THE ROLE OF LISTENER IDEOLOGY IN PERCEPTION OF NON-NATIVE SPEECH VOLUME

by

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A THESIS

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Primary Thesis Advisor

Implicit attitudes about social groups are often associated with the language varieties used by those groups. As a result, listeners not only make social evaluations based on a person's language and accent, but may also perceive speech differently based on social identities of speakers. However, there is little work investigating the influence of differences in social beliefs among listeners, rather than differences in social identity between speakers, and even less work examining listener perception of volume. This study investigated the relationship between a listener's ideological beliefs and the way they perceived the volume of non-native ("foreign-accented") speech. Native English speakers listened to a series of sentences in native-accented English, non-native English, and native Turkish, Spanish, and Mandarin, and they were asked to rate the volume of each sentence they heard. Next, they indicated their agreement with either nationalist or globalist ideological attitudes. Across intensity conditions, participants perceived native-accented English as louder than both non-native English and non-English languages. Ideology comparisons were limited, with the participant pool heavily skewed toward globalism, but the data suggest ideology may predict the extent to which listeners perceive a volume difference between native and non-native English. Implications for real-world interaction are discussed, and further research is recommended.

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Introduction

A broad body of linguistic work has investigated the relationship between social attitudes and language. Sociolinguistic work finds that attitudes listeners express about particular languages and accents often reflect broader social attitudes about the groups of people who use those languages and accents (Lippi-Green, 1997). Studies of speech perception[1], meanwhile, find that listeners' social biases can even influence how well they understand speakers, or how accented they perceive speakers to be (e.g., Babel and Russell, 2015). Often, such work finds evidence of prejudice against non-native[2] speakers in particular, with listeners negatively evaluating non-native speakers' accent strength, comprehensibility, and even personal traits. However, although there is abundant work investigating both language-based social judgements and the influence of social bias on perception of comprehensibility and accent, there is very little work that explores whether perception of physical acoustic qualities, like intensity (perceived as volume), is also influenced by the language or accent a listener hears. Additionally, although it is clear that many listeners hold language-based prejudices, there is a lack of

[1] Language attitude studies and experimental work in speech perception can be considered two different bodies of research with separate methodologies. Language attitude studies investigate how listeners' social evaluations of a speaker will be influenced by the speaker's language variety. The listeners will hear the same voice (although they are not aware it is the same voice) speaking different languages or accents, so that all voice qualities are constant except for the accent. They then evaluate speaker social traits for each different "speaker" (in reality, each different accent) they hear. Studies of speech perception, conversely, investigate the influence of internal social biases on listeners' perceptions of the same language variety. Listeners are often primed with non-linguistic social cues, like a picture of the speaker, before rating the accentedness of the speaker; in these studies, the language or accent listeners hear will remain the same, but the non-linguistic social cues (pictures) are changed.
In the studies referenced above, "speech perception" typically refers to listeners' ratings of the comprehensibility or accentedness of a speaker (in other words, how understandable they are, and how accented they are).

[2] A non-native accent is the accent of a person speaking a language other than their native language(s) (what listeners may perceive as a "foreign accent"). Native speech may be described as an "L1 accent," and non-native speech may be referred to as an "L2 accent."

work investigating whether some groups of listeners are more likely to be biased against non-native speakers than others, despite the fact that listeners (in this case, in the U.S. context) are likely to be highly diverse in terms of their individual political and social beliefs. Recently, Jaggers (2018) found that people with different ideological beliefs had different socially-driven language productions: globalism and nationalism, which are ideologies defined in part by beliefs about people and languages perceived as "foreign," may determine how speakers pronounce words borrowed from other languages (and thus, words related to non-native speech). Whether the influence of these ideologies extends to non-native speech *perception* has not been explored. This study addresses both intensity and ideology, investigating whether listeners' ideological attitudes may correlate with their perception of non-native speech intensity (volume). The experiment thus explores a possible relationship between listeners' biases toward "foreign" speakers and their perception of the relative "loudness" of non-native speech.

Literature background

I. Speakers, listeners, and social bias

Language attitudes

It is well-established in the experimental literature that social beliefs interact with language attitudes (social evaluations of speakers based on speech) in a number of ways. First of all, listeners readily make social judgements about speakers based on language and accent, and these language-based judgements frequently reflect broader stereotypes about the social groups associated with those languages and accents (e.g., Anisfield and Lambert 1964). Indeed, listeners use speech to infer a wealth of social information about speakers, including race, class, gender, regional origins, and other salient social categories (Labov, 1966; Labov, 2006). Listeners thus use cues in speech to link a speaker to stereotypes based on the perceived social identity, to the extent that listeners will make stereotyped judgements about speakers' personal social traits— including intelligence, friendliness, attractiveness, and more— based on speech alone (Lambert et al, 1960; Anisfield and Lambert, 1964; Lambert, 1967; Labov et al, 2011; Preston, 2014). Listeners' use of language to infer stereotypical social traits about speakers has been dubbed "linguistic stereotyping" (Lambert et al, 1960).

