

# 불어가 불어 원어민의 영어어휘강세학습에 미치는 영향

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## 요약

영어 어휘의 강세는 영어 원어민들이 말을 하거나 인식하는 데 있어서 중요한 역할을 한다. 하지만, 영어를 배우는 불어 화자들은 고정된 어말 강세 체계를 가지고 있어서, 영어의 고정되어 있지 않은 자유 강세 체계와는 다르다. 영어와 불어에서의 이러한 강세 체계의 차이점은 영어를 배우는 불어 화자들이 영어 강세를 실현할 때 모국어의 강세 체계에 영향을 받을 가능성이 많다. 본 논문에서는 음성실험을 통하여 모국어의 외국어 강세 학습에 끼치는 영향에 관한 가설을 검증하고자 한다. 한 명의 영어 원어민 여성과 불어가 원어로서 영어를 배우는 여성 한 명이 본 실험에 참가하였다. 이 두 여성들은 (단어의 빈출도가 비슷한) 세 음절로 이루어진 50개의 영어 단어들을 각각 두 번씩 발화하였다. 발화 환경은 '나는 \_\_\_를 말하지 않았다. 당신이 어제 \_\_\_를 말했다'이다. 강세에 해당하는 변수들은 음성의 기본 주파수, 진폭, 그리고 음장이 있다. 음성실험을 통해 뽑아낸 자료들은 통계분석을 위하여 각각의 변수들을 대상으로 하여 각 2 (언어) × 3 (음절내 위치) 반복측정 분산분석을 수행했다. 분석결과는 영어를 배우는 불어화자들이 자신의 모국에 의해 영향을 받을 것이라는 가정을 뒷받침한다. 본 논문은 제이언어 습득과 교육법에 대한 보다 체계적인 연구를 위한 필요성이 있음을 제시하고 있다.

## French Influence on Learning English Lexical Stress by French Learners of English

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## ABSTRACT

Lexical stress in English plays an important role in native speakers' perception and processing of speech. However, French learners of English have a fixed, final-stress system which differs from the free, variable-stress system of English. This difference in stress systems between the two languages may result in interference by the native language stress system in the production of English stress by French learners of English. This experiment sets out to test the hypothesis of native language interference in stress production. One female native English speaker and one female French learner of English produced 50 initially-stressed, trisyllabic English words (balanced for word frequency) twice in a carrier phrase 'I didn't say \_\_\_but you said \_\_\_ yesterday.' A 2 (language) × 3 (syllable position) repeated-measures ANOVA was conducted on the data for each parameter of stress: fundamental frequency, amplitude and duration. The results supported the hypothesis of native language interference for the French learner of English. Implications of further work on second language acquisition and pedagogy were discussed.

Key Words : L1 influence, English Lexical Stress, French learners of English, trisyllabic words, prosodic transfer, negative transfer

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## 1. Introduction

Lexical stress in English is an important component in the perception and processing of speech by native speakers. Since incorrect stress placement can contribute to foreign accent, second-language learners of English need to be able to correctly produce stress to achieve native-like productions so that they can communicate more effectively in English.

Previous second-language studies have focused more on the segmental production of a second language as a factor that contributes to foreign accent. [1][2][3] However, it is only recently that there have been investigations into the role of prosody in foreign accent and second language acquisition [4][5][6]. Guion (2005)[4] indicates that the literature on second language acquisition has suggested that perceived foreign accent and intelligibility might be more greatly impacted by prosody (suprasegmentals) than by segments.

Within the domain of second language acquisition, there is a theory of native language (L1) transfer [6]. This theory claims that there are two types of transfer: positive and negative. Positive transfer is thought to occur when the same linguistic components are present in both the native language and the second language, which assists in the acquisition of that component in the second language. Negative transfer or interference happens when there is a difference between a component of the native and the second language, which hinders the acquisition of that component in the second language. Rasier & Hiligsmann (2007)[6] mention that there has been little research on the interference

effects of L1 on the acquisition of prosodic characteristics of L2.

