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Phonological Awareness and Degree of Foreign Accent: An Exploratory Study

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Research in foreign accent has reported various factors of accentedness. However, very little attention has been given to the relationship between L2 speakers' accentedness and their awareness of, or sensitivity to, L2 phonological system. The present study aims to explore the relationship between ESL learners' phonological awareness, as measured by several tasks, and their accentedness, as rated by native speakers of English. Twelve advanced adult ESL speakers participated in seven tasks purported to tap into their sensitivity to English sounds and sound structures. They also read an English passage, and four native speakers rated their foreign accentedness on a 9-point scale. The learners showed individual differences in their phonological awareness despite the fact that they were from an intact class presumably at the same proficiency level. They also exhibited varying degrees of foreign accent. Correlational analyses revealed that in general there was a non-significant correlation between the learners' L2 phonological awareness and their accentedness, and that the awareness did not seem to have translated into L2 production. The study addresses some methodological and procedural issues that suggest crucial points for refinement of the phonological awareness tasks and the L2 speech data collection method.

Key words: accentedness, foreign accent, phonological awareness, L2 speech, L2 phonology

1. INTRODUCTION

It is commonly observed that late second language (L2) learners exhibit some degree of foreign accent while producing speech in their L2. Preservation of foreign accent is often considered as a phenomenon that persists even after years of L2 use, but scholars in L2 speech and phonology have attempted to investigate the factors involved in foreign

accentedness and instruction methods that may help L2 learners improve in producing more native-like speech in their L2 (e.g., Munro & Derwing, 2001). Accentedness has been found to be closely associated with learner-related factors such as age of L2 learning and motivation as well as phonetic factors such as voice onset time of particular stop consonants. In particular, although accentedness is a unique feature observed in nonnative speech, very little attention has been given to its relationship with learners' awareness of L2 phonology. Phonological awareness in the present study refers to the learners' ability to attend to, detect, and manipulate the phonological structure of spoken words (Snow, Burns, & Griffin, 1998). The construct has been demonstrated to be a predictor of acquisition of vocabulary and reading skills in both first language (L1) and L2, but how it is connected to native-like L2 speech production is not known.

The present study aims to explore the relationship between ESL learners' phonological awareness, as measured by several tasks, and the degree of their foreign accent, as rated by native speakers of English. The following section will review the research on foreign accent and phonological awareness. The study method, results, discussion of the findings, and a conclusion will follow.

2. LITERATURE REVIEW

2.1. Foreign Accent

The term *foreign accent* has been widely used to refer to the degree to which the pronunciation of an utterance differs from an expected production pattern, which is the norm of native speaker utterances (Derwing & Munro, 2005; Thompson, 1991). While some studies showed that the 'foreignness' in speech might reduce the credibility of nonnative speakers (e.g., Lev-Ari & Keysar, 2010) or affect listeners' attitudes toward nonnative speech (e.g., Choi, 2007; Munro, 2003; Oh, 2011), it has generally been argued that some degree of foreign accent does not necessarily work as a strong communication barrier nor affect comprehensibility of nonnative speech (Munro & Derwing, 1995, 1999; Saito, 2011). Thus far, foreign accent has been a topic of interest among L2 speech researchers and instructors due to its close relationships with multiple issues in L2 speaking development, such as the Critical Period, fossilization, and pronunciation instruction.

As admitted in many foreign accent studies (e.g., Flege, 1981; Gut, 2009), it is often difficult to determine whether nonnative accentedness is in fact due to a deviant phonological representation or an erroneous phonetic realization. Listeners generally perceive foreign accent holistically, and using listener rating data has become a widely

employed approach in foreign accent research. The qualitative assessment of foreign accent requires raters who evaluate the speech sample on an *n*-point scale that ranges from 'very strong foreign accent' to 'no foreign accent (i.e., native-like).' The number of gradients on the scales has varied, ranging from three to eleven, as shown in Jesney's (2004) report, and recent studies have commonly adopted a 9-point scale (e.g., Munro & Derwing, 2001; Riney, Takada, & Ota, 2000). Researchers, however, have pointed out problems regarding the reliability of native listener judgment since perception of accents may vary due to extraneous variables—raters' experiences, attitudes, rating scales and procedures, and the type and nature of L2 speech, to list a few (e.g., Kang, Rubin, & Pickering, 2010). Foreign accent assessment can also be made by carrying out instrumental-phonetic analyses of different sub-dimensions of the L2 speech and by comparing them to native speech. Although computer-assisted instrumental acoustic analysis is argued to be a potentially objective way of ascertaining accentedness, such analysis methods have been very rare in L2 speech research, perhaps due to common perception that their processes are complex and laborious (Kang et al., 2010). Also, it has been stressed that these methods should be accompanied by reliable and systematic descriptions of L2 and native speech (Gut, 2009).

Previous studies have investigated various factors that seem to influence accentedness. First, foreign accentedness may derive from a variety of phonetic properties (such as manner of consonant articulation) of the nonnative utterance (e.g., Jesney, 2004; Munro & Derwing, 2001; Piske, MacKay, & Flege, 2001). The voice onset time (VOT) of English stop consonants, for example, was found to influence the degree of perceived accentedness in some controlled contexts (Gonzalez-Bueno, 1997). However, the effect of VOT was not strongly supported in the studies that employed naturalistic speech data (Riney & Takagi, 1999). Meanwhile, Riney et al.'s (2000) study reported a significant correlation between the accuracy of the Japanese learners' production of English liquids /l/ and /r/ and their perceived foreign accent.

In addition to the aforementioned segmental feature differences, suprasegmental features such as intonation and word stress have been found to be associated with accent ratings of L2 speech (e.g., Derwing & Munro, 2005; Kang et al., 2010; Munro & Derwing, 2001). Anderson-Hsieh, Johnson, & Koehler (1992) compared the effects of segmental errors, syllable structure errors, and prosodic errors (which encompass errors in stress, rhythm, intonation, and phrasing) on foreign accent ratings obtained from English speech produced by nonnative speakers. The study found that errors in all three domains were significantly correlated with global accent, but that prosodic features accounted for the greatest amount of variance in accentedness. Magen (1998) investigated the relative weights of different types of segmental and prosodic errors by acoustically editing speech characteristics (e.g., syllable structure, stress) chosen from English sentences read by speakers with a heavy

Spanish accent. Magen reported that native listeners of English who evaluated the Spanish-accented sentences were sensitive to syllable structure, manner of consonant articulation, lexical and phrasal stress, and vowel tenseness and laxness. Her results indicate that supra-segmental factors as well as segmental factors consistently contribute to listeners' perception of accentedness.