In typical language attitude studies, listeners evaluate social traits of speakers based on the speaker's voice alone, often as part of a "matched guise" paradigm, in

which the voices heard in different language conditions (or "guises") are identical[3] apart from the language variety being spoken (Giles and Billings, 2004). These studies frequently find that language and accent differences cause listeners to significantly alter their evaluations of speakers' non-linguistic traits— even traits like height or attractiveness— despite the absence of any information about speakers apart from their voices. Lambert's (1960) foundational language attitude study, for example, found that both English and French Canadians rated speakers of English as more attractive and intelligent than speakers of French, despite the fact that, in reality, the voice they heard for each language belonged to the same bilingual speaker. The listeners' language-based judgements reflected Canadian cultural stereotypes that favored English Canadians over French Canadians. Similarly, studies of regional accent in the U.S. have found that when American listeners hear a voice speaking Southern English, they will rate the speaker as less educated but more pleasant than speakers of other English dialects, reflecting the American cultural stereotype that Southerners are friendly but uneducated (e.g., Fridland et al, 2005; Kinzler and DeJesus, 2013). In both cases, the results indicate that listeners use language and accent as a cue to social identities and their associated stereotypes. This kind of "linguistic stereotyping" has been found across a multitude of regions and language varieties (Giles and Billings, 2004; Giles and Rakic, 2014; Preston, 2014). The language attitude research clearly suggests that broad social

[3] Matched-guide studies may involve the same (bilingual) speaker producing different languages or accents (in which case the voices for different stimuli are truly identical), but they may also use different speakers who are matched for gender, voice pitch, and other qualities (manually and/or technologically). The goal of the matched guide paradigm is to keep the voice qualities of all stimuli constant, so that the only independent variable is the language variety being used. Ensuring that the voice remains consistent allows researchers to conclude that listeners are changing their social judgements based on language or accent, and not other qualities of the voices they hear.

beliefs and biases become inextricably linked to speech associated with particular social groups, to the extent that language alone is often sufficient for listeners to make stereotyped social evaluations.

Non-native speech is no exception to this pattern. In fact, the work on non-native speech consistently finds evidence of language- and accent-based social judgements (and often prejudice) among listeners, with participants frequently demonstrating negative social attitudes toward speakers with non-native accents (Gluszek and Dovidio, 2012; Lippi-Green, 1997). Some research argues for accent-specific prejudice: Bauman (2013), for example, found that native English-speaking American listeners rated Korean- and Chinese-accented English speakers as significantly less attractive and intelligent than both native-accented English speakers and Brazilian-accented English speakers, a finding which indicates that listeners had negative associations with the Korean and Chinese voices in particular. Lindemann (2005), meanwhile, asked U.S participants to use a map to rate the non-native English spoken in different countries (based on their own preconceptions, not new audio stimuli). Participants rated the accents of many European countries highly for positive traits like pleasantness, correctness, and friendliness, but gave low ratings to speakers in East Asian and Latin American countries, evaluating the English of these regions as "wrong" or "broken." In both of these cases, listeners assigned stigma to specific non-native accents relative to other accents, demonstrating different social biases for different speaker groups. However, listeners may also have a more generalized negative association with non-native speech: Roessel and colleagues (2017), for example, found that listeners negatively evaluated several different types of non-native speakers without

seeming to differentiate between particular accents, indicating a broad negative association with non-native speech. In a similar vein, Dragojevic (2017) suggests that listeners' negative language attitudes toward non-native speech arise in part from the added processing difficulties of comprehending non-native speech— independent of specific social stereotypes— with stronger speaker accents leading to more negative social judgements by listeners.

Speech perception

There is abundant evidence that social beliefs interact with speech perception in addition to language attitudes. Listeners' beliefs about a speaker's social identity have frequently been shown to influence perception of variables like comprehensibility and accentedness (e.g., Campbell-Kibler, 2010), an effect which D'Onofrio (2019) describes as the integration of "top-down social information to form linguistic expectations." In other words, listeners may modify their expectations for speech on the basis of a speaker's perceived race, nationality, or other salient social categories. Kang and Rubin (2009) call this effect "reverse linguistic stereotyping," arguing that stereotypes or biases associated with social categories influence speech perception. In the case of non-native speech, for example, native English-speaking participants may perceive a non-native speaker as less comprehensible and more accented when the speech is presented with a visual cue of an Asian face instead of a white face, possibly because racial bias triggers an expectation of non-nativeness (e.g., Babel and Russell, 2015). Rubin's early work on American undergraduates' reactions to the speech of international teaching assistants (ITAs) likewise found that a speaker's perceived ethnicity was more important to listeners' comprehension of non-native speech than the speaker's actual

