An Acoustic Analysis of Intra-sentential Pause Patterns by Taiwanese Learners of English

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Abstract

The major goal of this study is to investigate the intra-sentential pause patterns produced by Taiwanese learners of English through acoustic measures. An acoustic study designed to measure three aspects of pausing, namely pause duration, pause frequency, and distribution of pauses, was conducted. Four groups of subjects were recruited to produce a long English text, including 10 Americans from the U.S., 10 Chinese learners with low English proficiency (EFL-L) from Taiwan, 10 Chinese learners with high English proficiency (EFL-H) from Taiwan, and 10 ESL Chinese learners (ESL) from the U.S. The passage was recorded and five selected sentences were analyzed with the Praat software. A norm-referenced variability index (VI) was adopted from Chen and Chung (2008) and measured over the timing variables in this study.

Major findings of this study are as follows. First, the three variables of the Taiwanese learners displayed specific patterns that deviated from those of native English speakers and demonstrated more frequent and inappropriate pausing. The EFL-L, the EFL-H, and the ESL learners were also found to behave differently in acoustic timing patterns. Except for the major pause, the EFL-L learners exhibited random patterns of pausing. Compared to the EFL-L learners, the EFL-H learners performed more closely to native English speakers. The ESL learners did not significantly outperform the EFL-H learners on all the three variables.

Language proficiency is suggested to affect the way a learner uses pauses when speaking a second language (L2). In this sense, pausing could be a developmental phenomenon. The random pauses produced by the EFL-L group largely enhanced the impression of syllable-timing patterns, whereas the EFL-H and ESL groups were passing through the syllable-timing stage and moving to the other direction of stress-timing. These findings are expected to enhance the understanding of interlanguage phonetics and phonology and second language acquisition in general.

Keywords: rhythm patterns, acoustic phonetics, interlanguage phonology

Introduction

Pause has been defined operationally as the measurable silence between the words on either side of a syntactic boundary. While pausing is critical for intelligibility (Anderson-Hsieh, 1992), the literature contains few acoustic studies on the significance of pauses among English-as-a-second-language (ESL) learners. This study aims to explore the difficulties in pause patterns experienced by Taiwanese learners through an examination of acoustic measures.
Fillmore (1979), one of the pioneering works on fluency, conceptualizes fluency as the ability to talk at length with few pauses and to be able to fill the time with talk. Lennon (1990) further points out that fluency refers either to the quantity or amount of language produced within a given time or to the rapidity and smoothness of speech output. Temporal aspects, such as speech rate and pause, can thus be correlated with general fluency to some extent (Riazantseva, 2001). When non-native speakers employ a pausing pattern outside the norm of their target language, their speech may be perceived as less fluent than it can be because it lacks native-like rapidity and smoothness. In a more recent study, Lennon (2000) synthesizes earlier definitions and proposes that “a working definition of fluency might be the rapid, smooth, accurate, lucid, and efficient translation of thought or communicative intention into language under the temporal constraints of on-line processing” (p. 26).

A number of studies have been concerned with establishing the appropriate measures of pause. Pause duration, pause frequency, and distribution of pauses are the three aspects of pausing most frequently researched (Adams, 1979; Anderson-Hsieh and Venkatagiri, 1994; Chen 2005; Gustafson-Capkova & Megyesi, 2001; Kuo & Chiang, 2005; Riazantseva, 2001; Shen, 1998; Yang, 1997). Adams examined rhythm and pausing at the discourse level among a linguistically heterogeneous group of ESL learners by using rhymes and paragraphs as elicitation tasks. He found that non-native speakers paused frequently and at inappropriate junctures and differentiated between stressed and unstressed syllables for a shorter duration than native speakers. Anderson-Hsieh and Venkatagiri found that the difference in duration between stressed and unstressed syllables as well as in pausing constituted major areas of difficulty for Mandarin ESL learners in the U.S. The acquisition of proper stress-timing would be possible as proficiency improves, but Mandarin ESL speakers usually tended to rely more on syllable-timing at early stages.

