# LINGUISTIC FACTORS IN L2 WORD STRESS ACQUISITION: A COMPARISON OF CHINESE AND VIETNAMESE EFL LEARNERS' DEVELOPMENT

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## ABSTRACT

This paper disambiguates two linguistic factors in L2 English word stress acquisition. Chinese learners of English have been found to prefer a syllable to be stressed when it is closed by a sonorant [6]. This non-English-like pattern is open to at least two interpretations: (a) an effect of L1 transfer, and (b) an effect of universal sonority-weight mapping. In order to evaluate the analyses, data was collected from L1 Vietnamese speakers whose native language allows both sonorant and obstruent codas. If the Vietnamese speakers do not show a preference for sonorant codas, then the L1 transfer interpretation is supported. If both groups acquire L2 English stress in a similar way, then an effect of phonological universal might be possible. These predictions are tested in a perceptual experiment. The results support the hypothesis that the L2 English stress pattern shown by L1 Chinese speakers is due to phonological universals.

**Keywords:** L2 phonology, interlanguage, English word stress

## 1. INTRODUCTION

L2 learners usually exhibit various types of non-target-like patterns when learning the phonological system of a target language. In the generative approach, two factors which are thought to be significantly related to these two types of errors are the learners' L1 phonological system and universal phonological principles [3]. This study aims to find a plausible explanation for one of the L2 English patterns attested in native speakers of Chinese, i.e., their preference for syllables to be stressed when closed by a sonorant [6]. That is, Chinese speakers treated sonorant codas as heavier than obstruent codas (e.g., *agénda >> enígma*). This pattern is non-English-like and is open to at least two interpretations. First, it might show the effect of L1 transfer. Chinese has CVS(onorant), which is always heavy, but CVO(bstruent) does not exist. If this is transferred, these learners will treat CVS as heavy but will not know what to do with CVO. Alternatively, it could be the effect of phonological universals: sonorous codas tend to contribute more weight to syllables than other types of codas [8]. In order to clarify which analysis is more likely to be true, data is needed from EFL learners whose native language allows both sonorant and obstruent codas. The predictions were as follows. If the preference found in the Chinese subjects is an effect of L1 transfer, then the speakers in the comparison group would not show a preference for sonorant codas rather than obstruent codas. On the other hand, if the speakers of both Chinese and the comparison group acquired L2 English stress in a similar way, say by being more sensitive to sonorous coda consonants than obstruent coda consonants, then other explanations such as an effect of the universal sonority-weight relationship might be possible.

The language chosen to contrast with Chinese is Vietnamese since the critical difference of these two languages is the inventory of coda consonants.

## 2. CHINESE AND VIETNAMESE PHONOLOGY

In this section, I briefly introduce some phonological characteristics of Chinese and Vietnamese in terms of syllables, sound inventories and tones.

First, there are 23 consonants in Mandarin Chinese, including 6 stops, /p/, /$p^h$/, /t/, /$t^h$/, /k/, /$k^h$/, 7 fricatives, /f/, /v/, /s/, /ʂ/, /ʐ/, /ɕ/, /x/, 6 affricatives, /ts/, /$ts^h$/, /ʂ/, /$ʂ^h$/, /tɕ/, /$tɕ^h$/, 3 nasals /m/, /n/, /ŋ/, and 1 lateral /l/ [1]. There are 18 consonants in Vietnamese, including 6 stops, /p/, /b/, /t/, /d/, /c/, /k/, 7 fricatives, /f/, /v/, /s/, /z/, /x/, /ɣ/, /h/, 4 nasals, /m/, /n/, /ɲ/, /ŋ/, and 1 lateral /l/ [7]. Second, there