level of language proficiency or accent (Rubin and Smith, 1990), while Rubin (1992) found that even when all speakers used native-accented English, participants showed lower listening comprehension and gave higher accentedness ratings for speakers they visually identified as Asian (versus a white speaker). Notably, this "reverse linguistic stereotyping" hypothesis has been debated in subsequent literature, with some researchers arguing that decreased comprehension of non-native speech in audiovisual studies is actually due to a *mismatch* between social expectations and speech, rather than direct prejudice: in other words, decreased listener comprehension may result from the given speech conflicting with what listeners expect to hear based on the speaker's perceived identity (e.g., McGowan, 2015). For example, if listeners hear Chinese-accented English paired with a Caucasian face, they may struggle to comprehend it more than Chinese-accented English paired with a Chinese face. However, even in this counterargument, the evidence supports the fundamental notion that listeners' beliefs and expectations about the identity of a speaker influence speech perception.

Expectations about a speaker's "foreignness" may be particularly influential for perception of non-native speech. Rubin (2012), for instance, found that when American participants were told a speaker was international, they would rate the speech as more accented than a speaker they were told was American, though both the American and international guises used the same native-accented North American English. Yi and colleagues (2013), meanwhile, tested listener comprehension of native-accented English and Korean-accented English in an audio-only condition, which used speech alone, and an audiovisual condition, which paired native speech with a visual cue of a white face and paired non-native speech with an Asian face. They found that the Asian visual aid

did not improve comprehension as much as the white visual aid did, and that this reduced benefit patterned with listeners associating Asian ethnicity with being "foreign" on an implicit bias test (IAT). Participants in the same study also perceived non-native speech as more accented when it was presented with an Asian face (versus the audio-only condition), whereas the native speech was rated as less accented when it was presented with the white face. In a subsequent fMRI[4] study, the authors found that listeners with a stronger Asian-foreign IAT bias were more likely to struggle with cognitive processing of Korean-accented speech when it was presented with an Asian face (Yi et al, 2014). The research thus suggests that listeners' expectations about whether a speaker is "foreign" play a role in shaping perceptions of non-native speech.

Relevance to the present study

The existing work on both language attitudes and speech perception clearly indicate that listeners' social biases play a significant role in both evaluation and perception of non-native speech and speakers. Listeners infer speaker social traits based on stereotypes they associate with particular accents, and they also perceive speech differently based on a speaker's perceived social identity. However, there are gaps in the research, particularly in the area of speech perception.

Firstly, it is important to note that the majority of studies investigating social bias and non-native speech perception measure comprehensibility and accentedness, not loudness perception. In addition, these studies frequently employ visual or other non-

[4] Functional magnetic resonance imaging, or fMRI, is an imaging technology used to measure brain activity.

linguistic cues to speaker identity as a means of creating top-down expectations. Thus, though language attitude studies clearly suggest that listeners make social inferences about speakers based on speech alone, there is less evidence to indicate whether social biases associated with non-native speech influence listeners' speech perception in the absence[5] of visual cues to speaker identity, especially for variables other than comprehension and accentedness. Though the latter measures are highly valuable, they are not the only perceptual variables with potential social ramifications: a speaker's perceived volume may also have consequences for listeners' snap social judgements. A speaker who is perceived as "loud" (by native English-speaking American listeners) may be seen as more assertive and noticeable, or perhaps more intrusive or annoying; a speaker who is "quiet," on the other hand, may be assigned the qualities of reticence or uncertainty, and their speech may be less "noticeable." Volume perception, like comprehensibility and accentedness, could thus have tangible consequences for not only social traits attributed to speakers, but also the attention paid to their speech. The present study will therefore aim to address the gap in research on perception of loudness.

A number of questions also remain with regard to the importance of differences among listener beliefs (as opposed to speaker identities) for speech perception, despite the likelihood of variation in individual listeners' social beliefs and biases within a

[5] Examining listener perceptions of speech in the absence of visual cues allows us to isolate language as a source of listener judgements; when we provide only audio stimuli and then change the language varieties that listeners hear, if listeners change their reaction in response, we know that the change in perception is a response to the language variety being used, and not a response to other cues, like race. This does not mean that listeners only use language or accent to make judgements in real life (where they will likely have visual information in addition to speech), but it does mean that we can confirm the speech itself is a factor, in addition to the integration of non-linguistic social information.

given population. The majority of studies alter a *speaker's* accent or social identity (e.g., race or gender) to influence listeners' perceptions, but they do not investigate whether differences in personal beliefs (i.e., ideology) within a given population of listeners may create predictable differences in perception as well. The following section addresses recent work on connections between non-native speech and varying social beliefs in the American context, which lay the groundwork for the present study.