When considering French learners of English, one of the authors have informally observed their difficulty in placing stress in the correct location with respect to English words. Doupoux, Pallier, Sebastian & Mehler (1997)[7] have also made similar observations that many mistakes made by French learners of English are due to such prosodic difficulties with stress placement. By examining the stress systems of the two languages more closely, it has been determined that French is a fixed-stress language, placing stress on the final syllable of a word, whereas English is a free-stress language with stress occurring in various locations depending on the word (lexical stress) [4][8]. Since the stress systems of French and English differ (English is lexical, French is not), the notion of negative transfer or interference could be relevant to a second language study of English stress by native French speakers.

In Canadian French, the most prominent syllable is typically the last syllable not containing a schwa in the word. By contrast, in English, the most prominent syllable in non-derived nouns is the penultimate syllable if it is heavy, the antepenultimate syllable otherwise [9]. The most prominent syllable in non-derived verbs and adjectives is the word-final syllable if it is heavy (i.e. if it contains a long vowel or a complex coda), and otherwise the penultimate syllable.

Previous research has been done in this area with respect to stress perception by native French speakers. In one study by Doupoux et al. (1997)[7], they examined stress perception by native French

participants and found that French speakers have difficulty perceiving stress contrasts in languages such as Spanish, which has contrastive stress. These authors have described this inability to perceive stress contrasts as stress 'deafness'.

Pater (1997)[10] investigated the L2 acquisition of English word stress using contextualized non-sense words. French Canadian L2 learners of English in their first week of a summer immersion program and native speakers of English completed a nonsense word production task. The stimuli included trisyllabic nonsense words containing a light or heavy penult. All the words were contextualized as nouns. The participants with a target-like grammar were expected to stress the penult when it was heavy and the antepenult when the penult was light. The native speakers' productions of trisyllabic words were more or less as expected. Similarly to the native speakers, the L2 learners almost always stressed the trisyllabic words with a light penult word-initially, which suggests that the L2 learners had little difficulty in resetting foot headness to the left. Yet, on the trisyllabic words with a heavy penult, they stressed either the penult or the antepenult, and when they stressed the antepenult, there was a tendency for the vowel in this position to be tensed. Pater interpreted these results as an indication that the L2 learners were in the process of learning that syllable weight influence stress placement in English. However, since no individual results were reported, it is unclear if some L2 learners but not others were sensitive to syllable weight, or if all L2 learners had indeterminate interlanguage grammars.

Thus, we designed an experiment in order to answer the question of whether there would be

interference from the native language (French) stress system in the production of English stress. It is hypothesized that there will be interference from the native language given both the differences in the stress systems of French and English and the observed difficulties with stress in English by various French learners of English. Evidence supporting this hypothesis could be detected through incorrect stress production of English words by French learners of English; more specifically, the French learners of English would demonstrate L1 interference by placing stress on the final position of an English word (test stimuli) in accordance with their native fixed, final-stress system.

In designing stimuli to test this hypothesis, the target words would need to be English lexical items with greater than 2 syllables so that correct stress placement is not due to a chance effect; thus, trisyllabic English words would be ideal. Since the French stress system puts stress on the last syllable of a word, it would be interesting to look at where they would produce stress on an English word with non-final stress. Since English words have a tendency to be forestressed (stress on the initial syllable), the test stimuli should have initial stress as there would be a higher proportion of initially-stressed real words (as opposed to non-words which are often used in experiments) in the English language [11]. Stress could be measured on each syllable using 3 acoustic cues for stress: fundamental frequency, duration and amplitude [11].

A control participant who is a native English speaker must also be used to verify that these test words are actually initially stressed in English. This control participant must also be of the same gender

as the French learner of English in order to compare acoustic cues of stress such as fundamental frequency (which is in different ranges for males and females). Since word stress can be affected by a word produced in isolation, a carrier phrase is needed, where the target words are placed within a phrase so as to prevent utterance-initial stress from interfering with the results. The location of the target word within a carrier phrase must also be assessed for its effects on the results, since intonational contexts can play a role in stress production [12]. The position within a carrier phrase along with all the previous considerations were each accounted for in the development of the experimental design that was used to test the hypothesis of L1 interference in English stress production by French learners of English.

## II. Method

### 2.1 Subjects

One female French learner of English (age = 24) and 1 female, native English speaker (age = 22) participated in the experiment. Participants were recruited from Victoria, BC through their response to poster advertisements. The French participant's native language was French and she reported greater ease of communication in French than in English. She had arrived in an English-dominant community 12 months prior to her participation in experiment. The native English participant had been brought up in a home environment where English was the only language spoken by both parents and was the only language used to communicate on a daily basis. She

had no formal French language training or education.