The segmental and prosodic errors that cause perceived foreignness in speech are inherently associated with the influence of nonnative speakers' L1: the speakers may transfer their L1 sounds or sound systems to their L2 (e.g., Altenberg & Vago, 1983), or the similarities and/or dissimilarities between speakers' L1 and L2 may play a role (cf. Flege, 1987, 'Speech Learning Model'). Earlier studies have described how speakers of particular L1s exhibited better L2 speech production with lower segmental/prosodic error rates (e.g., Anderson-Hsieh et al., 1992; Suter, 1976). More recent studies have attempted to focus on particular aspects that represent the gap between two languages. For instance, in addition to the English liquids /l, r/ mentioned above (Riney et al., 2000), many Japanese learners of English have difficulties especially in pronouncing English-specific segments /æ, f, v, θ, ð, w/ because these sounds do not exist in the phonological system of Japanese. Saito (2011) administered four hours of explicit phonetic instruction on the challenging segments listed above and found that the intensive instruction increased comprehensibility of Japanese ESL learners but made no difference in their accentedness.

Studies of foreign accentedness have also reported the roles of individual differences. Among these individual, non-linguistic factors, age of L2 learning appears to be the most important predictor of degree of foreign accent (e.g., Flege, Birdsong, Bialystok, Mack, Sung, & Tsukada, 2005): early studies on the Critical Period Hypothesis, for instance, have documented that earlier exposure to L2 is associated with a lesser degree of foreign accent (e.g., Scovel, 1969, 2000). There have also been reports of some exceptional late L2 learners who mastered native-like pronunciation in their L2 (Bongaerts, 1999; Moyer, 1999), but such cases do not represent the vast majority of adult learners. Late learners are more likely to face psychological and/or biological constraints of phonetic production, especially articulation that relies on perceptual acuity as well as accuracy in motor skill. Age of L2 learning is related to other factors such as length of residence in a second language environment and amount of L1 use. Previous findings have been that less use of L1 and increased length of residence in an L2-dominant environment are correlated with improved global foreign accent (Piske et al., 2001). Other speaker-related factors have also been demonstrated to have significant effects on accentedness ratings: language learning aptitude (Suter, 1976), mimicry ability (Thompson, 1991), formal instruction, and motivation to sound like a native speaker (Moyer, 1999).

Examination of foreign accents (and L2 speech in general) has been a challenge to L2 researchers due to the complex interrelationship of numerous variables. The present study

attempted to explore phonological awareness, a variable that has received little attention thus far, but reflects phonetic/phonological aspects as well as individual-specific characteristics.

2.2. Phonological Awareness

In language acquisition research, phonological awareness typically refers to a speaker's sensitivity to the phonological system of a language, which includes sounds, syllable structure, phonotactics, and prosody of the language (Cassady, Smith, & Huber, 2005; Snow et al., 1998). Its investigation typically involves using a set of various tasks to tap different aspects of the phonological sensitivity of learners. Phonological awareness tasks in general require analysis (e.g., segmenting a word into speech units such as syllables or phonemes) or synthesis (e.g., blending speech units) of phonological units of a language.

Phonological awareness has been extensively investigated in language development research, but most of it has focused on children learning their L1. Phonological awareness in childhood progresses from sensitivity at the syllabic level, to sensitivity at the onset-rime level, and finally to sensitivity at the phoneme level (Goswami & Bryant, 1990). The effect of phonological awareness on children's L1 development has been attested in a number of studies: children with high phonological awareness were superior in learning to read and write in their L1 orthographic systems, whether it is alphabetic or non-alphabetic (e.g., McBride-Chang, Bialystok, Chong, & Yanping, 2004; Piske, 2008). Phonological awareness was also found to play a significant role in the development of vocabulary (e.g., Metsala, 1999) and reading (e.g., Amini, 2003; Huang & Hanley, 1994). Adult monolingual speakers seem to perform similarly. Williams and Wood (2012) investigated skilled readers' sensitivity to the lexical tone and amplitude patterns and reported a positive relationship between this sensitivity and standardized skills in reading.

The influence of phonological awareness in second/foreign language acquisition, however, is still unclear due to the mixed findings from past empirical studies. Swanson, Rosston, Gerber, and Solari (2008) assessed the roles of oral language skills and phonological awareness on reading skills of bilingual children (American students who speak Spanish as their heritage language), using bilingual segmentation and blending tasks as phonological measures. The researchers found that phonological awareness, whether in English or Spanish, does not strongly predict L2 reading skills of children after the second grade, while oral language skills (assessed by vocabulary and grammar tests) contributed a substantial amount of variance to their reading skills. However, Gottardo and her colleagues (Gottardo, Chiappe, Yan, Siegel, & Gu, 2006) reported different results from Chinese-Canadian (English) students in the same age group: their English reading performance was associated with most measures of phonological awareness in both

Chinese and English. The findings suggest that phonological processing is related to reading tasks with heavy phonological demands, such as reading in an alphabetic orthography or pseudo-character reading in a non-alphabetic orthography.