A comparison of L1-L2 pausing performance among native and non-native speakers can be found in Shen (1998) and Riazantseva (2001). Shen analyzed the temporal variables found in oral reading and story-telling among a group of 32 English-as-a-foreign-language (EFL) college students in Taiwan. The results, as expected, showed that the subjects were more fluent in their native language, Chinese, than in the foreign language, English. The results also indicated that pause duration was shorter, pause percentage was lower, both articulation and speech rate were faster, and utterance length was longer in Mandarin than in English. Furthermore, more pauses were found to appear between major syntactic constituents in Mandarin than in English. However, Shen neither included the native norms of English speakers nor outlined the English proficiency levels of the Chinese EFL subjects. In another study, Riazanantsева (2001) studied the pausing patterns of Russian speakers of English. His study showed that L2 proficiency was a factor that would influence the pause duration pattern of Russian speakers of English. However, the only test subjects included in both studies were those with a high or intermediate level of English oral proficiency.

While many studies have been conducted to explore the relationship between pause and its effect on listening comprehension, reading comprehension, and oral intelligibility, few such studies have focused on the pause patterns of Chinese ESL and EFL students (e.g., Anderson-Hsieh & Koehler, 1989; Anderson-Hsieh & Venkatagiri 1994; Chen, 2005; Kuo & Chiang, 2005). The participant size of most of
the previous studies is usually small, ranging from 4 (Yang, 1997), 9 (Anderson-Hsieh & Venkatagiri) to 12 (Chen). Although Kuo and Chiang (2005) conducted their study with a larger sample size of 51 EFL Taiwanese students of two English proficiency levels, a comparison between EFL students in Taiwan and ESL students in the U.S. has yet to be explored. Such a study would shed light on the role played by radically different learning environments in the process of second/foreign language acquisition. Further research in this field might focus on contrasts within ESL groups and two EFL groups with different proficiency levels, so that Taiwanese learners’ acquisition patterns of pauses might be examined and analyzed more comprehensively.

Accordingly, two research questions were raised as follows:

1. To what extent do Taiwanese learners display patterns of the pausing that are different from those of native speakers of American English?
2. In terms of the acquisition of second language phonology, to what extent do ESL learners, EFL low achievers, and EFL high achievers differ in their pausing patterns?

**Methods**

**Participants**

The speech of 40 participants was analyzed. To ensure diversity of speech patterns, four groups of participants were recruited to produce an English passage. These included 10 EFL-low (EFL-L) Taiwanese learners in Taiwan, 10 EFL-high (EFL-H) Taiwanese learners in Taiwan, 10 ESL Taiwanese learners in the U.S., and 10 native speakers of English (NS). The three groups of Taiwanese learners were distinguished from one another based on two criteria—their exposure to an English-speaking environment (namely, ESL and EFL learning environments) and their general level of proficiency in English. Each group consisted of an equal number of male and female speakers, aged between 19 and 25 years old. Table 1 shows each group’s sample sizes, mean ages, self-reported scores on English proficiency tests, and years of residency in the U.S.

**Table 1**

Profiles of the 40 subjects in the four groups

<table>
<thead>
<tr>
<th>Group</th>
<th>All</th>
<th>Number</th>
<th>Male</th>
<th>Female</th>
<th>Age (years)</th>
<th>Self-reported English proficiency</th>
<th>Years in the U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwanese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFL-L</td>
<td>10</td>
<td></td>
<td>5</td>
<td>5</td>
<td>20.3</td>
<td>GEPT elementary (the first phase)</td>
<td>–</td>
</tr>
<tr>
<td>Taiwanese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFL-H</td>
<td>10</td>
<td></td>
<td>5</td>
<td>5</td>
<td>22.6</td>
<td>GEPT high-intermediate</td>
<td>–</td>
</tr>
<tr>
<td>Taiwanese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESL</td>
<td>10</td>
<td></td>
<td>5</td>
<td>5</td>
<td>21.9</td>
<td>TOEFL (M = 273) or SAT (Verbal: M = 608)</td>
<td>7.2</td>
</tr>
<tr>
<td>Native</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speakers</td>
<td>10</td>
<td></td>
<td>5</td>
<td>5</td>
<td>22.3</td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>
**Materials**

The materials employed in the acoustic study included a short questionnaire about personal background and a diagnostic passage for acoustic measurement. Each language group filled out a personal background sheet specifically tailored for their group. The contents of the questionnaire for the four groups generally overlapped, except for a few specific to a particular group. The English speakers, for example, were asked about their home states and whether they had lived in any non-English speaking countries. The Taiwanese learners were asked about their ages at the beginning of receiving English instruction, their length of residency in the U.S. or other English-speaking countries, and their TOEFL (computer-based test), SAT or GEPT scores, if applicable.

