# *Feeling Righteous? Stress Shift in English L2 Learners*

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The Asian Conference on Language Learning 2015
Official Conference Proceedings

**Abstract**

This study examines the stress assignment of English suffixed words produced by L2 learners. The stimuli were disyllabic words and their two suffixed forms: in isolation, e.g. 'HUman', with neutral suffixes, e.g. 'HUman-ist', and with non-neutral suffixes e.g. 'huMAn-ity'. The addition of non-neutral suffixes in the present study induces two types of stress shift: (1) progressive shift in stem words with penultimate stress, e.g. MUsic to muSIcian and (2) regressive shift in stem words with ultimate stress, e.g. preFER to PREference. The stimuli were constructed using the spoken data from COCA (The Corpus of Contemporary American English). Each stimulus was presented in plain text without stress marks on a computer screen for 4 seconds and was repeated 4 times in a random order. Twenty-five L2 learners who are native Mandarin speakers were instructed to produce the word within the time limit. The reaction time was also monitored. The recordings were transcribed by a trained phonetician and the accuracy rate was tabulated. The results showed a significant lower accuracy rate and a longer reaction time in regressive shift pattern. It is thus postulated that there is an asymmetry between progressive and regressive shift patterns. The effect of stress location, lexical frequency, and stress awareness on the accuracy rate is discussed. The present study hopes to contribute to teaching English stress in an L2 context.

Keywords: Stress shift, Mandarin, Second Language, Foot structure, Suffix type

## Literature Review

### Stress placement and intelligibility

It has been shown in Filed (2005) that misplacement of lexical stress affect the intelligibility of both native and non-native learners. However, the phenomenon received less attention that the acoustic realizations of stress in L2 learners.

### Typology of suffix

According to Roach (2010), English suffixes can be categorized in three types: (1) suffixes carrying primary stress themselves, e.g. –ese and –eer in 'Vietamese' and 'pioneer'; (2) neutral suffixes that do not affect stress placement, e.g. –al and –ly as in 'magical' and 'lovely' suffixes; and (3) nonneutral suffixes that induces stress shift such as –ian and –ence in 'beautician' and 'competence'. (Celce-Murcia, Brinton, & Goodwin, 1996; Kreidler, 2004)

### Suffix and stress in second language learners

Shemshadsara (2011) investigated the production of neutral and nonneutral suffixes of 30 Persian speakers who learn English as a second language. The participants produce a stem in three conditions: unsuffixed, with neutral suffix and with nonneutral suffix. The study found that words with nonneutral suffixes induces higher error rate. However, the stimuli for non-neutral and neutral suffixes were not created systematically to examine the same stem with both neutral and nonneutral suffixes. The lexical frequencies of their stimuli were also not taken into account.

On the other hand, Chu (2013) recorded 20 Taiwanese students who learn English as L2 and found that nonneutral suffixation was generally more difficult than neutral suffixation. She also discovered a difference in performance between different foot type: trochaic stem words ('σσ) and words (σ'σ). Trochaic stem words showed higher accuracy rate. She inferred that it might originate from statistical learning that initial stress is more often. On the other hand, both trisyllabic and disyllabic stimuli with stress placed on the second syllable gained higher error rates than those with stress on the first syllable. Chu (2003) pointed out the possible modulating effect of syllable number, foot structure of stem and suffix type on stress shift in suffixed word; however, the factors involved in the analyses were too many and the interaction became too complex to tease apart the effect of these factors.

In sum, Shemshadsara (2011) suggested a possible performance difference between neutral and nonneutral suffixed words while Chu (2003) discovered some interaction between syllable number, foot structure of stem, and suffix type. The present study aims to explore two factors on English stress placement in disyllabic stems: foot strutcure (trochaic or iambic) and suffix type (null, neutral, nonneutral). In addition, given that nonneutral suffix could induce two types of stress shit: rightward/progressive (e.g. MUsic to muSIcian) or leftward/regressive (e.g. preFER to PREference), we would like to investigate the difficulties for these two types of shift patterns in L2 learners.

Our design differs from Chu (2012) in the following ways: 1) we adopt spoken frequency but not text frequency in order to tab the information which is more tuned into speech production 2) we focus on the foot structure of disyllabic stem for a closer examination on progressive and regressive stress shift: trochaic and iambic stem with non-neutral suffixes induces progressive (MUsic to musician) and regressive (preFER to PREFerence) stress shift respectively.

Previous studies by Shemshadsara (2011) and Chu (2013) yield different results on the accuracy rates of neutral and non-neutral suffixed words. Our hypothesis is as follows: non-neutral suffixes necessitate a shift in the stress placement and thus may be pronounced incorrectly compared to neutral ones. Furthermore, we predict that second language learners might have more difficulties in regressive shift compared to progressive shift.

