

Title of Project:

An Investigation of the Intelligibility and Comprehensibility of Speakers of Inner-, Outer-, and Expanding-circles of English by Listeners of Similar and Different Backgrounds

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Final Report

Motivation for the Research

Second language (L2) pronunciation teaching practices have long recognized accent-free speech as the end goal of speech learning. Prejudice against communication skills based on speakers' degree of accentedness is commonly used to discriminate against L2 speakers in educational or workplace settings (Lindemann, 2002; Lippi-Green, 2012). However, research has shown that there is no clear correlation between accent and understanding (e.g., Munro & Derwing, 1995; Munro et al., 2006). Instead, achieving an intelligible accent now understood to be a more realistic goal for most L2 learners (Derwing & Munro, 2009). Despite its importance in L2 pronunciation teaching, there is a lack of consensus as to which pronunciation features are crucial to listeners' intelligibility judgment, which is "the extent to which a speaker's message is actually understood" (Munro & Derwing, 1995a, p. 289), and what should be prioritized in L2 classrooms (Derwing et al., 1998; Hahn, 2004; Field, 2005; Isaacs, 2008; Kang, 2010).

Although the importance of non-native speakers' (NNSs) prosody (e.g., stress, pauses, rhythm) has been clearly recognized (Hahn, 2004; Pickering, 2004), no agreement has been reached in terms of which prosodic features of speech are most crucial in guiding listeners' perceptions of accented speech. In addition, with the expansion of English as an international language, intelligibility issues no longer only exist between native and non-native speakers. Speakers from outer and expanding circles (Kachru, 1985), such as Indian and Chinese speakers, increasingly interact in education and business domains. Thus, enhancing mutual intelligibility amongst all three circles of English should be prioritized in second language teaching. Nonetheless, it remains unclear what phonological features contribute to L2 intelligibility when NNS listeners are involved and to what extent listeners from different backgrounds share a response to the perceptual judgment of other L2 Englishes (e.g., Munro et al., 2006; Bent & Bradlow, 2003; Kang, 2012).

This study aimed at a deeper understanding of prosodic features that enhance mutual intelligibility among speakers from three circles of Englishes and the role of listener L1 background on their judgments of L2 speakers. It provides insights into second language pronunciation pedagogy in English as a Second Language (ESL) classes and International

Teaching Assistants (ITA) training programs, such as, what pronunciation features should be prioritized to increase speaker intelligibility, and whether to include outer- and expanding-circle Englishes in pedagogical materials, as familiarity with an L2 accent can potentially increase the understanding of that accent. It is also particularly relevant to the debate about whether high-stakes language tests should adopt varieties of English to reflect the highly diverse English norms used in higher-education contexts (Kang et al., 2019; Major et al., 2002).

Research Questions

The study addressed the following two questions:

1. What significant role, if any, do suprasegmental features play in judgments of intelligibility, comprehensibility, and accentedness in NS-NNS and English as a Lingua Franca (ELF) interaction?
2. To what extent, if any, do listeners of English who share the same L1 background as the speakers score those speakers differently in judgments of intelligibility, comprehensibility, and accentedness?

Research Methodology

Following Kachru's (1985) World Englishes paradigm, a total of six speakers representing three circles of English were recruited as speaking subjects. Two U.S. speakers represented inner circle English speakers where English is the mother tongue; Two Indian English (1=Bengali, 1=Hindi) speakers typified the outer circle variety where English is used as their second language; Two Mandarin Chinese speakers represented the expanding circle variety where English is used as a foreign language. These speakers were listened to by the researcher and another trained phonetician to ascertain that all speakers of each English variety demonstrated pronunciation features that are typical for the particular variety. Each speaker was recorded while producing a five-minute, spontaneous, introductory-level lecture in a Science, Technology, Engineering, and Mathematics (STEM) field (e.g. math, physics, chemistry) based on a prepared semi-structured script that resembled the structure of TOEFL listening passages.

Two types of stimuli were extracted from the lecture recordings for the listener tasks. First, one single continuous sample (10 words long on average) was taken from each lecture for a transcription task. The accuracy of listeners' transcription provided intelligibility scores for each speaker. Second, the lectures were edited to include only the first three minutes (+/- 10 seconds) of continuous speech, which provided stimuli for comprehensibility, which is "judgments on a rating scale of how difficult or easy an utterance is to understand" (Munro & Derwing, 1997, p. 2) and accentedness ratings, or "the degree to which the pronunciation of an utterance sounds different from an expected production pattern" (Munro et al., 2006, p. 112).