Hu (2003) investigated the effects of phonological awareness and memory on young Chinese children's learning of English vocabulary. The phonological awareness tasks involved phoneme and syllable manipulation (e.g., substitution and deletion), and the study reported that none of the phonological awareness measures predicted children's ability to learn novel English words. Hu noted that the development of children's phonological sensitivity in L2 resembles the development of sensitivity in L1—that is, sensitivity at the syllabic level is developed before sensitivity at the phonemic level (Goswami & Bryant, 1990). The study of Yeung, Siegel, and Chan (2013) also examined Chinese ESL children's reading and vocabulary development in relation to phonological awareness. The kindergarteners received instruction on phonological awareness skills—manipulation and detection of phonemes, rimes, and syllables—embedded in vocabulary learning activities, and such instruction was found to have positive effects on children's English word reading, spelling, and expressive vocabulary. Kang (2009) studied the role of L1 and L2 phonological awareness in Korean EFL children's English word reading skills and had two major findings. First, the children's English phonological awareness was a significant predictor for their English reading skills when out-of-school English-learning factors were controlled for. Second, the children's Korean phonological awareness was a significant predictor of English reading skills over and beyond their awareness in English phonemes and rimes.

Research on phonological awareness and L2 speech has been very rare. Venkatagiri and Levis (2007) conducted a study focusing on speech comprehensibility—perceived ease of understanding of speech, and claimed that EFL learners' speech comprehensibility can be facilitated by phonological awareness, as measured using a set of sound detection and manipulation tasks. The researchers treated phonological awareness as a type of implicit metalinguistic knowledge of pronunciation, which had been developed in the participants of the study without formal instruction in English pronunciation. Kennedy and Trofimovich (2010) explored how L2 learners' awareness is related to the quality of their L2 pronunciation, as assessed through listener-based ratings of accentedness, comprehensibility, and fluency. Awareness in this study encompassed 'being aware of how particular aspects of L2 speech (like stress assignment) convey meaning' as well as 'being aware of how language is acquired.' The learners in this study—college students enrolled in an intensive pronunciation course focusing on the suprasegmental aspects of English—kept dialogue journals on what they were learning in a class. The authors analyzed the comments in the entries for two aspects of language awareness: (i) quantitative awareness, which considers language as a set of items (e.g., word patterns) that need to be memorized

through effort, and (ii) qualitative awareness, which views language as something that carries meaning and leads a learner to understand speech and thus succeed in communication. Learners with more qualitative awareness (e.g., those who were better aware of "how particular characteristics of English speech carry particular meaning," p. 183) showed greater improvement in their L2 pronunciation, suggesting that learners' heightened awareness could be translated into their pronunciation. Although the notion of awareness in Kennedy and Trofimovich's study is distinct from the phonological awareness that the present study aims to focus on, their findings provide useful information about the potential of awareness in L2 pronunciation development.

The L2 awareness studies in this review did not have uniform phonological awareness measures; however, except for the study of Kennedy and Trofimovich (2010), which did not use phonetic/phonological stimuli, the L2 studies in general used manipulation (e.g., blending, substitution) and detection tasks to measure L2 learners' phonological awareness at phoneme and/or syllable levels. The types of tasks resemble those of the tasks typically used in L1 phonological awareness research. Researchers have attempted to develop standardized phonological awareness tasks (e.g., Cassady et al., 2005), but in most cases the task items and contents have targeted young children learning their L1. L2 researchers, on the other hand, have developed task materials, incorporating varied types of tasks to meet their own research purposes, and the present study also followed that trend.

In sum, L2 phonological awareness has been studied in relation to the acquisition of L2 vocabulary, spelling, and reading. However, much less attention has been paid to the role of phonological awareness in the development of L2 speech, even though both L2 phonological awareness and L2 speech touch upon purely phonetic/phonological aspects: L2 sounds and sound systems. The present study attempted to fill in this gap, exploring the relationship between phonological awareness and foreign accent, a stubborn attribute of L2 learners' speech.

2.3. Research Questions

This study, therefore, sought to address the following research question: What is the relationship between an L2 learner's phonological awareness and his/her degree of foreign accent? It is hypothesized that L2 learners who have superior phonological awareness or greater sensitivity to L2 sounds and phonological systems are better at noticing the gap between native-like and nonnative-like pronunciations and also at manipulating their pronunciation to eliminate that gap (i.e., the foreign accent, or the characteristics of *foreignness*). If these learners of *awareness* indeed exhibit less foreign accent in their read-aloud speech in L2, a relationship between phonological awareness and accentedness can be established. However, if such a pattern is not observed, it can be argued that

phonological awareness and accentedness are independent of each other.

3. METHOD

3.1. Participants

An intact group of adult ESL learners participated in the present study (n = 12; two males, ten females). The participants were from a high-advanced ESL class in the Community English Program offered by Teachers College. All participants learned English as their foreign language via regular foreign language curricula offered in their home countries: their mean length of EFL instruction was 6.91 years (range: 5-8 years). The learner participants arrived in the United States as adults—mostly a few months prior to the time of the data collection. The learner participants overall had little experience of learning English as their second language (range: 1 month to 1 year). They were of diverse L1s: Korean, Japanese, Spanish, Italian, Portuguese, Croatian, Latvian, and Sanskrit. Table 1 contains detailed demographic information of each participant.

TABLE 1

ESL Learner Participants

Participant	Gender	Age	L1	Years of Instruction		Length of Residence in the US
				EFL	ESL	
A	F	20s	Spanish	8.0	0.0	< 0.5
B	F	20s	Croatian	6.0	0.0	≤ 1.0
C	F	20s	Korean	8.0	0.0	< 0.5
D	F	20s	Korean	8.0	0.0	≤ 1.0
E	M	50s	Japanese	7.0	0.5	< 1.0
F	F	20s	Sanskrit	6.0	1.0	≤ 1.0
G	M	30s	Portuguese	6.0	0.0	< 0.5
H	F	20s	Korean	7.0	0.0	< 0.5
I	F	40s	Korean	8.0	0.0	< 1.0
J	F	20s	Latvian	5.0	0.0	< 0.5
K	F	20s	Italian	7.0	0.0	< 0.5
L	F	30s	Japanese	7.0	0.0	< 0.5

The present study also had four native speakers of English (one female, three males; age range: 30s-40s) who rated the foreign accentedness of the ESL learners' spoken data. All of the raters were experienced ESL/EFL instructors (average: 10.5 years), but not all of them were experienced in rating the degree of foreign accent.