### 2.2 Stimuli

A word list consisting of 100 words was developed to elicit lexical stress production of English words. The 50 target words contained 3 syllables and had primary stress on the first syllable of the word. A few trisyllabic words are presented in Table 1 for illustration.

표 1. 세음절로된 목표 단어들의 예  
Table 1. Example trisyllabic target words

Frequent words	Infrequent words	Distracters
integer	sagathy	intangible
popular	salangane	integument
general	baladine	population
restaurant	balafon	generosity
conference	baluster	genomic

The words were also of French etymology and were balanced for word frequency (25 frequent words and 25 infrequent words). Infrequent words were deemed as such by a definition of 'rare' from the Oxford English Dictionary or that they were from a specific field or technical discipline, where their frequency would be limited. Six target words were removed from further analysis due to incorrect syllable or stress production by the English participant; therefore, 44 target words were analyzed (23 frequent words and 21 infrequent words).

The other 50 words were distracter words that helped prevent the participants from detecting the purpose of the experiment or that the target words all had native stress on the first syllable. These words

were 3 or more syllables in length but the primary stress was not on the first syllable of the word nor did the etymology of the word need to be French.

Each word was presented orthographically, twice in the following carrier phrase: "I didn't say \_\_\_, but you said \_\_\_ yesterday." The first production of the target word was at an intonational boundary whereas the second production was at a medial position within the intonational phrase; thus, there were 44 target words each with 2 productions, which resulted in 88 lexical target words for analysis. The word list was presented to the participants in a randomized order of target words and distracter words via a Powerpoint presentation on a computer screen in the recording booth.

### 2.3 Procedure

Participants were given a brief introduction about the study and were asked to read and sign the participant consent form. Each participant was informed about the presentation of the stimuli and adjusted for the correct microphone recording levels. The participants were given 3 practice examples using the experimental carrier phrase and were instructed to produce the sentences as naturally as possible without hesitation. They were told that if they had pronunciation difficulties, they should say the word to the best of their abilities without stopping to correct themselves. If they did hesitate, participants were asked to try the sentence again until their production was without pause or hesitation. Participants then continued on with the production of the experimental words (target and distracter words), in 3 blocks (Block 1: 40 words; Block 2 and 3: 30 words) stopping after each block to

give participants a short 2 minute break. At the beginning of both blocks 2 and 3, the participants were given a practice carrier phrase to reacquaint themselves with the experimental procedure before continuing with the experiment.

After completing the experiment, the participants filled out a form giving background information about themselves. The form contained questions about age, gender, age of arrival in English speaking province; age that English was first learned; native language of the parents; language spoken in the home; years of formal English instruction, level of education completed; length of time spent in an English-dominant environment; knowledge of other languages; percentage of daily communication in English; and a self-reported English fluency level on a scale of 1 to 5. At the end of the experiment, the participants were debriefed on the purpose of the experiment and were thanked for their participation.

The participants' productions were recorded using a condenser microphone in a sound-treated booth at the University of Victoria Phonetics lab. The program Audacity was used to record the productions with a sampling rate of 44,000 Hz and a quantization rate of 24 bits. The target words were analyzed using Praat to determine the pitch, amplitude and duration of the stressed syllables.

### 2.4. Analysis

This experiment was designed to measure the stress production of French learner of English compared to that of native English speaker. The independent variables were language group (French or English), and stress placement (syllable 1, 2, 3). The dependent variables were three acoustic cues of

stress: fundamental frequency, duration and amplitude for each syllable. In analyzing the target words, the acoustic stress cues of the three syllable positions of the target word were measured for the French participant compared to that of the native English participant to determine which syllable the stress was placed on by the French learner of English.

### III. Results

A 2 (language: French vs. English) x 3 (syllable position: 1 vs. 2 vs. 3) repeated-measures ANOVA, with syllable position as the within subjects variable, was conducted for the participants' data. Separate ANOVAs were conducted for each acoustic cue of stress: fundamental frequency, duration and amplitude. Table 2 presents descriptive statistics.