A well-known diagnostic passage with 14 sentences was selected from *Teaching Pronunciation* (Celce-Murcia, Brinton & Goodwin, 2001) as the reading material. This passage had several advantages. First, it limited vocabulary, grammar, sound segments, and consonant clusters, thereby enabling listeners to make more reliable comparison of speakers. Second, the sentences in the passage were carefully designed to focus on a particular theme, avoiding sequences that are hard to syllabify or segment. Third, the passage contained five types of sentences—wh-questions, declarative sentences, yes-no questions, tag questions, and closed-choice alternative questions—in order to eliminate or counterbalance the effects of different sentence types on timing patterns produced by the Taiwanese learners. The following five sentences corresponding to these sentence types were selected for further acoustic analysis:

1. Wh-questions
   *Why do people usually have an accent when they speak a second language?*
2. Declarative sentences
   *Most native speakers of English can, for example, recognize people from France by their French accents.*
3. Yes-No questions
   *Does this mean that accents can’t be changed?*
4. Tag questions
   *Old habits won’t change without a lot of hard work, will they?*
5. Closed-choice alternative questions
   *Will you manage to make progress, or will you just give up?*

**Acoustic Data Collection: Measurement of Pause**

The participants were informed of the research goal and procedure of recording before the session began. The passage was then read in a quiet room and recorded on a notebook computer with the Praat software, and an attached microphone was placed at a distance of about 20 centimeters from the participant’s mouth. Each participant was asked to read the diagnostic passage and allowed to request help and practice words s/he was not familiar with before the recording began. Participants were not corrected, even if they still mispronounced words after they had practiced. The author then analyzed the speech data acoustically and auditorily.
The pausing data were analyzed from three perspectives: pause frequency, pause distribution, and pause duration. They were operationally defined and measured as follows (cf. Riazantseva, 2001):

1. Pause frequency referred to the number of silent pauses that occurred per sentence.
2. Pause distribution referred to the silent pauses that occurred at constituent boundaries (e.g., before or after an NP constituent) and within constituent boundaries (e.g., within an NP constituent). Examples of at-constituent pauses are: [pause] “have an accent”; [pause] “a second language.” Examples of within-constituent pauses are: “have an [pause] accent”; “a second [pause] language.” Pauses at constituent boundaries were regarded as possible pause distribution produced by the NS while pauses within constituent boundaries were treated as impossible pauses produced by the NS or inappropriate pauses by the nonnative speakers of English (NNS). Figure 1 illustrates the differences of at-constituent boundaries and within-constituent boundaries.
3. Pause duration referred to the length of silent pauses and was measured in milliseconds and reported in seconds.

AT-constituent boundaries: Possible pause distribution

WITHIN-constituent boundaries: Impossible pause distribution

Note. S = Sentence, NP = noun phrase, VP = verb phrase, V = Verb, Art = Article

Figure 1. Differences of at-constituent boundaries and within-constituent boundaries
To identify each individual silent pause, clear acoustic cues should be provided. As Chen (2005) mentions, intensity can be considered to be the best acoustic cue to measure pause. Duez also regards silent pause as “any interval on the oscillographic trace where the speech amplitude is indistinguishable from that of background noise” (1982, p. 13). A human being, for example, produces voicing with high intensity in order to shout and with low intensity to speak quietly. In the present study, only those pauses greater than 100 ms, the cut-off for pauses (Griffiths, 1991), were considered as “pause.” Cut-off points were designed following the conventions established in first language pausological research (e.g., Griffiths, 1991; Hieke, Kowal & O’Connell, 1983). Detailed analysis of waveform displays and spectrographic printouts were complemented by perceptual crosschecks of the corresponding recordings in order to increase the level of reliability of the measurement.