3.2. Instruments

3.2.1. Phonological awareness tasks

In the current study, seven tasks were used to tap the phonological awareness of the ESL learner participants, as described below:

- Task 1: Segmentation, requiring decomposition of a word into phonemes and/or syllables.
- Task 2: Blending, which involves blending of phonemes into syllables and syllables into words.
- Tasks 3 and 4: Initial consonant deletion and final consonant deletion, which are measures of phonological manipulation—particularly in this study, deletion of the word-initial and word-final consonants.
- Tasks 5 and 6: Word-initial cluster identification and word-final cluster identi-fication, which are measures of phonological sequencing, requiring a speaker to identify a specified phoneme or a sequence of phonemes within a word.
- Task 7: Nonword reading. Nonwords refer to sequences of phonemes that conform to the phonotactic constraints of the language, but lacking any semantic content. Reading a nonword requires "converting text into a sequence of sounds and syllables and then applying a prosodic structure to the sequence before pronouncing it" (Venkatagiri & Levis, 2007, p. 268). The nonwords were taken from the ARC Nonword Database, created by Rastle, Harrington, and Coltheart (2002).

3.2.2. Reading task and rating scheme for accentedness

A short passage (176 words) from a children's literature piece was given to the ESL learner participants to read aloud. The learner participants read the given passage, and their speech was recorded with a sound recorder program. To assess accentedness of the recorded speech, the raters were given a 9-point scale (1: very heavy foreign accent; 3: heavy foreign accent; 5: moderate foreign accent; 7: slight, negligible foreign accent; 9: no foreign accent), which is most commonly adopted in recent studies of foreign accent (See Jesney, 2004; Munro & Derwing, 2001; Riney et al., 2000).

3.3. Procedures

The ESL learner participants took a set of phonological awareness tasks and a reading task administered individually. The phonological awareness task items were presented on a

computer screen or played through the speaker of the computer, and the tasks required the learner participants to respond either orally or in writing. Prior to testing, the learner participants completed two practice items for each of the phonological awareness tasks. During the practice trials, the participants received written instructions shown on the screen as well as direct explanations from the test administrator so that they could understand the requirements of each task. The participants followed standard written instructions presented on the screen without any additional prompts.

TABLE 2

Data Collection Procedures (Phonological Awareness Tasks)

Task	Instruction	Input	Output	Example	Original k	Final k
Task 1 Segmentation	Count the number of sounds in the word you hear.	audio	written (number)	Stimulus: 'back' Expected response: 3 (/bæk/; transcription was not required)	15	15
Task 2 Blending	Combine the marked sound in each word to form a new word.	text	sound	Stimulus: <**p**un>, <b**u**t>, <i**n**> Expected response: *pun*	15	15
Task 3 Initial consonant deletion	Drop the first consonant in the word.	text	sound	Stimulus: <house> Expected response: [aws]	15	13
Task 4 Final consonant deletion	Drop the last consonant in the word.	text	sound	Stimulus: <test> Expected response: [tes]	15	15
Task 5 Word-initial cluster identification	Write the consonant sequence that you hear in the beginning of the word.	audio	written (text)	Stimulus: 'sprint' Expected response: <spr>	12	11
Task 6 Word-final cluster identification	Write the consonant sequence that you hear in the end of the word.	audio	written (text)	Stimulus: 'sprint' Expected response: <nt>	13	9
Task 7 Nonword reading	Read each word to your best. The word will show for 2-2.5 seconds.	text	sound	Stimulus: 'blanterfony' Expected response: /blæ ntərfoni/	15	15

For segmentation (Task 1), the participants heard 15 English words one at a time and were asked to write down the number of sounds (phonemes) present in each word. For instance, 'back' /bæk/ required the response *3*. The participants were informed that they should focus on the sounds, not the spelling. For blending (Task 2), the participants were presented with a list of English words, each of which had a letter (or letters) for a particular phoneme marked in a different color. The participants were asked to combine the marked

sound in each word to form a new word (one or two syllables long), and their responses were audio-recorded. For example, the required response for <**p**un>, <b**u**t>, and <i**n**> was *pun*. For initial and final consonant deletion (Tasks 3 and 4), the participants were presented with a word that began with a consonant or a consonant cluster. They were asked to pronounce the word without the first consonant sound (for Task 3; e.g., <house> was to be read as [aws]) or the final consonant (Task 4; e.g., <test> was to be read as [tes]). The responses were audio-recorded. Then for word-initial and word-final cluster identification (Tasks 5 and 6), the participants wrote down the word-initial (Task 5) or word-final consonant cluster (Task 6) upon hearing each word spoken. For instance, the audio stimulus 'sprint' required the written response <spr> for Task 5 and <nt> for Task 6. Finally, for nonword reading (Task 7), the participants were presented with 15 written nonwords (of 2-4 syllables) one at a time and were asked to read them aloud. The responses were audio-recorded. The data collection procedures are summarized in Table 2.

The reading task was administered with short preparation time: the learner participants were asked to read the given passage aloud after skimming it for a few seconds. The participants' read-aloud speech was audio-recorded. Four sentences of similar length were extracted from the passage and then rated for accentedness. The first and the last sentences read were excluded to allow for warm-up and cool-down. The extracted sentences were as follows:

1) They were looking down upon a lovely valley. (12 syllables)
2) There was a tremendous waterfall halfway along the river. (16 syllables)
3) (And) this was the most astonishing sight of all. (11-12 syllables)
4) There must have been a dozen of them at least. (11 syllables)

The extracted sentences contained some features that might be challenging for English learners to pronounce accurately, and that have been suggested as features associated with perceived degrees of foreign accent, according to previous research studies (e.g., Magen, 1998). These features include the liquid consonant /l/ and the fricatives (e.g., /f, v, ð/), which are widely known to be particularly difficult to learners whose L1 does not have such segments /l, f, v, ð/ in its phoneme inventory—like Korean and Japanese (Ladefoged, 2001; Saito, 2011). Consonant clusters like <tr> and <st> may also challenge learners whose L1 allows only a single consonant in the onset or coda position: speakers of these L1s tend to make syllable structure errors by epenthesizing a vowel or deleting a consonant when pronouncing English consonant clusters, and previous studies have reported a connection between syllable structure errors and accentedness (e.g., Anderson-Hsieh et al., 1992). The extracted sentences also contained suprasegmental and prosodic features such as stress and intonation.