Three groups of listener participants who were categorized by their L1 backgrounds listened to these stimuli. Group 1 consisted of 30 U.S. English speakers who were all undergraduate students. They represented the inner-circle English speakers. Group 2 consisted of 30 Indian-English speakers who represented the outer-circle English speakers. All the Indian-English listeners had an intermediate to advanced level of English proficiency, a B2 or above level in the Common European Framework of Reference (CEFR), based on a self-report of their test scores on TOEFL or equivalent tests (e.g., IELTS and TOEIC). They also reported a moderate degree of contact with nonnative speakers of English ($M = 2.87$; $SD = 1.05$). Group 3 comprised of 30 native speakers of Mandarin who represented expanding-circle English

speakers. All Mandarin participants had a proficiency of CEFR B2 level or above. They reported a slightly more frequent degree of contact with nonnative speakers than the other two groups of participants ($M = 2.50$; $SD = 1.22$).

For each speaker, the participants first listened to the single sentence excerpt and completed the transcription task, which provided an intelligibility score for each of the six speakers (i.e., the percentage of correct words listeners successfully wrote). Then, they listened to the three-minute lecture excerpt by the same speaker one time, completed a comprehensibility rating by sliding the cursor on a 9-point bipolar scale (1 = easy to understand; 9 = extremely difficult or impossible to understand), and provided an accentedness rating on a 9-point scale (1 = no accent; 9 = extremely strong accent).

To answer the first question, a prosodic profile (Kang & Pickering, 2014) of each speaker was created and reduced into five clustered variables using a principal component analysis (PCA). Then, the clustered variables were correlated with listeners' measurements of perceptual judgments using separate stepwise multiple regressions to investigate the role of prosodic features on their comprehension of varieties of Englishes. To answer the second question, linear mixed models were employed to examine the relationship between listeners' perceptual judgments and their L1 backgrounds and familiarity with an L2 accent.

Summary of Findings

Concerning the first research question, the results showed that prosodic features played an undeniable role in listeners' perceptual judgments of speakers in the World English context. However, they were weighted significantly differently depending on what judgments listeners were making. Specifically, listeners relied less on prosodic features when judging intelligibility compared to when they judged speakers' comprehensibility, which confirms the findings of previous research (Kashiwagi et al., 2006; Munro & Derwing, 2006; Munro et al., 1996). On the other hand, listeners were most sensitive to prosodic traits when judging speakers' accentedness. Furthermore, the results from stepwise regressions suggested that listeners relied on different traits in intelligibility judgments compared to comprehensibility and accentedness judgments. For intelligibility judgments, listeners relied heavily on speech rate measures, particularly the number of silent pauses, and tone choices, such as level and rising tones. For comprehensibility and accentedness judgments, the strongest indicators were mid-rising and low-rising tones. Fluency factors such as speech rate and articulation rate were also found to influence listeners' comprehensibility and accentedness ratings. This finding is supported by Munro and Derwing (1997), who observed an increase in perceived accentedness and poorer comprehensibility ratings in slower-than-normal speech. The results also lend partial support to findings of Kang et al. (2012) on suprasegmental fluency, which included most speech rate indices.

Regarding whether listeners would benefit from listening to speakers who shared their own accents, the results remained inconclusive. First, the shared L1 benefit was not significant on listeners' intelligibility judgments. There was a lack of consistent patterns, which seemed to agree with Major et al.'s (2002) and Munro et al.'s (2006) findings that there was an inconsistent shared-L1 benefit, in which some L2 listeners understand speakers from their own accents better, but not all. Some evidence favored a shared-L1 benefit for native U.S. English and Mandarin speakers and listeners, although this benefit was not significant. On the other hand, Indian listeners found Mandarin speakers more intelligible than Indian speakers. Therefore, the results seem to point to a more complex interplay of speaker L1 and listener L1 factors. Second, the results showed that comprehensibility and accentedness ratings were largely predicted by

speakers' accents, whereas the influence of listeners' accents was relatively small. For instance, all three listener groups agreed that native U.S. English speakers were the most comprehensible and the least accented. A shared-L1 effect was observed for both Indian and Mandarin listeners as they rated their own accent as more comprehensible and less accented.

Implications

The findings in this study lend support to the view that L2 prosodic features substantially contribute to listeners' judgments, regardless of whether listeners are inner-, outer-, or expanding-circle English speakers. Several phonological features were found to impact listeners' intelligibility and comprehensibility judgments. Therefore, these features should be considered first when planning for pedagogical treatments in ITA programs and English as an international language classrooms. For instance, to enhance listeners' understanding of the speakers and reduce the level of difficulty in processing different varieties of English, speakers should vary their tone choices.

The findings also provide some support for the potential incorporation of different varieties of highly comprehensible non-inner circle speakers in listening comprehension tests, which in turn increases the *ecological validity*, or whether the observed behavior in an experiment can be generalized to natural behavior in real life (Schmuckler, 2001), of the language tests to represent the highly variable higher education contexts. Although the results showed some impact of listeners' L1 on their comprehension of different accents, there was no definitive evidence regarding the shared-L1 benefit for L2 listeners on actual understanding their own accent. Therefore, introducing a non-inner circle English to the high-stake language tests will not necessarily advantage listeners from one L1 background and disadvantage others.

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