Pauses were identified with ear perception and the acoustic cue of intensity, which is illustrated in Figures 2 and 3. Figure 2 is a sample of a Taiwanese speaker with many instances of extremely low intensity, while Figure 3 shows a sample of an American speaker with fewer instances of extremely low intensity.

**Sentence:** Why do people usually have an accent when they speak a second language?

**Figure 2.** A speech sample produced by a Taiwanese speaker

**Sentence:** Why do people usually have an accent when they speak a second language?

**Figure 3.** A speech sample produced by a native speaker of English
Figure 4 presents a pause in “Does this [pause] mean that accent can’t be changed?” produced by a female from the EFL-L group. 

Calculations of the Variables: Variability Index (VI)

In this study, an index for norm-referenced comparison was adopted (Chen & Chung, 2008), which is referred to as the variability index (VI):

\[ VI = \sqrt{\frac{\sum_{k=1}^{K} (X_k - E_k)^2}{K}} \]

where \( X_k \) is the \( k \)-th component, and \( E_k \) is the mean of the \( k \)-th component over the 10 native speakers of English (treated as the norm); \( K \) is the number of components in the sentence. Since the VI involves the norm \( (E_k) \), it is a norm-referenced variability index. If a participant gives exactly the same timing pattern as the norm, the VI will equal zero. The larger the VI is, the greater the participant’s timing pattern will deviate from the norm. It was expected that the NS would have a smaller VI than the NNS.

An analysis of pause duration demonstrates the superiority of the VI. Chen (2005) computed single major pause duration at a clause boundary. This major pause duration was then divided by the whole sentence duration to yield a percentage, which was then averaged over sentences and subjects to yield a mean percentage for each group. The mean percentage of each of the Taiwanese groups was divided by the mean percentage of the native speaker group to yield a ratio. Through inspecting this ratio, Chen concluded that the Taiwanese learners had quite different pause duration from the native speakers. However, this method has several drawbacks. First, in reality each sentence has multiple pauses, all of which must be taken into account in order to ensure an accurate measurement. Second, the ratio calculation ignores the variation among the members of the native speaker group, because the mean percentages of these groups, rather than the percentages of individual subjects, are compared. The VI can resolve these problems if applied to pause duration in which multiple pause duration patterns and variations within the native group are simultaneously considered.
Results and Discussion

Pause Patterns: Frequency, Distribution and Duration

This section investigates pause frequency, distribution and duration. The acoustic data of the NS group (taken as the norm) showed that the major pauses for each sentence occurred at clause or phrase boundaries. It is worth noting that in sentence three, due to the negation (i.e., “can’t” in Figure 5 in the appendix), the major pause was placed before can’t, a noun phrase boundary (“accents” under an NP) for emphatic purpose. Without negation, the major pause would usually be expected in the clause boundary rather than this phrase boundary. Although the pauses in all learner groups occurred unsystematically and were not easily classified, in general, most pauses occurred at clause or phrase boundaries as well.

The following are the major pause and possible pauses in each sentence produced by the NS. As the NS was taken as the norm, the major pause here was defined as the pause with the longest duration in the sentence, while the possible pause meant the pause with shorter duration or as optional produced by the NS group. For instance, most NS participants produced a major pause in Sentence One, but a relatively small portion of them produced a second possible pause in the same sentence. Among the utterances of the NS group, there were 2 possible pauses in Sentence One, 5 in Sentence Two, 1 in Sentence Three, 3 in Sentence Four, and 2 in Sentence Five. Table 2 summarizes the results.

Table 2
Possible pause locations and pause numbers by native speakers of English

<table>
<thead>
<tr>
<th>Possible pause locations by the NS</th>
<th>Pause number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Why do people usually have an accent [major pause] when they speak a [possible pause] second language?</td>
<td>2</td>
</tr>
<tr>
<td>3. Does this mean that accents [major pause] can’t be changed?</td>
<td>1</td>
</tr>
<tr>
<td>4. But all habits won’t change without [possible pause] a lot of [possible pause] hard work, [major pause] will they?</td>
<td>3</td>
</tr>
<tr>
<td>5. Will you manage to make [possible pause] progress, [major pause] or will you just give up?</td>
<td>2</td>
</tr>
</tbody>
</table>