**Methodology**

Stimuli

To explore the effect of Foot and Type, the stimuli were designed according to these two factors. Two types of disyllabic stems were constructed according to their foot structure: trochaic or iambic. Furthermore, each word along with their two suffixed forms form a suffix set: (1) in isolation, e.g. ‘HUman’, (2) with neutral suffixes, e.g. ‘HUman-ist’, and (3) with non-neutral suffixes e.g. ‘huMAN-ity’. Twelve sets of these triplets and a total of 36 words were used as stimuli. The neutral suffixes included –al, –ing, –ist, –ly, and–s; while the non-neutral suffixes that induces regressive stress included –ence and –ent. The frequency of the stimuli were queried using the spoken data from COCA (The Corpus of Contemporary American English at http://corpus.byu.edu/coca/ ).

| Trochaic stem | Neutral suffixed | Non-neutral suffixed |
|---|---|---|
| dictate (394) | dictating (120) | dictation (25) |
| music (19431) | musical (2454) | musician (1194) |
| beauty (2584) | beauties (78) | beautician (21) |
| human (16270) | humanist (23) | humanity (972) |
| normal (7221) | normally (3247) | normality (56) |
| noble (638) | nobly (12) | nobility (66) |

| Iambic stem | Neutral suffixed | Non-neutral suffixed |
|---|---|---|
| compete (1990) | competing (1219) | competence (275) |
| prefer (1707) | preferring (55) | preference (493) |
| defer (235) | deferring (39) | deference (145) |
| precede (47) | preceding (118) | precedent (822) |
| prevail (668) | prevailing (199) | prevalent (297) |
| reside (99) | residing (38) | resident (2010) |

**Participants**

Twenty-five college students (age 19-24. 10 male, 15 female) participated in the experiment. All of them had no speech or hearing impairment.

Procedure

The stimuli were presented using a subject testing software. Randomized stimulus was presented in plain text in lowercase without stress marks for 4 seconds with four repetitions. The participants were seated in front of a computer screen and wore a Microsoft LX3000 headset with a microphone placed about 8 cm from their lips. The participants were instructed to read the word shown on the screen naturally. The entire recording lasted about 10 minutes, followed by a language background questionnaire.

Stress placement rating

A total of 3600 tokens (36 words × 4 repetitions × 25 participants) were analyzed. The participants' productions were played and rated for the stress placement. A phonetically trained linguist rated the 25 participants' recordings and identified the stress placement. Segmental errors were not considered as error.

## Results

The overall accuracy result at a glance is presented in Fig. 1

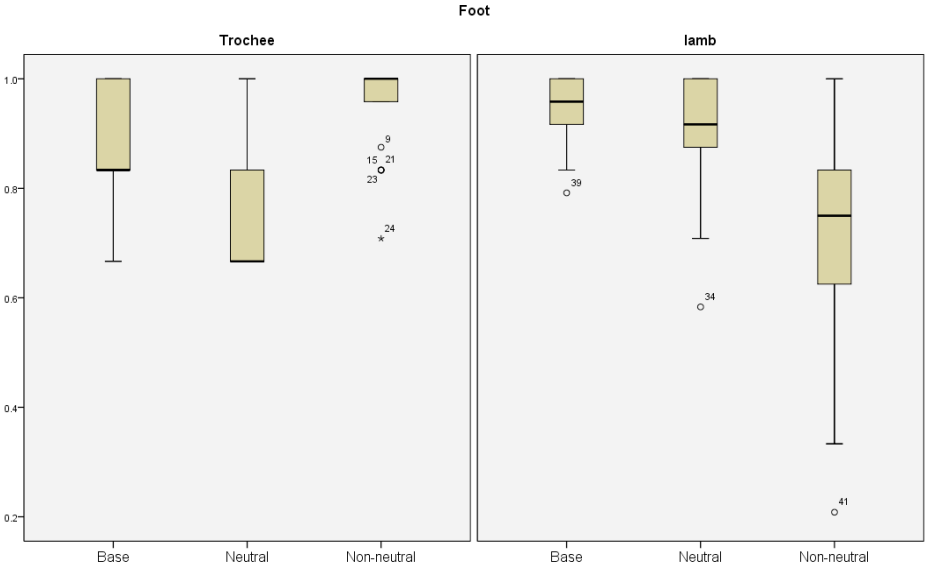


Figure 1. Accuracy rate of all foot structures and suffix types

A 2x3 repeated measure ANOVA was adopted to examine the effect of Foot and Type on the accuracy rate of stress shit. The results indicated the main effect of Foot is not significant $F(1, 24)=.28$ $p = .602$ (Fig. 2).