II. Non-native language in the U.S. context: Ideology and "foreign" speech

In the U.S. context, overt attitudes about language are a highly salient feature of the sociopolitical landscape. English-dominant and English-only ideologies are highly prevalent in American social life and policymaking, with native-accented standard[6] English enjoying not only social prestige but also a privileged status in government operations, education, and virtually all other aspects of mainstream society (Lippi-Green, 1997; Wiley, 2014). Inherent in English-dominant ideology is resistance to linguistic diversity in the U.S., as evidenced by phenomena like the English-Only movement, which advocates policies that promote English monolingualism and suppress the use of non-English languages in education and other settings. English-Only advocacy is often closely tied to anti-immigration sentiments, with English-only proponents viewing non-English languages and accents as foreign and un-American

[6] "Standard" English can be defined as the dialect(s) of English that are socially privileged and widely enforced in the education system, often (misguidedly) believed to be the "default" or "unaccented" version of English. "Standard" English can be contrasted with "nonstandard" English, which encompasses stigmatized varieties of English that include both native and non-native accents. In reality, the difference between "standard" and "nonstandard" English is social privilege, not "correctness" (Lippi-Green, 1997).

(Wiley, 2014), despite the long history of the U.S. as a multilingual nation (Rumbaut and Massey, 2014). Dominika Baran (2017) calls this "Otherization," in which American listeners deem a speaker to be "Other" on the basis of accent, assuming they do not belong because they "sound" foreign. Such attitudes about "foreign" languages and accents— and the people who use them— have very real consequences for speakers. People who use English with a non-native accent in the U.S. are more likely to face discrimination from employers (Russo et al, 2017), coworkers (Neeley et al 2012), the media (Lippi-Green, 1997), and more. Social attitudes toward speakers who are perceived as un-American or foreign on the basis of language are thus highly relevant in the U.S. context.

Social beliefs and attitudes within the U.S. population are highly diverse, and attitudes toward non-English speech and speakers are no exception. Indeed, different ideological alignments within the U.S. population can predict attitudes toward "foreigners" and the languages they speak. In particular, previous work on American ideology has identified a distinction between "globalism" and "nationalism," categories which can be seen as opposite ends on a spectrum of attitudes about the United States and the status of Americans in a global context (Merry, 2016; Jaggers, 2018). American nationalism is associated with loyalty to the U.S. and a rejection of culture and language associated with being foreign, favoring an exclusive and homogenous construct of U.S. identity as English-speaking, often white, and superior to other national identities (Banikowski and DiMaggio, 2016). Globalism, at the other end of the continuum, is characterized by a receptive attitude toward people, culture, and language outside this exclusive subset (Jaggers, 2018; Merry, 2016). Ideological nationalism and globalism

often pattern with political conservative and liberal identities (though the two do not always pattern together, as demonstrated by Jaggers (2018)).

Given the assumption that these ideological alignments can predict attitudes toward "foreigners," one might expect that, by natural extension, a tendency toward globalism or nationalism might also predict language attitudes, particularly social evaluations of non-native speech or other speech associated with "foreignness." Indeed, in an extension of work by Hall-Lew and colleagues (2010), Jaggers (2018) found that ideological categories predicted language *productions* related to non-native speech: foreign loan words[7] used by English speakers, particularly place names (for example, *Iraq* or *Chile*), were produced differently depending on the ideology and political identity of the speaker. Globalist-aligning speakers produced loan words with a source-like pronunciation (e.g., /iɹɑk/), whereas nationalist-aligning speakers produced the anglicized versions (e.g., /ɑɪɹæk/).[8] Participants' productions of foreign loan words could thus be predicted by their ideologically-based level of receptiveness toward "foreign" culture and language.

Importantly, foreign loan word pronunciations have the potential to be politically salient, and speakers may be aware of their own productions; particular pronunciations not only index ideological identity, they may also be a conscious signal of political identity (Jaggers, 2018). Whether ideology can predict differences in listeners' speech perception—a process much less likely to be consciously curated than

[7] Words borrowed from another language into common English use.

[8] In other words, nationalists used the versions of loan words that have been adjusted to sound like English words (for Iraq: *ay-rack*), whereas globalists pronounced the words in a way that more closely resembled the original pronunciation in the language from which the word was borrowed (for Iraq: *ee-rahk*, which resembles the original pronunciation in Arabic).

loan word production— thus remains an open question. However, given the previously discussed evidence of listener biases on non-native speech perception, we might expect Jaggers' language production results to be echoed by perceptual analogues. In other words, given the evidence that listener speech perception is influenced by the biases toward the social identity of the speaker— including associations with "foreignness" — it is not unreasonable to predict that the ideological alignments studied by Jaggers (2018) might determine differences among listeners for perception of non-native language.