The pauses in each sentence type were analyzed with respect to the similarity or distinction among the three Taiwanese groups. Figures 5 through 9 in the appendix present the pause patterns of the five sentences for the four groups respectively. The height of the bar signifies the pause duration. The taller the bar is, the longer the pause is. The number of bars corresponds to the number of the pauses. The fourth block of each figure represents the pause frequency, distribution and duration of the NS.
Each group, as expected, made a similar number of major pauses at the clause boundary, which suggests that making major pauses is perhaps a language universal. The NS group was also found to pause less frequently, and most often after punctuation (e.g., commas and semi-colons) and at clause or phrase boundaries (i.e., “accent-when” in Sentence One, “example-recognize” in Sentence Two, “work-will” in Sentence Four, and “progress-or” in Sentence Five). An exception was noted for “accents-can’t” in Sentence Three, where they demonstrated the speakers’ personal opinion or attitude and placed the emphatic stress on the negative modal verb “can’t”, thus facilitating the occurrence of a greater duration of pause before the placement of prominence. Owing to this semantic function, they were not in favor of the thumb of rule for pause (i.e., pause at clause or phrase boundaries).

In light of similar pause patterns across five sentences, mainly pausing at the syntactic boundaries, Sentence One “Why do people usually have an accent when they speak a second language?” is discussed in greater detail here to illustrate the possible development from a low proficiency EFL group to the two higher groups. As seen in Figure 5, the four groups paused at the clause boundary (i.e., pause between “accent-when”), but the location of a secondary pause among the NS, ESL, and EFL-H groups differed (i.e., pause between “a-second” for the NS; pause between “speak-a” for the ESL; pause between “when-they” for the EFL-H). Both the ESL (the third block) and EFL-H (the second block) groups had longer and more frequent pause patterns (sometimes at inappropriate locations), but both groups, just like the NS group, paused at the major syntactic boundaries.

Without complying with the NS norm, the EFL-L group performed in a bullet-like manner and chopped Sentence One into eight pieces, (i.e., pauses between “why-do”, “do-people”, “people-usually”, “have-an”, “an-accent”, “accent-when”, “speak-a”, and “a-second”). The detailed information of pause duration for the sentence among the EFL-L, in comparison with that of the other groups, is as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Pause Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFL-L</td>
<td>Why 0.480 0.0248 do 0.111 people 0.025 usually 0.000 have 0.014 an 0.111 accent 0.480 when 0.000 they 0.000 speak 0.053 a 0.109 second 0.000 language</td>
</tr>
<tr>
<td>EFL-H</td>
<td>Why 0.126 0.000 do 0.000 people 0.000 usually 0.000 have 0.000 an 0.000 accent 0.126 when 0.018 they 0.000 speak 0.000 a 0.000 second 0.000 language</td>
</tr>
<tr>
<td>ESL</td>
<td>Why 0.178 0.000 do 0.000 people 0.000 usually 0.000 have 0.000 an 0.000 accent 0.178 when 0.000 they 0.000 speak 0.023 a 0.000 second 0.000 language</td>
</tr>
<tr>
<td>NS</td>
<td>Why 0.021 0.000 do 0.000 people 0.000 usually 0.000 have 0.000 an 0.000 accent 0.021 when 0.000 they 0.000 speak 0.000 a 0.013 second 0.000 language</td>
</tr>
</tbody>
</table>

The recorded patterns showed that the NS, ESL, and EFL-H groups shared similar major pause duration (NS: 0.021; ESL: 0.178; EFL-H: 0.126 at the clause boundary) but not the EFL-L group (0.480). While most EFL-L participants showed that pauses should be placed at clause boundaries, only the groups with a higher proficiency had timing similar to that of the NS group, and reproduced a native-like tempo at clause boundaries.
Except for the major pause, the EFL-L group exhibited random patterns (the first block in Figures 5 through 9). They made significantly more within-constituent pauses than the other three groups. Although the ESL and EFL-H groups also made more within-constituent pauses, this number was still within the native norm for the English language as exemplified by the NS group. Take Sentence Five, “Will you manage to make progress or...” as an example. While the NS mainly paused at the clause boundary: will [0.000] you [0.000] manage [0.000] to [0.000] make [0.045] progress [0.055] or ..., the EFL-H made some within-constituent pauses: will [0.000] you [0.000] manage [0.074] to [0.200] make [0.049] progress [0.341] or ..., and so did the ESL: will [0.000] you [0.030] manage [0.086] to [0.056] make [0.045] progress [0.137] or .... This in turn indicates that the NNS would acquire pause distribution patterns as they reach higher levels of proficiency in the target language.