The extracted sentences were presented in random order to each native listener rater, after he or she had listened to one sample sentence for warm-up. The raters judged the accentedness of each sentence on a 9-point scale, the ends of which are given contrasting labels such as 'very heavy foreign accent' and 'no foreign accent,' as previously explained. The raters were allowed to replay and listen to the extracted sentences as many times as they wanted, but they reported after rating that they had not needed to replay all sentences. As a result, each learner participant was given four scores for each of the four sentences that they read aloud. The mean score for each sentence was computed for statistical analyses.

3.4.Coding and Analysis

After data collection, the written and audio-recorded responses of each learner participant were tallied and computed. The learner participants' performance on phonological awareness tasks were coded for analysis by the researcher and an assistant, using the coding scheme shown in Table 3. For the phonological awareness tasks (Tasks 1-7), participants received a point for each accurate response. For the four extracted sentences from the reading task, the participants' accentedness was rated on a 9-point scale.

TABLE 3

Coding Scheme

Task	Coding
Task 1 Segmentation	Phonemes (sound segments) accurately counted: 1 point for a correct count and 0 point for an incorrect count
Task 2 Blending	Phonemes (sound segments) accurately blended into a target word: 1 point for a correct pronunciation of the target word and 0 point for other cases (e.g., an incorrect pronunciation of the target word, giving up)
Task 3 Initial consonant deletion	Word-initial consonants accurately deleted: 1 point for accurate deletion of a word-initial consonant and 0 point for inaccurate deletion
Task 4 Final consonant deletion	Word-final consonants accurately deleted: 1 point for accurate deletion of a word-final consonant and 0 point for inaccurate deletion
Task 5 Word-initial cluster identification	Word-initial consonant clusters accurately identified and noted: 1 point for accurate identification of a word-initial consonant clusters and 0 point for inaccurate identification (Note: Spelling was not a primary concern. For example, both <chr> and <kr> were considered to be the correct word-initial cluster for the word 'Christmas.')
Task 6 Word-final cluster identification	Word-final consonant clusters accurately identified and noted: 1 point for accurate identification of a word-final consonant clusters and 0 point for inaccurate identification
Task 7 Nonword reading	Phonemes, syllables, and prosody of a nonword are accurately pronounced in the way native speakers of English pronounced the word: 1 point for accurate reading and 0 point for reading that deviates from the native-like reading (e.g., inaccurate pronunciation or omission of a segment and/or syllable)

Some data went missing due to a recording problem. It was also found that some participants gave up on some items while taking some of the phonological awareness tasks: Tasks 3, 5, and 6. These participants later reported that they felt anxious and the tasks were difficult. The items that more than 66% of the participants did not complete were therefore excluded, and the final item numbers (k) are shown in Table 2.

Following coding, the phonological awareness data and accentedness ratings were analyzed. First, inter-rater reliability for the ratings of the nonnative productions was computed. Descriptive statistics were computed to obtain an overview of the means and standard deviations. Other statistical analyses (ANOVA and correlation) were also carried out to see if there is a relationship between phonological awareness and foreign accentedness.

4. RESULTS

4.1. Accentedness Rating

Table 4 presents statistics concerning the inter-rater reliability measures for four sentences read by the 12 ESL learner participants. The Cronbach alpha values reported in Table 4 indicate a fairly high degree of consistency among native speaker raters' judgments: the samples that were highly rated by one rater also received high ratings by other raters and vice versa.

TABLE 4

Descriptive Statistics of Mean Accentedness Ratings and Inter-Rater Reliability

Items	Descriptive Statistics			Inter-Rater Reliability	
	Min	Max	*M* (*SD*)	Cronbach's Alpha	Std. Alpha
Sentence 1	3.00	7.00	4.92 (1.36)	.90	.91
Sentence 2	2.50	4.00	4.00 (1.12)	.86	.88
Sentence 3	2.25	5.50	4.17 (1.01)	.74	.76
Sentence 4	3.00	5.75	4.17 (.83)	.71	.70
Total				.86	.86

The accentedness rating data revealed that all ESL learner participants were judged to be speaking with some degree of foreign accent. As shown in Table 5, none of the participants produced native-like, accent-free English speech. The participants' overall accentedness ratings for the four extracted sentences ranged from 2.25 (i.e., the point between 'very heavy foreign accent' and 'heavy foreign accent') to 7 ('slight, negligible foreign accent'), and the overall mean ratings were around 4 to 5 ('moderate foreign accent'). This indicates

that the raters in general avoided giving extremely low or high ratings to sentences that they listened to.

Table 5 also shows that the ESL participants were judged to be of a relatively low degree of foreign accent when they were reading sentence 1 (*They were looking down upon a lovely valley.*) than when they were reading the rest of the sentences. For Sentence 4 (*There must have been a dozen of them at least.*), the overall accentedness rating score was lower than Sentence 1, but the rating scores for Sentence 4 were more homogeneous than scores for other sentences. However, the rating differences across the four sentences were of no statistical significance, according to a one-way analysis of variance (ANOVA), $F(3, 44) = 1.682$, $p = .185$.

