, Antonio. 1971. Caracterización fonética del acento español. *Travaux de Linguistique et de Littérature* 9.53-72.
- ROCA, Iggy. 1990. Diachrony and synchrony in Spanish word stress. *Journal of Linguistics* 26.133-64.
- . 1999. Stress in the Romance languages. In: van der Hulst (ed.), 659-811.
- SALTARELLI, Mario. 1999. Stress in Spanish and Latin: Where morphology meets prosody. In: Martínez-Gil & Morales-Front (eds.), 665-94.
- SEBEOK, T. 1973. *Diachronic, Areal, and Typological Linguistics*. (Current Trends in Linguistics, 2) The Hague: Mouton.
- VAN DER HULST, Harry (ed.). 1999. *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter.
- WALTERMIRE, Mark. 2004. The effect of syllable weight on the determination of spoken stress in Spanish. In: Face (ed.).

Visit our

HOME PAGE:

<http://www.linguistics.uiuc.edu/sls/index.html>

for information on *SLS*,

including:

Editorial policy,

Style Sheet,

Contents of each issue to date,

Complete Author Index,

Ordering information and Order Form