

LANGUAGE ATTITUDES AFFECT PERCEIVED INTELLIGIBILITY, PROFICIENCY, AND ACCENTEDNESS OF NON-NATIVE SPEECH

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ABSTRACT

Previous research [7], showed that Mandarin speakers of English modified acoustic properties of their English speech as a factor of both the interlocutor (native vs. non-native speakers of English) and their own attitudes towards Mandarin and English. The present study investigates whether these acoustic modifications are perceptible to native speakers of English. Seventy-two native English listeners rated short English speech samples from twenty-four Mandarin learners with respect to speaker's intelligibility, proficiency, and accentedness, on a 7-point scale. The results showed that the interlocutor condition was not reflected in listeners' ratings. However, speakers' attitudes significantly predicted listeners' ratings. Participants who were more positively oriented towards Mandarin than English were perceived as less intelligible, less proficient, and more accented. The results suggest that the effects of language attitudes on second language speech are salient and perceptible to native listeners.

Keywords: Non-native speech, language attitudes, intelligibility, proficiency, accentedness

1. INTRODUCTION

The acquisition of a second language (L2) requires much more than learning skills because of its inherent social nature. In order to be successful in the acquisition of an L2, the learner must be willing to adapt and alter their self-image, and previous research suggests that learners who approach L2 acquisition with a more positive attitude are likely to achieve higher ultimate attainment in the language ([6, 10, 21], *inter alia*).

Among other aspects of linguistic competence, acquisition of L2 pronunciation can be affected by learners' attitudes [8, 12, 13, 14, 15, 20]. Pronunciation is subject to a number of factors such as long-term transfer effects, fossilization, and age-effects, which therefore makes it challenging for the learner to achieve target-like proficiency [16]. Nevertheless, research has shown that a positive attitude towards the L2 aids in achieving near target-like pronunciation [8, 12, 15, 20].

One study that demonstrated the effect of speaker attitude on non-native speech [7] examined the speech of Mandarin speakers of English conversing with interlocutors from different L1 backgrounds (Mandarin, Russian, and English). When addressing native English speakers, Mandarin speakers who reported being more English-oriented (had a positive attitude towards English), utilized a more hyperarticulated vowel space, faster articulation rate, and higher pitch compared to speakers who were more Mandarin-oriented.

While [7] found that English-oriented Mandarin speakers made modifications to their English speech, it is unclear whether those adaptations were implemented with a purpose in mind. One possibility is that participants aimed to make their speech more intelligible or less accented when addressing English-speaking interlocutors. In this case, multiple acoustic properties of their speech would reflect this goal, in addition to those explored in [7] (vowel space expansion, global pitch and articulation rate). Moreover, if the acoustic modifications are salient enough, human listeners would be able to detect them in a perceptual judgement experiment.

The current study investigates whether the interlocutor factor (L1 background of the person the speaker is addressing) and speakers' language attitudes have an effect on native listener judgments of speakers' intelligibility, accentedness, and proficiency in English. Evidence of such effects would suggest that non-native speakers modify the acoustic properties of their speech with specific listeners and specific goals in mind, and that their ability or willingness to implement such modifications depends on their language attitudes.

2. METHODS

2.1. Participants

Seventy speakers of American English (mean age 20.7 years, 7 male and 63 female) participated in this study as raters. Raters were recruited among students enrolled at a major Midwestern American University and were compensated for their time with course credit.

2.2. Materials

The experimental stimuli were short sound clips extracted from longer recordings of 24 Mandarin speakers completing a map task [1]. In each recording, a speaker gave directions to a confederate using a map with labeled landmarks. All speakers were native speakers of Mandarin from the same dialectal area (Beijing and Northern China). Three different confederates participated in the task: a native speaker of Mandarin, a native speaker of Midwestern American English, and a native speaker of Russian. Twenty-four Mandarin speakers completed the task three times, once with each confederate. After completing the direction-giving task, each of the speakers took a language background questionnaire, which featured questions regarding their age of arrival (AOA), length of residence in the US (LOR), onset of L2 acquisition, and years of English schooling. The questionnaire also included a section on language attitudes adopted from the Bilingual Language Profile questionnaire [3]. Speakers were asked to indicate their level of agreement with statements such as “I identify with an English/Mandarin-speaking culture” on a 7-point scale (four statements per language). The sum of points for English-oriented statements and Mandarin-oriented statements was obtained, and a Mandarin/English attitude ratio was calculated. A ratio of 1 indicated that the speaker valued their Mandarin and English-speaking identities equally, while a ratio lower than one indicated a more English-oriented attitude and a ratio greater than 1 suggested a more Mandarin-oriented attitude (see [7] for details of the original study).