TABLE 5

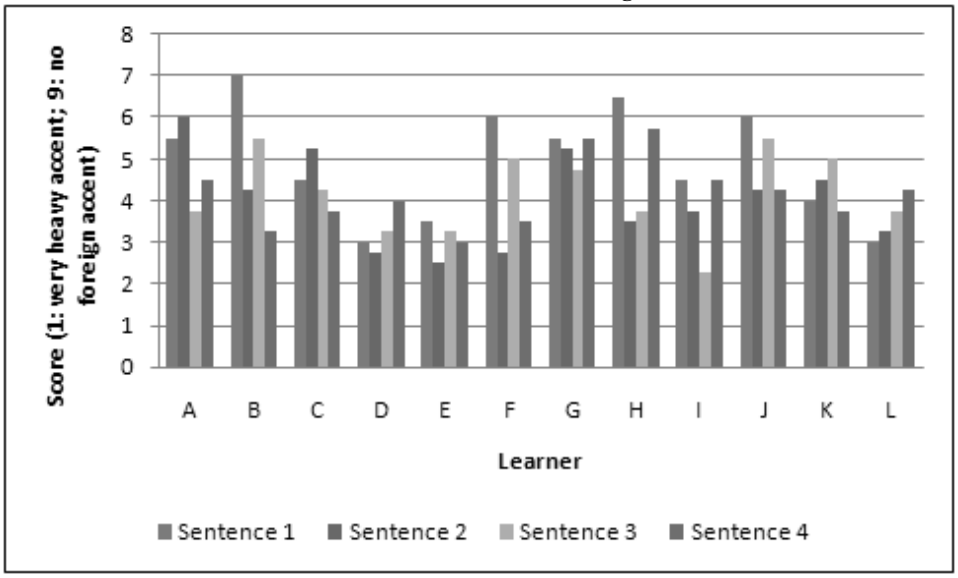
Individual Accentedness Rating

ESL Participant	Sentence 1	Sentence 2	Sentence 3	Sentence 4	*M*
A	5.50	6.00	3.75	4.50	4.94
B	7.00	4.25	5.50	3.25	5.00
C	4.50	5.25	4.25	3.75	4.44
D	3.00	2.75	3.25	4.00	3.25
E	3.50	2.50	3.25	3.00	3.06
F	6.00	2.75	5.00	3.50	4.31
G	5.50	5.25	4.75	5.50	5.25
H	6.50	3.50	3.75	5.75	4.86
I	4.50	3.75	2.25	4.50	3.75
J	6.00	4.25	5.50	4.25	5.00
K	4.00	4.50	5.00	3.75	4.31
L	3.00	3.25	3.75	4.25	3.56
Min	3.00	2.50	2.25	3.00	3.06
Max	7.00	4.00	5.50	5.75	5.25
M	4.92	4.00	4.17	4.17	4.31
SD	1.36	1.12	1.01	0.83	0.75

Although the mean accentedness ratings occupy the middle of the rating scale (4 to 4.92), the individual ESL learners' ratings varied as depicted in Table 5 and Figure 1. Participants D and E were rated relatively low; in other words, they were perceived to be more heavily accented than other ESL learners in the group. The ratings of E were consistently low across sentences (ranging 2.5 to 3.5). Participant G was another one who was quite consistently rated cross-sententially. However, in the speech of some of the learner participants, the degree of foreign accent varied across sentences. Participant B, for example, received the highest rating for Sentence 1 among the group (7) but the second lowest rating for Sentence 4 (3.25). Participants F and H both received high ratings for Sentence 1 and low ratings for Sentence 2 (*There was a tremendous waterfall halfway along the river.*), but they were rated differently for Sentences 3 (*(And) this was the most astonishing sight of all.*) and 4.

FIGURE 1

Individual Accentedness Ratings



In sum, each of the learner participants was perceived to possess various degrees of foreign accent when reading English sentences. Weak correlations among the ratings for Sentences 1, 2, 3, and 4, as shown in Table 7, also indicate a great deal of individual variation.

4.2. Phonological Awareness Tasks

Table 6 presents summary data for seven phonological awareness measures obtained in the study. Since the tasks did not consist of the same number of items, the measured task scores were converted to proportions: the individual participants' scores reported in Table 6 were computed by dividing the number of correct responses by the total number of items in each task for each participant. Table 6 also includes descriptive statistics of the scores.

The ESL learner participants exhibited varying degrees of phonological awareness, as shown in Table 6. The participants on average tended to score in the 47% to 76% range in the tasks, performing better in tasks that involved word-initial segments (initial-consonant deletion [Task 3]: .71; word-initial cluster identification [Task 5]: .76) than in tasks that involved word-final segments (final-consonant deletion [Task 4]: .48; word-final cluster identification [Task 6]: .47). The mean scores for other tasks were in the middle ranges. The performance of individual participants, however, varied considerably on different tasks, with one participant scoring as low as 7% on the phoneme segmentation (Task 1), but another participant scoring 100% on the word-initial cluster identification task.

TABLE 6

Accuracy and Phonological Awareness

Participants	Task 1 (k = 15)	Task 2 (k = 15)	Task 3 (k = 13)	Task 4 (k = 15)	Task 5 (k = 11)	Task 6 (k = 9)	Task 7 (k = 15)	Agg.M.PA
A	.60	.87	.69	.40	.82	.78	.93	.73
B	.67	.47	.69	.40	.82	.44	.33	.55
C	.80	.93	.62	.40	.91	.56	.87	.73
D	.67	.60	.69	.40	.73	.11	.40	.51
E	.07	.40	.85	.80	.64	.22	.53	.50
F	.33	.20	.62	.40	.64	.22	.60	.43
G	.20	.87	.62	.27	.73	.44	.67	.54
H	.73	.67	.92	.87	1.00	.67	.53	.77
I	.47	.60	.69	.53	.82	.44	.53	.58
J	.40	.73	.69	.40	.55	.56	.60	.56
K	.73	.67	.62	.40	.82	.89	.80	.70
L	.60	.80	.77	.47	.64	.33	.73	.62
Min	.07	.20	.62	.27	.55	.11	.33	.43
Max	.80	.93	.92	.87	1.00	.89	.93	.77
M	.52	.65	.71	.48	.76	.47	.63	.60
SD	.23	.21	.10	.18	.13	.23	.18	.11

Note. Agg.M.PA stands for aggregate means of phonological awareness

TABLE 7

Correlation Matrix for Phonological Awareness Tasks and Rated Accentedness Scores