표 2. 불어와 영어화자들의 음절위치(첫째번, 두번째, 그리고 세번째 음절)에 따른 기초주파수, 음장, 그리고 진폭의 평균값과 표준 편차를 기술한 통계치

Table 2. Descriptive statistics for mean values and standard deviations (SD) of fundamental frequency (Hz), duration (ms) and amplitude (dB) across syllable positions (1st, 2nd, 3rd) for French and English speakers

		French			English		
		Syllable Position			Syllable Position		
		1st	2nd	3rd	1st	2nd	3rd
F <sub>0</sub> (Hz)	Mean	174.63	191.02	201.53	193.86	184.16	179.69
	SD	35.94	25.67	25.74	28.43	45.29	33.31
Duration (ms)	Mean	83.97	77.14	116.26	109.23	54.22	99.73
	SD	28.84	35.45	45.06	33.11	24.32	39.72
Amplitude (dB)	Mean	71.79	71.14	72.04	69.07	66.20	64.78
	SD	3.83	3.79	3.40	3.68	3.65	2.95

For fundamental frequency (Figure 1), there was neither a significant main effect for syllable position nor for language. The syllable position x language interaction was found to be significant  $F(1, 2) = 19.64, p < .001$  (partial eta squared = .10) indicating that the differences in F<sub>0</sub> values for the 3 syllable positions were differentially affected depending on whether the participant was French or English.

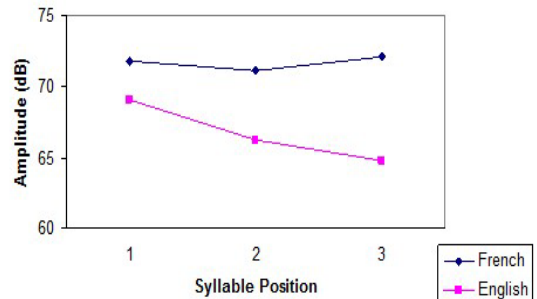


그림 1. 불어화자와 영어화자의 음절위치에 따른 기초주파수의 평균

Fig 1. Mean F<sub>0</sub> values across syllable position for French and English speakers

For duration (Figure 2), a significant main effect was found for syllable position  $F(1, 2) = 66.09, p < .001$  (partial eta squared = .28), but not for language.

Pairwise comparisons revealed that mean duration values were significantly greater for the third syllable (108.00 ms) than for the first syllable (96.60 ms), both of which were significantly greater than the second syllable mean value (65.68 ms). A significant interaction for syllable position  $\times$  language was found  $F(1, 2) = 23.60, p < .001$  (partial eta squared = .12), which shows that differences in duration values for the 3 syllable positions were differentially affected depending on the language of the participant.

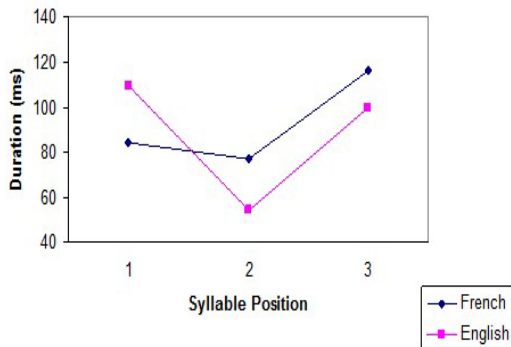


그림 2. 불어화자와 영어화자의 음절위치에 따른 음장의 평균

Fig 2. duration values across syllable position for French and English speakers

For amplitude (Figure 3), there was a significant main effect for syllable position  $F(1, 2) = 52.72, p < .001$  (partial eta squared = .23) as well as for language  $F(1, 2) = 108.95, p < .001$  (partial eta squared = .39). Pairwise comparisons of syllable position indicated that mean amplitude values of the 1st syllable were significantly greater than values for the 2nd syllable (68.67 dB) and the 3rd syllable (66.41 dB) whose values did not significantly differ. Pairwise comparisons of language showed that the mean amplitude values for the French speaker (71.66 dB)

were significantly greater than the values for the English speaker (66.68 dB). A significant interaction of syllable position  $\times$  language was discovered  $F(1, 2) = 56.09, p < .001$  (partial eta squared = .24), which indicates that the differences in amplitude values for the 3 syllable positions were affected differently depending on whether the speaker was French or English.