For the current study, sound clips were extracted from approximately the middle of the recording for each condition of the direction-giving task. Each clip was approximately 10 seconds in length and contained a full inflection phrase (e.g. “into the garage,” “now to the zoo”). Clips were carefully selected to ensure that they did not contain disfluencies, prominent dialect variation or feedback from the confederate. Clips were extracted and normalized for loudness using Praat [4]. This procedure was followed for all recordings, resulting in 24 clips in each of the three conditions. Each set of 24 clips was divided into three blocks consisting of 8 clips each. Block 1 contained clips from speakers 1-8, block 2 contained clips from speakers 9-16, and block 3 contained clips from speakers 17-24. Blocks were arranged into six lists of 24 items such that two blocks from the same condition never appeared on the same list. The order of block selection was counterbalanced across lists. Each listener rated only one of the six lists. As a result, each rater judged all

speakers and all conditions but never rated a single speaker more than once.

2.3. Procedures

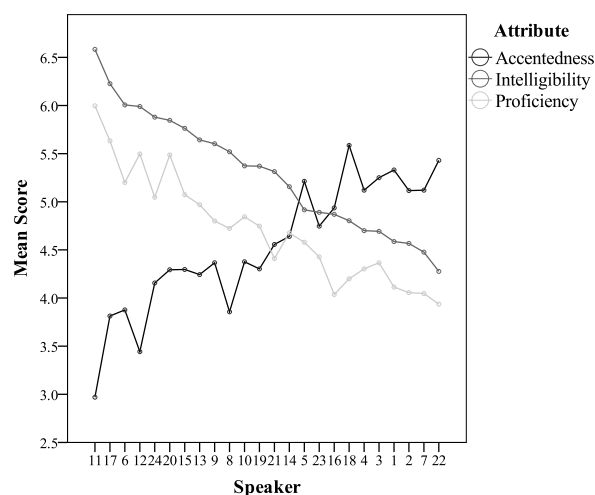
Participants took the survey online via Qualtrics. They rated 24 clips of non-native speech using three 7-point scales (7 being the highest). The prompts and their scales were as follows: “How well did you understand this person speaking English?” (e.g., “Not well at all”; “Very poorly”; “Poorly”; “Moderately”, “Fairly well”, “Well”, “Very well”), “Please rate the strength of this person’s foreign accent, if any, when speaking English” (“non-existent”; “Very weak”; “Weak”; “Moderate”; “Fairly strong”; “Strong”; “Very strong”) and “Please evaluate this person’s overall proficiency in English” (“Not high at all”; “Very poor”; “Poor”; “Moderate”; “Good”; “Near-native”; “Native-like”). Participants were randomly assigned to one of six lists of 24 clips. Clips were presented in random order, and each list was rated an equal number of times.

3. RESULTS

3.1. Overall variability

Figure 1 demonstrates the overall variability in rating scores and the amount of spread across speakers in terms of their perceived intelligibility, proficiency, and accentedness. It shows that overall speakers were perceived as fairly intelligible, with intermediate-to high English proficiency (all scores are above the mid-scale ‘moderate’ point for both attributes). All participants’ speech was perceived as accented, rising almost to the 6th point on the scale, labelled as ‘strong’.

Figure 1: Average accentedness, intelligibility and proficiency ratings per speaker (speakers are arranged in the order of decreasing intelligibility).