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Agg. M.PA	Sent. 1	Sent. 2	Sent. 3	Sent. 4	M.Sent 1-4
Task 1	1												
Task 2	.371	1											
Task 3	-.134	.413	1										
Task 4	-.062	-.16	.502	1									
Task 5	.653*	.295	.029	.331	1								
Task 6	.458	.508	.333	.059	.514	1							
Task 7	.182	.616*	.288	-.112	.125	.588*	1						
Agg.M.PA	.681*	.679*	.216	.217	.734**	.810**	.572	1					
Sent. 1	.026	-0.14	-.124	.03	.248	.327	-.174	.060	1				
Sent. 2	.282	.732**	.142	-.363	.368	.718**	.637*	.561	.336	1			
Sent. 3	.048	-.056	-.325	-.374	-.215	.258	.039	-.114	.557	.288	1		
Sent. 4	.098	.528	.37	.124	.37	.328	.148	.434	.255	.319	-.166	1	
M.Sent1-4	.156	.342	-.260	-.332	.281	.596*	.217	.320	.842**	.714**	.654*	.458	1

Note. Agg.M.PA stands for aggregate means of phonological awareness; M.Sent1-4 stands for means of accent ratings for Sentences 1 through 4.
*$p < .05$, **$p < .01$

Among the phonological awareness tasks, significant correlations were found (i) between segmentation (Task 1) and word-initial cluster identification (Task 5) (r [11] = .653, $p < .05$), (ii) between blending (Task 2) and nonword reading (Task 7) (r [11] = .616, $p < .05$), and (iii) between word-final cluster identification (Task 6) and nonword reading (r [11] = .588, $p < .05$). The correlation between blending and nonword reading is not surprising because nonword reading involves blending of sounds, which is the core

skill needed for the blending task, as well as syllable configuration and stress assignment. Lastly, the aggregate means of phonological awareness was significantly correlated with the following tasks: (i) segmentation (r [11] = .681, $p < .05$), (ii) blending (r [11] = .679, $p < .05$), (iii) word-initial cluster identification (r [11] = .734, $p < .01$), and (iv) word-final cluster identification (r [11] = .810, $p < .01$). Among the rest of the phonological awareness tasks, however, correlations did not reach statistical significance, indicating that the tasks were independent.

5. DISCUSSION

The present study examined the relationship between ESL learners' phonological awareness and the degree of their foreign accent as perceived by a small number of native speakers of English. A group of adults from an advanced ESL class took seven tasks purported to tap into their sensitivity to English sounds and sound structures. They also read an English passage, and four native speakers rated their foreign accentedness. The results show that each learner has a certain level of phonological awareness as well as a certain degree of foreign accent. Despite the fact that the learners were from the same intact class presumably with the same proficiency level, they exhibited varying degrees of foreign accent as well as individual differences in their phonological awareness.

Correlation analyses revealed that in general, there was a non-significant correlation between the learners' L2 phonological awareness and their accent. That is, greater phonological awareness does not seem to make L2 speech less accented. In this study, learner participants' awareness of L2 phonology (e.g., consonant phonemes in English words) was not significantly correlated with the degree of foreignness perceived from their L2 speech, suggesting that the awareness may not have been translated into L2 production. There was one exception: the accent ratings for one of the read sentences (Sentence 2: *There was a tremendous waterfall halfway along the river.*) were significantly correlated with blending, nonword reading, and word-final cluster identification scores. Moreover, native speakers perceived the heaviest foreign accent when they heard Sentence 2 among other extracted sentences.

The reason Sentence 2 had an exceptional result is not known in the current study, but some conjectures can be made. One reason for the uniqueness of Sentence 2 may lie in the vocabulary that appears in the sentence. During recording and sentence extraction, the word *tremendous* appeared as a particularly interesting word. Despite their fairly high proficiency level (high-advanced), some of the ESL participants failed to read the word *tremendous* smoothly with ease. These participants tended to pause at the word, stutter, or slow down, and this might have affected the raters' accent ratings. In fact, previous

research has pointed out the effects of temporal variables (such as pauses and speech rate) not only in making fluency judgments (e.g., Skehan & Foster, 1999) but also in accent ratings; for instance, long and frequent pauses (Kang et al., 2010) and slow speech rate (Munro & Derwing, 2001) could increase the foreignness of nonnative speech (cf. Munro and Derwing reported an optimal rate was 4.76 syllables per second). Furthermore, if the learners were indeed unfamiliar with *tremendous* (i.e., if *tremendous* were a new word to them), the learners' sensitivity to the phonological structure of the word should be critical: reading a new word must have been similar to reading a nonword or blending segments into one or more syllables. Then, the relationships among the ratings of Sentence 2, blending scores, and nonword reading scores could be explained. This speculation can be attested by future L2 speech studies whose stimuli include both high-frequency and low-frequency lexical items (cf. Derwing et al., 1998) as well as studies that take account of the issues of lexical familiarity (e.g., Flege, Takagi, & Mann, 1996). Admittedly, the current study was only a pilot study that drew on a small database, and any of its findings should therefore be interpreted with caution.

Due to the lack of extant research on phonological awareness and foreign accent, there are no studies whose findings are directly comparable to the results of the present study. As reviewed earlier, Kennedy and Trofimovich (2010) investigated accentedness, comprehensibility, and fluency of L2 speakers in relation to their qualitative and quantitative language awareness. The present study focused on a specific type of awareness—phonological awareness—and measured the construct by administering tasks, rather than looking into holistic language awareness. While Kennedy and Trofimovich reported that only qualitative aspects of learners' awareness (measured through reflection journals) were related to learners' pronunciation ratings, the results of the present study indicate a non-significant relationship between learners' sensitivity to specific L2 sound systems and the 'foreignness' or 'nativelike-ness' of their L2 speech. Since there have been no uniform measures of L2 phonological awareness, as noted previously, operationalization of phonological awareness and interpretation of data will remain as topics of further investigation.

In the study of Venkatagiri and Levis (2007), EFL learners' phonological awareness in general was not strongly correlated to their speech comprehensibility. Their performance on nonword reading and phoneme position identification was an exception. Comprehensibility, along with accentedness and intelligibility, has been investigated as one of the core constructs in evaluating nonnative speech; some previous studies, like Munro and Derwing (1999), found a moderate correlation between comprehensibility, intelligibility, and global foreign accent, but the correlation was not always consistent (e.g., Munro & Derwing, 1995). Although comparison of comprehensibility and accentedness is not the point of the present paper, nonword reading was a particularly significant ability in both

the study of Venkatagiri and Levis and the present study.