Under greater scrutiny, the results imply the way in which the level of English proficiency of these learners rather than the experiences of exposure to English-speaking countries might have affected this temporal variable. An analysis of these two factors revealed that both ESL and EFL-H produced pauses of similar duration to the NS, while the EFL-L made considerably longer pauses in English. All of the findings suggest that both EFL-H (without overseas experiences) and ESL (with overseas experiences) seem to have possessed the ability to adjust their pause duration to the temporal conventions of the English language. The EFL-L however did not share the same characteristic. Language proficiency affects the way a person uses pauses when speaking a non-native language. In this sense, pausing could be a developmental phenomenon: pausing becomes more native-like as higher language proficiency is achieved. Moreover, random pausing may entail, for example, a lack of linkage (e.g., a phrase like “a lot of”). Without appropriate linking, the utterance becomes choppy. Such random pauses produced by the EFL-L largely enhance the impression of syllable-timing patterns, whereas both EFL-H and ESL were passing through the syllable-timing stage and moving to the other direction of stress-timing.

One other speculation might be that frequent pausing is a characteristic of low proficiency speakers, and has little to do with whether the speakers are changing the rhythmic mode or not. In other words, German speakers of English would also demonstrate frequent pauses at the beginning stage, even though both languages belong to the same rhythmic group.1 At this stage, we are not very sure if the pause location produced by these learners mentioned would have similar patterns to those by Taiwanese low achievers. Moreover, if “frequent pauses” always fall at phrase or clause boundary, they may not be equal to “inappropriate pauses.” Further empirical research would be conducted to seek for the answers.

**Pause Duration Calculated by VI**

In this section, pause duration patterns in the speech of the four groups are examined. The VI index for norm-referenced comparison (the NS group) was used. The analysis of pause duration considers multiple pause duration patterns in different utterances from different speakers, and variations within the native group at the same time. Table 3 reports the means, standard deviations, maximum values and minimum values of the pause VIs for the four groups. The one-way ANOVA showed that the four groups differed in the mean VIs for each kind of sentence and all five types (total) statistically significantly (all the p-values being smaller than .05). Based on the
post-hoc Tukey’s honestly significant difference test, the pause duration of the EFL-L was significantly longer than that of the NS. Figure 10 presents the VI in pause duration of each type of sentence and all sentences (total) for the four groups.

When the performance of the four groups for the five types of sentences was closely examined, the pause duration of EFL-L (0.241) was, on average, eight times longer than that of the NS (0.031). The maximum value of pause duration in the EFL-L (0.420) was ten times longer than that of the NS (0.048). The minimum value of pause duration in the EFL-L (0.109) was five times longer than that of the NS (0.024).

At the same time, the pause duration of the EFL-H and ESL groups did not differ significantly from that of the NS (mean values: EFL-H: 0.093; ESL: 0.086; NS: 0.031). The pause duration patterns of the EFL-H and ESL were similar. The pause duration of the EFL-H (0.093) was on average similar to that of the ESL (0.086). The maximum value of pause duration in the EFL-H (0.164) was even shorter (i.e., performed better) than that of the ESL (0.269), due to the relatively larger value of standard deviation (0.074) of the ESL. The minimum value of pause duration in the EFL-H (0.062) was three times longer than that of the ESL (0.029). This further indicates that non-native speakers acquire second language pause patterns as they attain a higher level of proficiency. Thus, the pause duration pattern of a target language is learnable.