are 7 simple vowels in Mandarin Chinese, including /i/, /ɛ/, /a/, /y/, /ə/, /u/ and /ɔ/ while there are 10 in Vietnamese, including /i/, /e/, /ɛ/, /ɨ/, /əː/, /ɜ/, /ɐ/, /u/, /o/, /ɔ/ [5]. Both languages also have complex vowels in addition to monophthongs, but these are not mentioned here since they are not related to our main concern. Third, Chinese and Vietnamese have similar syllable structures. They can be schematized as (C1)(G)V(C2). Chinese only allows the nasals /n/ and /ŋ/ in the coda position. (In addition, Peiking Mandarin allows /r/ in coda position.) However, Vietnamese allows many more coda consonants: the nasals /m/, /n/, /ɲ/, /ŋ/and voiceless stops /p/, /t/, /c/, /k/ are all allowed. When voiceless stops occur in final positions, they are unreleased. Some Vietnamese examples are shown in (1).

(1)

| Sonorant codas in Vietnamese (CVS) | Obstruent codas in Vietnamese (CVO) |
|---|---|
| a. nam 'year' | d. tiep 'welcome' |
| b. pin 'battery' | e. mot 'one' |
| c. dung 'be correct' | f. hoc 'to study' |

Fourth, similar to Chinese, Vietnamese is typologically classified as a tone language: its phonological use of pitch height has the function of distinguishing word meanings. Mandarin Chinese has four lexical tones [1], and Vietnamese has six [5].

After this simple introduction to the phonology of Chinese and Vietnamese, we now present the experiments conducted in this study.

## 3. EXPERIMENT

The paradigm used in this study is a perceptual stress preference task, which is widely used in testing L2 learners' stress placement and has been shown to be a valid means of eliciting data about L2 stress [4, 6]. In order to minimize variability, the experiment was the same as that conducted by Ou [6], described below.

### 3.1 Materials

The experiment was designed to test whether native speakers of Vietnamese and Chinese know that English stress shifts from the antepenultimate to the penultimate syllable when the penult contains a coda consonant (e.g., *Cá.na.da* vs. *e.níg.ma*) [2]. In order to avoid possible effects of memorization arising from real words, nonsense words were used. The experimental items were trisyllabic 16 non-words with either antepenultimate or penultimate stress. The penultimate syllable was either (i) open with a short nucleus (CV), or (ii) closed with a short nucleus (CVC). In half the test items the penultimate syllable was closed by a sonorous consonant and the other half were closed by obstruent consonants. The test items are presented in the Appendix. The non-words in carrier sentences were pre-recorded in a sound recording studio by a female native speaker from North America.

### 3.2 Subjects

Participants were either undergraduate or graduate students at the National University of Kaohsiung and National Kaohsiung University of Applied Sciences, Taiwan. There were 53 native speakers of Chinese and 43 native speakers of Vietnamese. The average age was 22.6, with a minimum 8-year experience of learning English. Participants were each paid NT.100.

### 3.3 Procedure

The items were presented randomly, controlled by E-Prime software. In each trial, a visual carrier sentence appeared on the screen, followed by two sound stimuli with an interval of 200 msec in between, each with a different pronunciation of the non-word in terms of stress placement. Subjects were tested individually in a quiet room with a PC. Two keys on the keyboard were labeled '1' and '2', to indicate the first sound stimulus and the second sound stimulus respectively. First, the subjects saw the visual stimulus e.g., *The* ____ *is white*, where the blank indicated the non-word (the non-word was not visually presented). They then heard two sentences one after the other, e.g., "*The* /nætɪmpə/ *is white. The* /nətímpə/ *is white*," and pressed a key to indicate which of the non-words sounded more natural as a potential English word. Each trial was played just once (i.e., 16 visual presentations and 32 audio presentations per listener).

## 4. RESULTS

Recall that the prediction was that if the learners were sensitive to the stress contrast associated with the syllable structure of penultimate syllables, they would prefer antepenultimate stress when the penult was CV (e.g., *ná.ti.pa* rather than *na.tí.pa*),

but when the penult was CVC they would prefer penultimate stress (e.g., *ba.síl.ka* rather than *bá.sil.ka*).