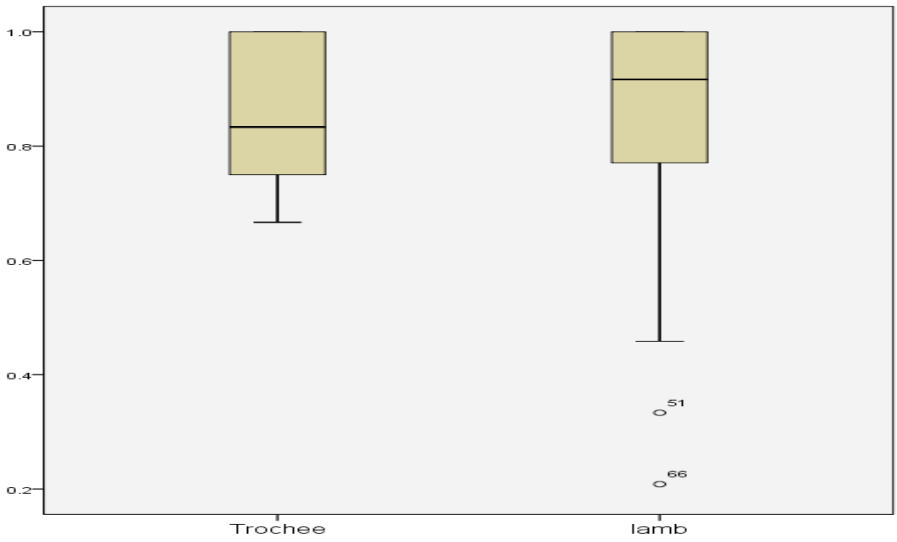


Figure 2. Accuracy rate by Foot.

On the other hand, the main effect of Type is significant, $F(2, 24) = 8.16$ $p = .001$ (Fig. 3.3). Posthoc comparison confirmed that the accuracy of Stem (M=.913, SD=.01) is significantly higher than Neutral (M=.824, SD=.016)and Non-Neutral (M=.832, SD=.021), yet there is no significant difference between the later.

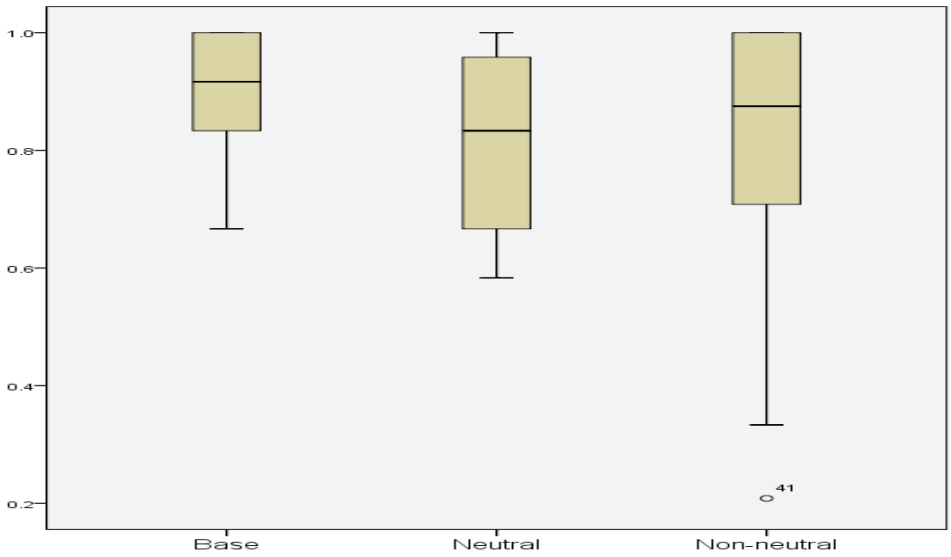


Figure 3. Accuracy rate by Type.

The interaction is also significant $F(2, 48) = 28$, $p < .001$, the significant interaction originates from the fact that words without suffix (Stem) and words with neutral suffix (Neutral) get higher accuracy in iambic foot. On the contrary, words with non-neutral suffix induces direct opposite performance— stem with trochaic foot seem (M=.95 SD=.081) to be significantly easier than iambic stem (M=.71, SD=.20).