III. Research questions and hypothesis

The present study tests a perception question rather than a production question, investigating the role of listeners' broad attitudes about non-English culture and language in their perception of non-native speech. We chose to investigate volume, as it has received little attention thus far despite its potential as a variable with myriad social consequences for listeners' perceptions and evaluations of speakers. The experiment aims to determine whether listeners' ideological beliefs may influence their perception of the volume of non-native speech relative to native-accented speech. Given the anti-foreign and pro-English biases associated with nationalism, we predicted that nationalist-aligning participants would perceive non-native speech as louder than native-accented speech, with "loud" serving as a potential proxy for obtrusiveness or annoyance (i.e., a social rejection of non-native speakers).

Methods

The experiment was run as an online survey through Qualtrics. It consisted of a volume judgement task, a questionnaire, and a demographics survey. The beginning of the survey provided participants with two audio samples, one at the lowest intensity they would hear (52dB) and one at the highest (70dB). Participants were asked to adjust their device volume to a comfortable level for both audio samples, and were then asked not to change their device volume for the remainder of the experiment. They were also asked to wear headphones and sit in a quiet environment.

It is important to note the methodological limitations of the experiment, which was completely remote and did not take place in a controlled lab environment. Although the beginning of the survey included an audio test and reminders about experimental conditions (a quiet environment with headphones), participants' listening environment cannot be controlled in a remote online experiment; there is no guarantee that results have not been affected by participants' individual devices and listening environments.

Participants

Participants were recruited through the University of Oregon's Human Subjects Pool and were compensated for their participation with course credit. Subjects were all University of Oregon students, and sign-ups for the study were open to any HSP participant. 87 total students signed up for the study online. Nine of these were excluded from analysis for failure to participate or failure to complete the experiment, and two were excluded because they were non-native English speakers. The 74 remaining participants fell between between the ages of 18 and 28, with 57 identifying as female,

16 as male, and one as non-binary. The participant pool included both bilingual[9] native English speakers (n = 15) and monolingual native English speakers (n = 59).

Experiment

Volume judgement task

Design

The experiment stimuli were 147 sentences collected from the ALLSSTAR online corpus. Stimuli fell into three broad categories: Native English, non-native English, and non-English languages. The target languages included L1 English (native English), L1 Mandarin Chinese, L1 Spanish, and L1 Turkish (non-English languages), as well as English spoken with a Mandarin Chinese, Spanish, or Turkish accent (non-native English). For each language variety, there were 21 sentences spoken by three different speakers, with seven sentences per speaker (with the exception of Turkish, for which there were two speakers with ten sentences each). All of the stimulus sentences were produced by female-identified speakers.

The stimuli were modified using Praat to fall into three categories of intensity: low intensity (52 dB), medium intensity (61dB), and high intensity (70dB). Sentences from each language variety category were divided evenly into the intensity categories, so that participants were presented with the same number of sentences per language group per intensity level. (For a breakdown of the stimuli, see Table 1, Appendix A.)

[9] Languages spoken by bilingual participants included Spanish, French, Farsi, German, and Tamil. All bilingual speakers included in analysis identified as native English speakers.

Method

Before the volume judgement task began, participants were reminded to wear headphones and sit in a quiet environment. They were also given a chance to adjust their device volume to a comfortable level and were then asked not to change the volume of their device for the duration of the experiment. They completed one practice trial before beginning the experiment.

Once the experiment began, participants were presented with the 147 stimulus sentences in random order and were asked to rate the relative volume of each sentence on a scale from 1-9 (1 = Very Quiet, 9 = Very Loud). For each sentence, participants would click a "play" button to listen to the sentence. After selecting a volume rating (1-9), they advanced automatically to the audio for the next sentence. Each sentence was thus heard only once, and participants could not change their volume ratings once they had clicked on the scale. When participants finished rating all of the sentences, they advanced to the questionnaire. See Appendix A for sample images of the volume task.

Questionnaire

The questionnaire contained 21 statements that participants rated on a 5-point Likert scale (Strongly Disagree to Strongly Agree). Participants were asked to rate the extent to which they agreed with each statement. The first 16 statements expressed either globalist or nationalist ideological attitudes toward immigration, language, travel, and U.S. identity. The remaining 5 questions asked the participants to explicitly indicate their level of agreement with dominant U.S. political parties and ideologies (liberal/conservative and Democrat/Republican). Based on responses to the first 16 statements, each participant was assigned a score ranging from -32 to 32, with a score

of -32 as most globalist and a score of 32 as most nationalist. See Appendix A to view the full questionnaire.