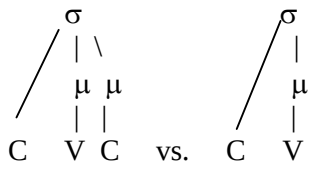
Considering the groups as a whole, these L2 learners showed no preference for one stress pattern or the other depending on syllable structure ($\chi^2(1) = 0.06$, n.s.). This is shown in Table 1.

**Table 1.** Preference for Penultimate Stress according to Type of Penultimate Syllable (CV and CVC)

| | **CV Mean (s.d.) in %** | **CVC Mean (s.d.) in %** |
|---|---|---|
| **Chinese learners of English (N = 53)** | 44.6 (13.7) | 51.8 (30.4) |
| **Vietnamese learners of English (N = 43 )** | 38.8 (15.3) | 49.6 (36.8) |

However, there was a large amount of variability in the CVC results in both groups, implying that at least some of the learners were sensitive to the stress difference associated with the two types of syllable structure. A more detailed look into the data reveals that eighteen of the Chinese speakers had a preference for stressed CVC penults which was within ±2SD of the English natives' mean preference [5], as shown in Table 5 below. T-tests confirmed that there was no significant difference in the preference for penultimate stress in words with a CVC penult between these 18 Chinese subjects and the 20 English subjects ($t(36) = 1.25$, n.s., two tailed), while there was a significant difference in the preference for penultimate stress in words with a CVC penult between the 18 successful Chinese subjects and the other 35 less successful Chinese subjects ($t(51) = 8.91$, $p = 0.000$, two-tailed). Using the same procedure, 11 Vietnamese subjects can be regarded as sharing the preference shown by native speakers of English for penultimate stress on CVC penults, ($t(29) = 1.47$, n.s., two tailed); their performance is significantly different from the other 32 less successful Vietnamese subjects ($t(41) = 7.63$, $p = 0.000$), two-tailed). These 18 Chinese subjects and 11 Vietnamese subjects, therefore, can be regarded as showing a native-like sensitivity to the weight distinction as shown in (2).

(2)




These successful learners (18 Chinese and 11 Vietnamese) preferred penultimate stress when the penult was CVC, and antepenultimate stress when the penult was CV. Since the stress placement preference of the less successful learners was more or less random, their results are removed from the following analysis.

We now consider whether the more successful subjects make a distinction between CVS and CVO when assigning stress, as this will show whether or not their sensitivity to English stress is conditioned by coda consonants (sonorant codas vs. obstruent codas).

The results for the successful Chinese learners show that they preferred penultimate syllables to be stressed when they were closed by a sonorant consonant compared to when they were closed by a sonorant consonant ($\chi^2(1) = 28.07$, $p<0.01$). This is shown in Table 2, where each cell shows the number of times that a particular form was selected by the group of successful learners. Note that there were 4 items of each type, presented to the 18 successful learners, giving a total out of 72 in each cell. Then when you come to Table 3 and Table 4 I'd add the comment that the data is presented in the same format as in Table 2.

**Table 2.** Stress preferences of the 18 successful Chinese learners according to the type of coda consonant

| | **σ ˈσ σ Penultimate** | **ˈσ σ σ Antepenultimate** | **$\chi^2(1)$** |
|---|---|---|---|
| **Sonorant coda** | 92%(N = 66/72) | 8% (N = 6/72) | 28.07, $p < 0.01$ |
| **Obstruent coda** | 60%(N = 43/72) | 40%(N = 29/72) | |

The results of the 11 successful Vietnamese subjects show that they have a similar preference to the Chinese subjects. Stress was preferred on penults closed by a sonorant compared to penults closed by an obstruent ($\chi^2(1) = 10.13$, $p < 0.01$). This is shown in Table 3.