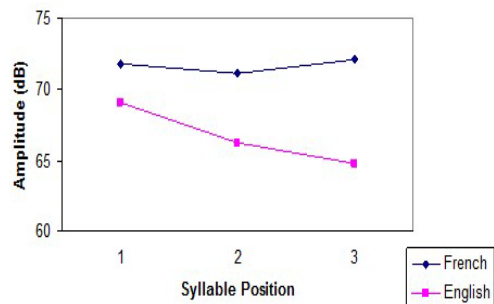


그림 3. 불어화자와 영어화자의 음절위치에 따른 음폭의 평균값

Fig 3. Mean amplitude values across syllable position for French and English speakers

#### IV. Discussion

Overall, the findings from this pilot study have supported the hypothesis that there was interference by the native language in the production of English lexical stress by a French learner of English. The evidence was seen in the tendency of this particular French learner of English to place stress on the last syllable of the English test words (in accordance with the stress pattern of French) as was noted by the higher values of fundamental frequency and

duration on the 3rd syllable compared to the 1st syllable of the word. Amplitude was not found to be a parameter that this French learner of English used in producing stress as there was no significant difference in the amplitude values of the 1st and 3rd syllable of the English target words over the 2 productions. This is not completely surprising as it has been noted that amplitude is not always the most salient cue for stress [11].

The overall results for the English (control) participant ensured that the overall stress production pattern applied to these target words was one of initial stress, given that the initial syllable was stressed more than the final (3rd) syllable. This pattern was seen through significantly higher mean F0 and amplitude values for the 1st syllable compared to that of the 3rd syllable. Duration has also been found to be a salient cue for stress in English, but it didn't quite attain significance (it was only approaching significance) for the 1st syllable over the 3rd syllable. One has to keep in mind that these results are only for 1 participant in each language group; results for a larger number of participants may show that duration also has significantly higher duration values for the 1st syllable compared to that of the 3rd syllable. Overall, the English participant's results supported the predictions of stress production according to the English stress pattern of initial stress.

When considering the results of this experiment, it is also important to keep in mind that there were issues with the design of the experiment and with the interpretation of the results. The issues with the design involve the stimuli as well as the participants. The stimuli were designed to be of French etymology

to elicit a deliberation between stress patterns for the French learner of English, yet it may have been the case that this design actually encouraged the default usage of the native language (French) stress system because the target words (particularly infrequent words) may have seemed more like French words than English words. Thus, using words with a French origin may have biased the French participant to respond according to her French stress system. Further experimentation using English words with non-French etymology may clear up whether this factor may have inhibited correct stress production by French learners of English. With respect to the issue with the participants, the self-report of poorer communication abilities in English than in French is not the most reliable way to determine a participant's ability with respect to her 1st and 2nd language as this is a subjective criterion. Thus, a more objective criterion for determining proficiency in a second language would need to be developed and implemented in further research.

Regarding the issue with the interpretation of the results, it must be remembered that there was significant variability (as can be seen in the standard deviation values in Table 1) in the mean values obtained for F0, duration and amplitude; thus, the results may not actually be as significant (if at all) as previously thought. The effect size (partial eta squared) for most tests were weak to moderate at best, also indicating that the variability was too great to obtain strong effect sizes. Part of the reason is due to the small number of participants (only 1 participant in each language group). Therefore, these results need to be verified by using a much larger number of participants in each language group to try

and decrease the individual variation. Thus, further work would require testing a greater number of participants across a similar experiment to determine if there trends observed in this pilot study are indeed significant. Yet even by reducing the variability, there would be difficulty in generalizing the results to a larger population of French learners of English. Since there are so many biological (learning abilities, intelligence etc.) and environmental factors (age of L2 acquisition and exposure, L2 education etc.) that come into play, it would be difficult to generalize the outcome to a highly variable population of French learners of English.

## V. Conclusion

Despite the fact this French learner of English has not demonstrated the ability to correctly produce English stress, a big question still remains: can correct stress production be learned (or taught)? An answer to this question would have big implications for second language research and pedagogy. One question that might, if answered, begin to shed some light on this 'big' question is whether a more fluent French learner of English would show more similarities to the English pattern of lexical stress? If there was a greater similarity in the production of English stress by a more proficient French learner of English, this may be an indication that lexical stress production can be acquired by learners with a different stress system than English (although a more reliable way for testing proficiency would need to be implemented). If French learners of English were able to acquire the English stress patterns, this would

help to diminish their foreign accent and increase their effectiveness of communication in a second language.

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