The present study faced a few methodological and procedural issues that need to be taken into consideration in conducting future research. One lies in the way how foreign accents were assessed. In this study, the learner participants' accentedness was measured based on native listeners' holistic judgments of L2 speech; in other words, the accent ratings did not focus on which feature(s) of the L2 speech—whether segmental, prosodic, or both (then, to what extent)—affected the perceived degree of foreign accent (e.g., Anderson-Hsieh et al., 1992; Gut, 2009; Kang et al., 2010). This limitation can be handled by adopting analytic accent rating scales that draw raters' attention to specific properties of foreign accents, such as stress placement or VOT, and/or by developing a research design that combines both human rating methods and instrumental analyses in a complementary fashion.

In addition, the phonological awareness tasks used in this study overlooked some essential features: they involved task items that largely focused on segmental features, such as consonants as in consonant deletion tasks. Among the phonological awareness tasks, only nonword reading involved analysis and synthesis of both segments and prosody (e.g., stress assignment). The phonological awareness tasks in this study therefore mostly measured learners' sensitivity to phonological segments, with prosodic features largely unexamined. Enhancing the phonological awareness tasks by including tasks that tap into the learners' awareness of L2 prosody would enable us to gain fuller understanding of phonological awareness, and furthermore, its relationship with L2 speech.

Other factors may have affected accent ratings and consequently their analyses. For example, the speech data elicitation method may have played a role. Typically, foreign accent studies use speech data elicited by having participants read aloud texts, repeat audio stimuli, or produce narratives (e.g., picture descriptions). Previous studies that compared different elicitation methods have had mixed findings on the effect of the type of speech data on accentedness. Oyama (1976) claimed that extemporaneous speech is generally perceived to be more accented than read speech, while others (e.g., Flege, 1981) reported no significant difference between the accent ratings made from the reading data and those from the spontaneous speech. Indeed, spontaneous speaking tasks are in general considered to be more cognitively demanding and complex than simple reading tasks (Robinson, 2001), so the influence of the elicitation method cannot be neglected. The present study used a reading task in order to measure participants' performance while controlling grammar and vocabulary—having participants pay less attention to meaning, but more to phonetic/phonological forms in order to minimize the possibility of the foreign accent ratings being influenced by grammatical errors or nonnative-like vocabulary use (e.g., Munro & Derwing, 2001). Comparison of reading and spontaneous speech data was not the point of the present study; however, its exclusive use of reading data, which are not as

naturalistic as spontaneous speech, creates a generalizability issue.

The native raters in this study were found to have assessed the learners' accentedness quite consistently, as demonstrated by high inter-rater reliability coefficients. However, listener-related factors, such as native listeners' linguistic, rating experience or dialect background, also need to be considered (e.g., Munro & Derwing, 1999, 2001; Thompson, 1991). All raters in the present study were experienced English instructors who may have become less sensitive to foreign accents, and their individual differences, such as their familiarity with certain L1s or their rating experience, have been neglected. In addition, the raters received neither baseline data nor formal training on accent rating prior to making accent judgments. These limitations were somewhat offset by sufficiently high inter-rater reliability in this study, as supported by the report of Munro and Derwing (1995) that untrained listeners are able to produce highly reliable ratings. But the limitations noted above point to the need for future research that employs homogeneous raters and involves more fine-grained methods of collecting rating data.

Several procedural issues are worth noting as well, which surfaced while the study was being conducted. As briefly mentioned in Section 3.4, the technical or recording problems forced the exclusion of a few items from some phonological awareness tasks, highlighting the need for careful use of technical devices in speech-based studies. In addition, some participants did not complete some of the phonological awareness tasks that involved consonant manipulation and sequencing, and they reported that the tasks were difficult for them. Their detailed post-task responses were not collected, but the participants may have come across some words they did not know and felt intimidated. As pointed out in some previous studies (e.g., Saito, 2011), fatigue could have been an issue as well, considering the number of task items given to individual students and the amount of speech data to which the raters had to listen and provide accentedness judgments. These issues may pose a threat to the validity of the findings of the present study.

6. CONCLUSION

It is admitted by many scholars (e.g., Munro & Derwing, 1999) that in the current era of communicative language use, second/foreign language learners' speech comprehensibility and intelligibility are more emphasized than nativelike-ness. English, particularly, is now a global language whose nonnative speakers outnumber native speakers. However, achievement of native-like pronunciation competence remains a goal for a large population of language learners and instructors. Foreign accent has therefore been a frequently revisited topic in the field of SLA for decades. Researchers have attempted to investigate various factors of the fossilized foreign accent of late L2 learners, but relatively little

research has been conducted on foreign accents and learners' awareness of L2 phonology. The present study was motivated by the need to address this gap by examining the relationship between ESL learners' phonological awareness and L2 accent. The analyses in this study found a non-significant relationship between the L2 learners' phonological awareness and their accentedness, suggesting that a greater awareness of L2 phonology does not make L2 speech less accented. That is, L2 learners' sensitivity to L2 segments, clusters, syllables, and prosody is independent of their nativelike-ness or foreignness as assessed by native listeners. This study, as it was based on correlational analyses, cannot conclude any causal relationship between phonological awareness and the perceived degree of foreignness.

The identified limitations of the current study provide directions for future research on foreign accents and phonological awareness. Research is needed that employs more than a single accent judgment system as well as enhanced phonological awareness tasks which will enable us to examine these constructs in greater detail. In addition to the issue of eliciting L2 speech data, as discussed in the previous section, it should be noted that there is also a need for examining L2 speech tokens that are shorter (e.g., words or phrases) or longer (e.g., discourse) than the sentence level in order to gain a better insight into the understanding of the dynamic nature of L2 speech. This study has also acknowledged the limitations of using a small database and that larger groups of participants—both learner participants and native listener raters—are desired for the generalizability of the study. In addition to increasing the sample size, controlling participants (e.g., employing homogeneous raters) will enable more systematic investigation of the learners' performance and raters' judgments. It is hoped that further exploration of the relationship between the phonological awareness and foreign accentedness will help language researchers and instructors understand what is essential in the development of L2 speech.

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Applicable levels: Adult

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