Table 3
Means, standard deviations, maximum values and minimum values of the VI in pause duration for the four groups

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFL-L</td>
<td>0.241</td>
<td>0.090</td>
<td>0.420</td>
<td>0.109</td>
</tr>
<tr>
<td>EFL-H</td>
<td>0.093</td>
<td>0.036</td>
<td>0.164</td>
<td>0.062</td>
</tr>
<tr>
<td>ESL</td>
<td>0.086</td>
<td>0.074</td>
<td>0.269</td>
<td>0.029</td>
</tr>
<tr>
<td>NS</td>
<td>0.031</td>
<td>0.007</td>
<td>0.048</td>
<td>0.024</td>
</tr>
</tbody>
</table>
To sum up, language proficiency is likely to affect the way a learner uses pauses when speaking an L2. In this sense, pausing could be a developmental phenomenon: pausing becomes more native-like as higher language proficiency is achieved. Moreover, the random pauses produced by the EFL-L largely enhanced the impression of syllable-timing patterns, whereas both EFL-H and ESL were passing through the syllable-timing stage and moving to the other direction of stress-timing.

Conclusion

The study reported in this paper investigated the English speech pause patterns produced by some Taiwanese learners through examining acoustic measures. In this research the author analyzed speech samples collected from four groups of participants at distinct levels of proficiency and with different experiences of exposure to English. The results indicate that the three variables of the Taiwanese learners (pause duration, pause frequency, and distribution of pauses) displayed specific patterns that deviated from those of the native English speakers. Taiwanese learners exhibited more frequent and inappropriate pausing. The EFL-L, EFL-H, and ESL learners behaved differently in acoustic measures. Except for the major pause, the EFL-L learners exhibited random patterns of pausing. Compared to the EFL-L learners, the EFL-H and ESL learners performed more closely to the native English speakers. The ESL learners did not significantly outperform the EFL-H learners on all the three variables.

One outcome worth mentioning was the fact that the ESL group (with extensive experiences in an English-speaking country) did not substantially outperform the EFL-H group (without experiences of studying abroad). Two explanations might shed some light on these results. First, greater exposure to English native speakers in everyday life has helped the ESL group speak more fluently as a consequence of
linking the segments and accelerating the speech rate. This group, however, did not greatly surpass the EFL-H group. The phonological threshold may provide an explanation for this phenomenon. The improvement of timing may not seem hard at the beginning, but once a certain degree of proficiency is attained, progress becomes more difficult. Second, even though the EFL-H has never had overseas experiences, their greater meta-linguistic knowledge stemming from formal instruction in English linguistics along with incentives may have contributed to their performance in the identification of the English temporal patterns. Consequently, they performed almost equally well, compared to the ESL group.

Increased proficiency and exposure to an English environment (not necessarily an English-speaking country) can be correlated with gradual but positive changes in the use of pause. There is a huge acquisition slope between the EFL-L and EFL-H, which suggests that pausing is a learnable and teachable component in an EFL context. The research findings here recommend that EFL learners and teachers deliberately teach and learn this component in the classroom context. Explicit instruction and persistent practices help EFL learners to reach a certain language standard. EFL teachers should strive to expose their students to a considerably wider variety of situations that demonstrate native patterns of communication, and then they can better mimic native speech patterns in such an EFL context. Some guided learning strategies can be provided for lower achievers. For example, in a printed text of any sort, punctuation (e.g., full stops, semi-colons, and commas) could be used to separate words. The varying punctuation marks give information about how students should read and comprehend the text. Before reading aloud, they can practice pausing by reading a passage silently while noting the thought groups or the natural places (e.g., at clause and phrase boundaries) to pause and breathe.

Pause and the suprasegmental aspects of language, such as its temporal characteristics, have traditionally received less attention among language researchers and practitioners, perhaps because these aspects of language are very difficult to quantify perceptually and, consequently, are neither easy to study nor to teach. The findings in this study hopefully constitute a step forward in understanding the temporal organization and distribution of speech flow as well as teaching pause in an EFL context.

Notes
1. I would like to thank the anonymous reviewers of the Hong Kong Journal of Applied Linguistics for raising this point.

References


**Appendix**  
**Pause Patterns of Sentences One to Five**

**Figure 5.** Bar-plot of the pause patterns of Sentence One for the four groups

**Figure 6.** Bar-plot of the pause patterns of Sentence Two for the four groups
Figure 7. Bar-plot of the pause patterns of Sentence Three for the four groups

Figure 8. Bar-plot of the pause patterns of Sentence Four for the four groups
Figure 9. Bar-plot of the pause patterns of Sentence Five for the four groups