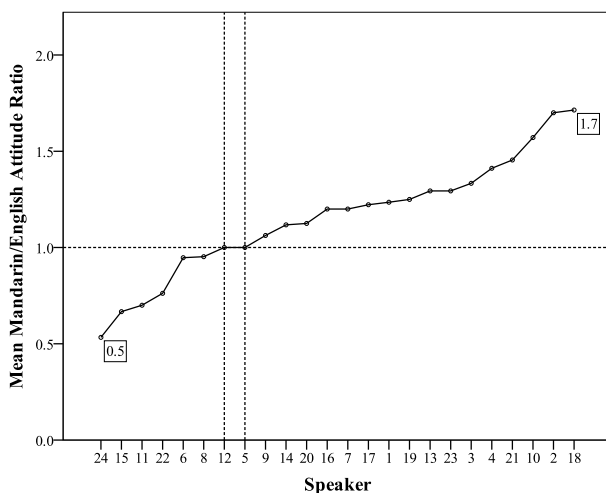
Within these ranges there was a fair amount of variability in all three dimensions, from almost perfect intelligibility (6.58 on a 7-point scale, speaker 11), near-native proficiency (6 on a 7-point scale, speaker 11), and weak accent (2.97, speaker 11) to moderate intelligibility (4.28, speaker 22), moderate proficiency (3.94, speaker 22) and strong accent (5.59, speaker 18).

Intelligibility and proficiency ratings appear to be in an almost perfect positive correlation with each other (in fact, the correlation was significant: $r[72] = 0.94$, $p < .001$), while both are in a negative relationship with perceived accentedness ($r[72] = -.876$, $p < .001$ and $r[72] = -.863$, $p < .001$). The correlation between accentedness and the other two attributes is less consistent, indicating that this dimension exhibits a greater degree of independence from the other two.

3.2. Language attitudes

For the majority of the speakers in the sample (16 out of 24) the Mandarin/English attitudes ratio was above 1, indicating a more positive attitude towards Mandarin than English, but there was a fair amount of variability, the ratio ranging from 0.53 to 1.71 (Fig. 2).

Figure 2: Average Mandarin/English ratio across speakers.

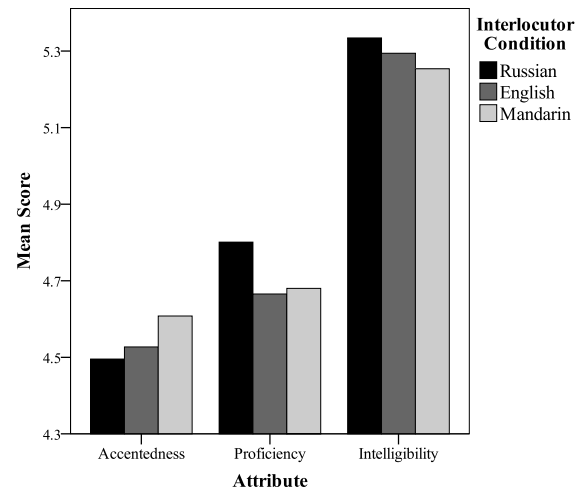


3.2. Proficiency, intelligibility, and accentedness ratings across interlocutor conditions

On average, speakers were rated the most proficient and intelligible when addressing the Russian interlocutor (Fig. 3), whereas the differences between Mandarin and English conditions were less pronounced and less consistent. Speech addressed to the Mandarin interlocutor was also rated as the most

accented, while speech addressed to the Russian interlocutor was rated as the least accented.

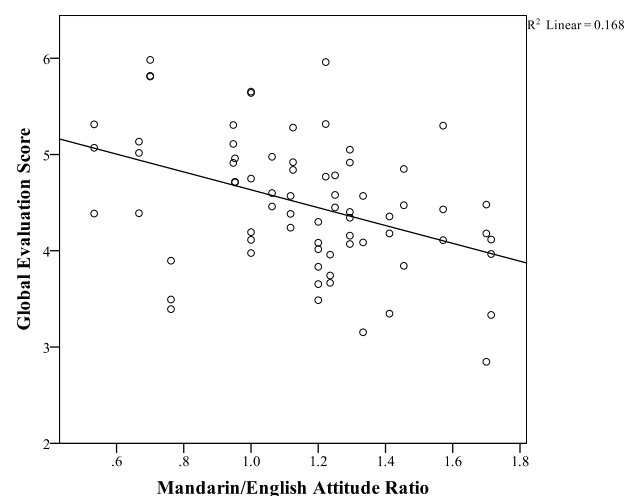
Figure 3: Average attribute scores by interlocutor condition (L1 background).



3.3. Linear mixed model results

Since intelligibility, proficiency, and accentedness scores were correlated with each other, a single global evaluation score was created by taking an average of the three (accentedness scale was reversed prior to averaging). The resulting global scores were normally distributed (Shapiro-Wilk test, $p = .866$) therefore no further transformation was applied. The global evaluation score was submitted as a dependent variable to a Linear Mixed Model with Interlocutor condition as a fixed factor, Mandarin/English attitude ratio as a covariate, the interaction between the two, and a random intercept for speaker.