**Table 3.** Stress preferences of the 11 successful Vietnamese learners according to the type of coda consonant

| | **σ ˈσ σ** | **ˈσ σ σ** | **$\chi^2(1)$** |
|---|---|---|---|
| **Sonorant coda** | 89%(N=39/44) | 11%(N=5/44) | 10.13, $p< 0.01$ |
| **Obstruent coda** | 71%(N=31/44) | 29%(N=13/44) | |

## 5. DISCUSSION

The first point of interest is that the results of the Chinese learners tested in this study replicate the results of Ou's previous research [5]. This can be seen by comparing Table 1 with Table 4 below

**Table 4.** Preference for Penultimate Stress according to Type of Penultimate Syllable (CV and CVC) (Ou [6])

| | CV Mean (s.d.) in % | CVC Mean (s.d.) in % |
|---|---|---|
| Native speakers of English (N = 20) | 40.6 (14.6) | 85.6 (13.7) |
| Chinese learners of English (N = 20) | 43.1 (12.5) | 50.6 (26.7) |

The finding that the successful Chinese learners in this study preferred penultimate stress on penults closed by a sonorant compared to penults closed by an obstruent is also a confirmation of the previous study, as shown in Table 5. We see that native speakers of English, however, do not make a distinction between sonorant codas and obstruent codas when they assign stress to the penult of trisyllabic nouns.

**Table 5.** Group Preferences for Stress Patterns according to Type of Coda Consonant (Ou[6])

| | σ ˈσ σ | ˈσ σ σ | $\chi^2(1)$ |
|---|---|---|---|
| **8 Chinese subjects** | | | |
| **CVS** | 91%(N = 29/32) | 9%(N = 3/32) | 22.13, $p < 0.01$ |
| **CVO** | 63%(N = 20/32) | 37%(N=12/32) | |
| **20 English subjects** | | | |
| **CVS** | 84%(N = 67/80) | 16%(N = 13/80) | 0.66, n.s. |
| **CVO** | 88%(N = 70/80) | 13%(N = 10/80) | |

Turning to address the more specific purpose of this study, recall that the prediction was stated as follows. Due to the different syllable structures allowed in the two tone languages under consideration, if Vietnamese subjects' performance is similar to the Chinese subjects, then the preference for penultimate stress on penults closed by sonorants is more likely due to phonological universals; if not, then tendency found in Chinese speakers is more likely due to L1 transfer.

As shown in Table 3 above, the Vietnamese subjects did show the same preference as Chinese subjects. Although Vietnamese, unlike Chinese, allows obstruent codas, the Vietnamese learners of L2 English still preferred syllables closed by a sonorant consonant to be stressed more than those closed by an obstruent consonant. This suggests that the preference of the Chinese learners may result from the universal tendency for sonorant codas to contribute more syllable weight cross-linguistically. However, before such a strong conclusion can be drawn, extensive data from EFL learners of stress languages is also required, in particular ones which allow both sonorant and obstruent coda consonants.

## APPENDIX: A list of test words

| Type 1: CV penult | | Type 2: CVC penult | |
|---|---|---|---|
| Visual stimuli | Auditory stimuli ́σσσ σσ́σ | Visual stimuli | Auditory stimuli ́σσσ σσ́σ |
| natipa | /nǽtɪpə/ /nətípə/ | bemfímpus/bénfɪmpəs//bənfímpəs/ | |
| sebika | /sébɪkər/ /səbíkər/ | natimpa /nǽtɪməpə//nətímәpə/ | |
| panitus | /pǽnɪtəs/ /pənítəs/ | vepilka /vépɪlka/ /vəpílkə/ | |
| pefira | /péfɪrə/ /pəfírə/ | basilka /bǽsɪlkə/ /bəsílkə/ | |
| terimy | /térɪmi/ /tərími/ | tobitla /tóbɪtlə/ /təbítlə/ | |
| tokifer | /tókɪfər/ /təkífər/ | trufidla /trúfɪdlə/ /trəfídlə/ | |
| varimi | /vǽrɪmi/ /vərími/ | pemisto /pémɪsto/ /pəmísto/ | |
| kabikus/kǽbɪkəs/ | /kəbíkəs/ | natiskus /nǽtɪskəs/ /nətískəs/ | |
| Example of carrier sentences: The ____ is [blue/red/white/black/pink]. | | | |

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