Results

I. Loudness perception

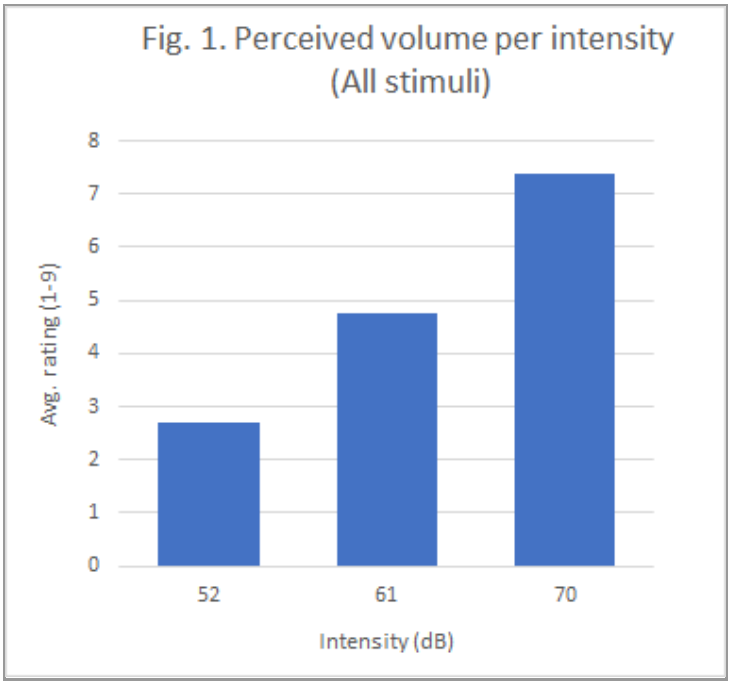


Figure 1: Perceived Volume per Intensity (All Stimuli)

Average loudness rating per acoustic intensity level, across language conditions.

Both bilingual (n = 15) and monolingual (n = 59) native English speakers were included in analysis of loudness ratings. Table 3 (Appendix B) lists average loudness ratings for all participant groups.

Participants perceived the three intensity conditions appropriately (Fig. 1). This indicates that participants did adhere to experiment guidelines (e.g., not changing device volume mid-experiment), and suggests that changes in loudness perception were due to listeners' perceptions and not changes in device volume.

When including both monolingual and bilingual participants, native-accented English was rated as louder than both non-native English and non-English languages

(Figs. 2 & 3). Across intensity conditions, non-English languages averaged a rating of 4.9, non-native English speech averaged 4.9, and native English speech was rated as 5.3. The English-as-louder effect held true within each intensity level, though it was stronger within the two lower intensity levels (Figs. 9 & 10, Appendix B). Differences between monolingual and bilingual participants as isolated groups were minimal (See Appendix B for a summary of loudness results and a comparison of monolingual versus bilingual participants).

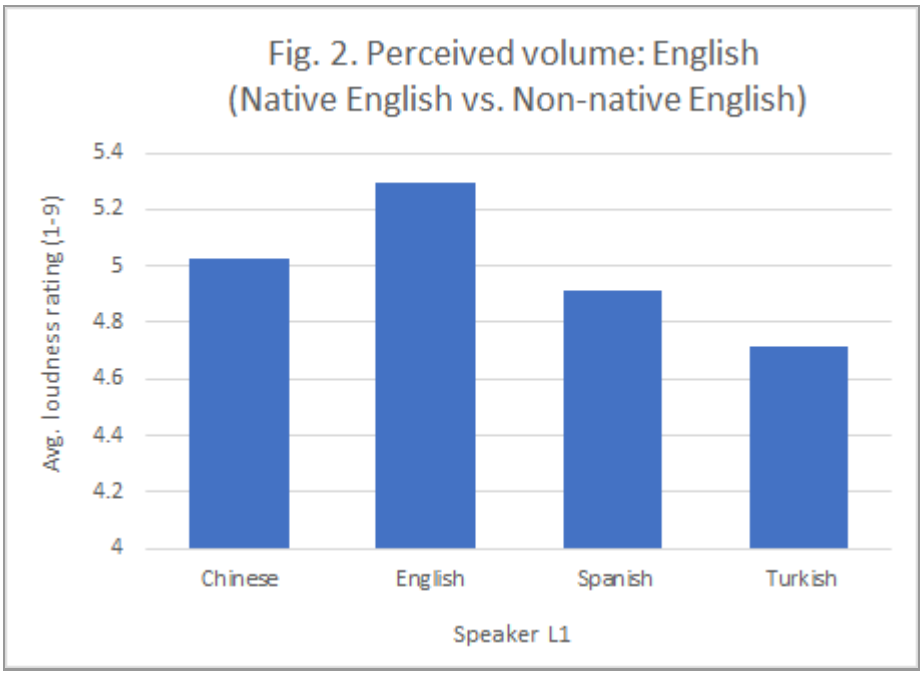


Figure 2: Perceived Volume: English (Native English vs. Non-Native English)

For stimuli with English as the target language, native-accented English was rated as louder than the three varieties of non-native English. (All participants)