Figure 4: Correlation between Mandarin/English ratio and global evaluation score.



The results showed no significant effect of the Interlocutor condition and no significant interaction between Interlocutor and Mandarin/English attitudes ratio. The attitudes covariate was a significant predictor of global evaluation score ($\beta = -0.919$, $SE = 0.434$, $t = -2.115$, $p = 0.041$). A higher Mandarin/English ratio was associated with a lower evaluation score (Fig. 4), indicating that speakers who were less positively oriented towards English language and culture were perceived as less intelligible, less proficient, and more accented by native English-speaking raters. It is worth mentioning that significant correlations were also observed between each one of the evaluative dimensions and attitudes ratio. Additionally, no correlations were found between attitudes ratio and participants AOA, LOR, years of L2 schooling, and onset of acquisition.

4. DISCUSSION

Average differences in evaluation score as function of interlocutor condition suggest that non-native speakers aimed for greater intelligibility when addressing the native Russian speaker. This makes intuitive sense, since the Russian interlocutor has neither the benefit of being a native speaker of English, nor the benefit of a shared L1 background with the Mandarin speaker [2, 10, 11, 19]. Therefore, from the point of view of the Mandarin speakers, the Russian interlocutor is in a greater need of increased intelligibility than other interlocutors.

However, these average differences must be interpreted with great caution since they were not statistically significant. On the other hand, the lack of statistical significance could be due to methodological choices. The sound samples were extracted from a relatively arbitrary point in a recording of a naturalistic conversational task, which means that a large amount of irrelevant variability was unavoidable. This variability has likely reduced the sensitivity of the perceptual test. In addition, the sound samples were rather short, and it is possible that they didn't provide the raters with enough information to arrive at a reliable evaluation of participants' speech. Finally, findings in [7] were not entirely compatible with the view that speakers modified the acoustics of their speech in order to increase intelligibility. Instead, affective factors could play a role. Results suggested that participants may have modified their speech to indicate a greater level of engagement and a positive stance in the conversation. If this was indeed the case, eliciting positive affect judgements of the speech samples instead of intelligibility judgements would be a better way to reveal interlocutor condition differences.

The only statistically significant effect detected in the present data was that of a covariation between participants' attitudes ratio and their evaluation score. A more positive attitude towards English was associated with greater intelligibility, greater proficiency, and lower accentedness, as indicated by the global evaluation score. While it is unknown whether a more positive L2 attitude leads to greater success in L2 acquisition or whether greater prowess at language learning ultimately results in a more positive attitude, it is clear that the two are connected. Moreover, this link was established on the basis of evaluation of very brief speech samples, containing a single inflectional phrase. Among other things, this indicates that listeners are able to form such judgements quickly and with limited information.

While it is certainly possible that the relationship between language attitudes and perceived intelligibility or accentedness of L2 is indirect and is instead mediated by factors such as LOR, our data did not reveal any significant correlations between variables quantifying the onset and duration of L2 acquisition and attitudes ratio. Admittedly, our sample of university students was quite homogeneous with respect to these background characteristics. Further research is necessary to establish whether these or other circumstances of L2 acquisition could mediate the relationship between language attitudes and L2 speech intelligibility, accentedness, and proficiency.

The ratings of intelligibility, proficiency, and accentedness could not be analysed separately in the present study because of covariation among them. However, the three concepts are, in principle, independent. That is, a speaker can be relatively accented but highly intelligible [5, 17, 18]. Similarly, high overall proficiency does not necessarily guarantee high intelligibility [5]. Covariation among these attributes in the present study could be attributed to the fact that all three were evaluated simultaneously for a given speaker. Blocking the experiment by task rather than by speaker could decouple the three dimensions, potentially revealing different patterns of results.

To conclude, results of the study suggest that language attitudes play an important role in acquisition of second language speech. Acoustic differences in non-native speech that are associated with differences in language attitudes are perceptually salient and detectable by native listeners. From the pedagogical perspective, this study confirms that students' positive attitudes towards the language can lead to improved intelligibility, ultimately justifying work that language teachers do to ensure that students have a positive orientation towards the language and associated culture.

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