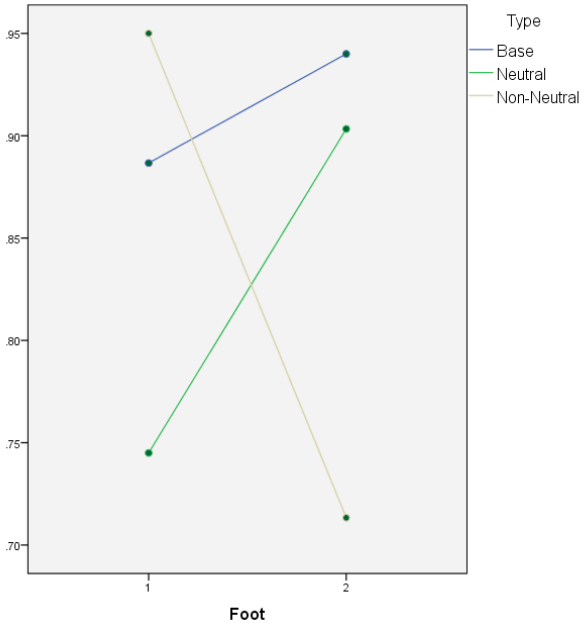


Figure 4. Interaction between Foot and Type.

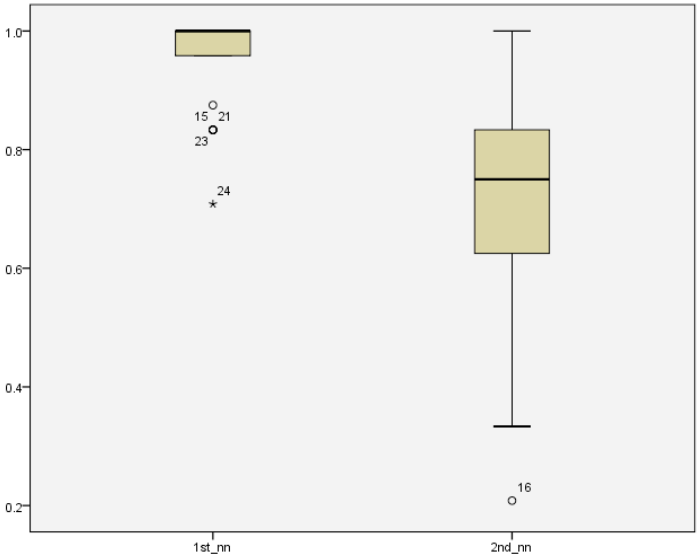


Figure 5. Pair-wise comparison between trochaic and iambic stems with nonneutral suffixes.

**Discussion**

The present study examines the stress assignment of English suffixed words produced by L2 learners with Mandarin L1 background. The stimuli were disyllabic words and their suffixed counter parts. The results indicated that regressive shift pattern is significantly harder for L2 learners. The asymmetry between progressive and regressive shift patterns was confirmed.

To further examine the non-neutral factor, which causes the significant interaction o Foot and Type, we compared the stimuli derived from trochaic and iambic foot. It is observed that for words with trochaic stem (e.g. human), non-neutral suffix induces progressive stress shift (e.g. humanity) whereas iambic stem (e.g. preFER) induces a regressive stress shift (e.g. PREference). Despite the fact that the lexical frequencies for the iamb-derived words are higher than trochee-derived words, they seem to be significantly more difficult, for second language learners. The frequency comparison could be found in Table 1.

(a)

| Trochaic stem | Non-neutral derivation |
|---|---|
| dictate (394) | dictation (25) |
| music (19431) | musician (1194) |
| beauty (2584) | beautician (21) |
| human (16270) | humanity (972) |
| normal (7221) | normality (56) |
| noble (638) | nobility (66) |

(b)

| Iambic stem | Non-neutral derivation |
|---|---|
| compete (1990) | competence (275) |
| prefer (1707) | preference (493) |
| defer (235) | deference (145) |
| precede (47) | precedent (822) |
| prevail (668) | prevalent (297) |
| reside (99) | resident (2010) |

Table 1. Lexical frequencies of trochaic (a) iambic (b) stems and their derived words with nonneutral suffixes.

We postulate that a possible factor behind the results could be that the most frequent suffixes: -tion, -ic, and -ity (data from White et al. 1989) all attract pre-suffixial stress and might have trigger a preference for that specific location. On the other hand, a cross-linguistic study should be conducted to examine if there are universal linguistic stress pattern in world languages.

**Limitation and further studies**

A possible confound of the present study was brought up by the audiences that the assumption of the present study is that the stem form is the base where the learners started their learning. However, a closer examination should be done for word sets in which suffixed words are more frequent than the base and the learners task would be re-docking the stress from the suffixed form. Issue of word frequency.

Two major issues One more issue we didn't address fully is that the stress placement of the base stem should be correct to start with so the stress shift could be certain to start with the position we assume. The bar charts below

We plan to conduct a perception study comparing the perceptual differences between the base and progressive shift words vs. base and regressive shift words.

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