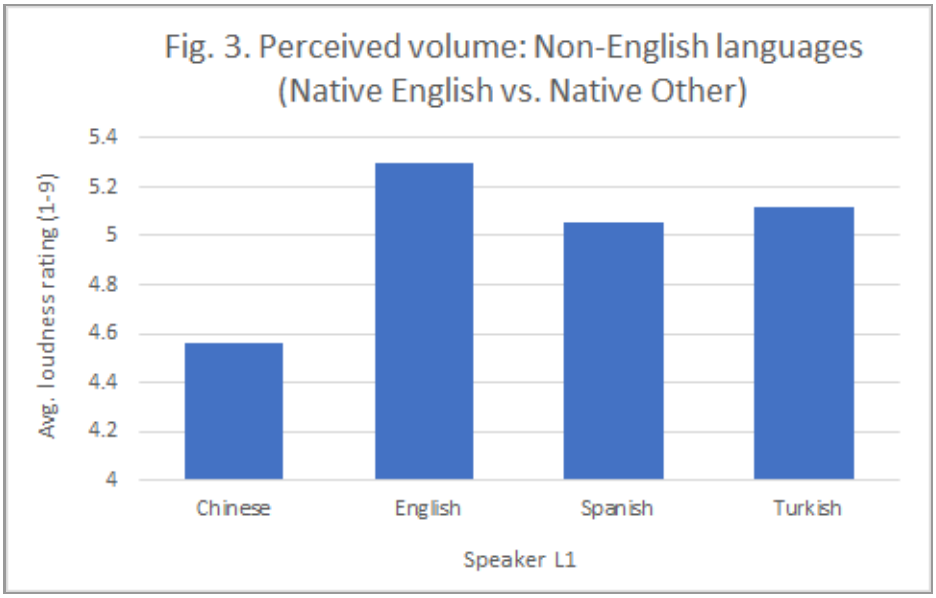


Figure 3: Perceived Volume: Non-English Languages (Native English vs. Native Other)

For stimuli with native-accented Chinese, English, Spanish, and Turkish as the target languages, native English was rated as louder than the three non-English languages. (All participants)

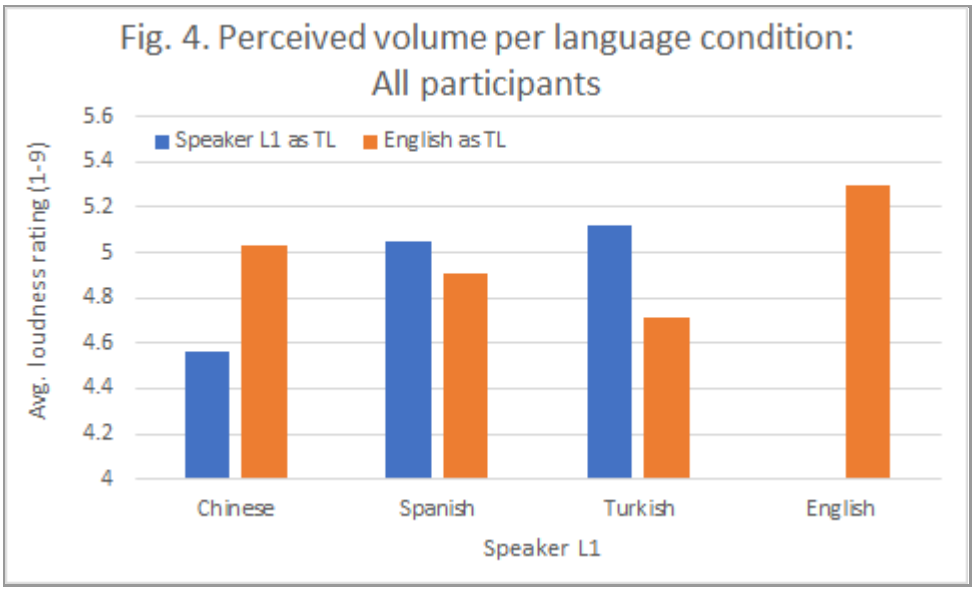


Figure 4: Perceived Volume per Language Condition: All Participants

Comparison of average loudness ratings for stimuli in which the target language (TL) was English versus stimuli in which the target languages was the speakers' L1 (non-English languages). (All participants)

II. Ideological alignment

All but two participants (97%) received an ideological alignment score that fell within the "globalist" ideology category (-32 to 0). Fig. 5 shows the distribution of alignment scores within the participant pool. See Table 4, Appendix B for a summary of the ideology data.

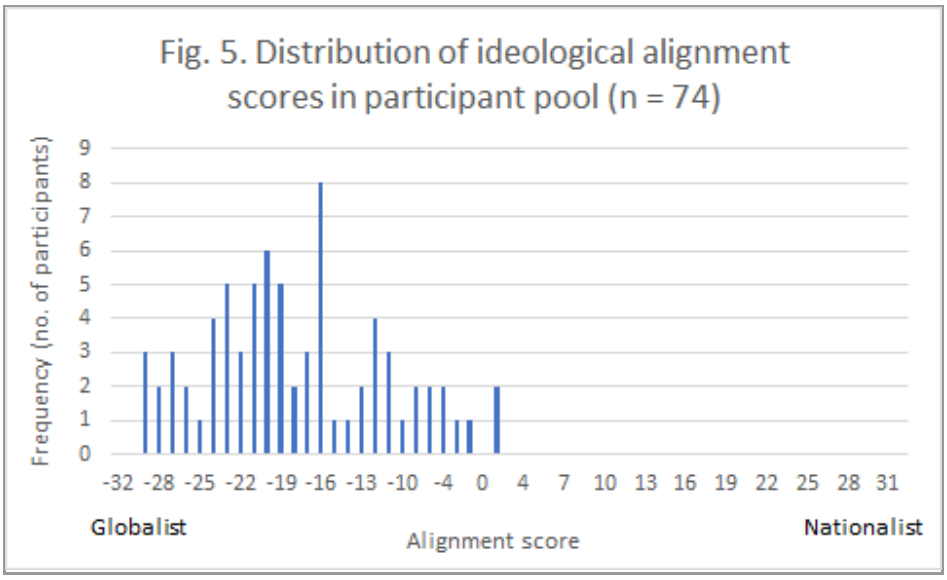


Figure 5: Distribution of Ideological Alignment Scores in Participant Pool

Frequency of ideological alignment scores within participant population, with -32 as most globalist, 0 as neutral, and 32 as most nationalist.

III. Ideology and loudness

Given the absence of nationalist-aligning participants, comparisons of ideology against loudness are limited. However, the range of ideological alignment scores within the participant pool yields a minor but statistically significant pattern: for monolingual English speakers (n = 59), the less globalist the participant, the greater the perceived difference between the volume of native English and non-native English (Fig. 6). Each listener's "difference" score measured the gap between the listener's average loudness ratings for native English and their average ratings for non-native English; a greater difference score thus reflects a wider gap between perceived loudness of native versus non-native speech. The above result suggests that more nationalist participants may be likely to perceive a greater volume difference between native and non-native speech. However, further data is clearly necessary to confirm the pattern (See Table 5, Appendix B).

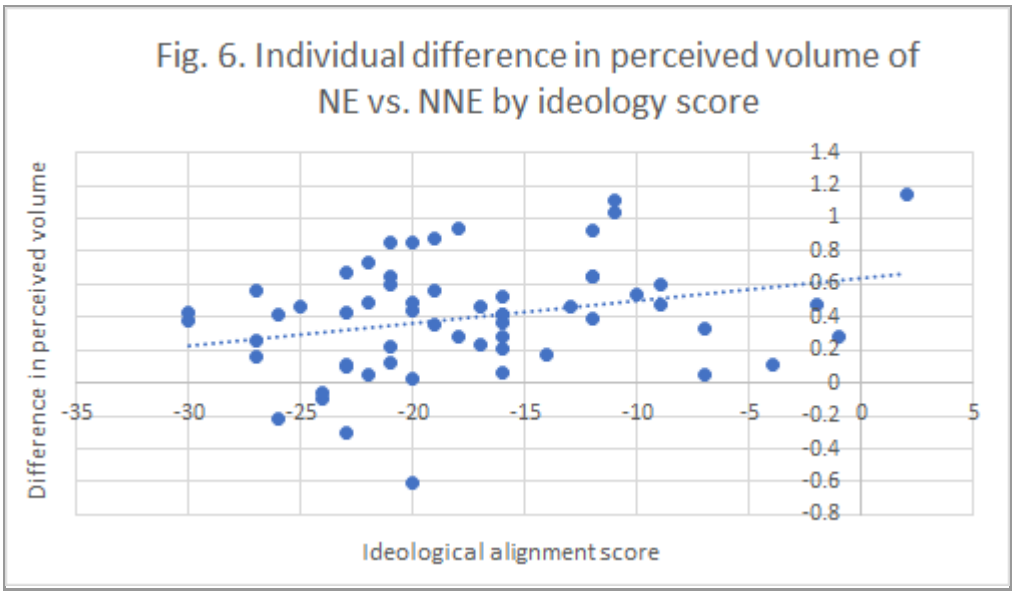


Figure 6: Individual Difference in Perceived Volume of Native English vs. Non-Native English by Ideology Score

Perceived volume difference between native English and non-native English for individual participants, by ideological alignment score.

Summary

Native-accented English speech was perceived as louder than both non-native English and non-English languages across intensity conditions. Non-native English and non-English languages were rated similarly. Almost all participants received a globalist alignment score, and less globalist participants perceived a greater difference in volume between native-accented and non-native accented English. Implications are discussed below.

Discussion

We hypothesized that negative social biases toward "foreign" speech and speakers would cause non-native speech to be perceived as loud; instead, non-native speech was consistently rated as quieter than native-accented English. The dearth of nationalist-aligning participants means that we cannot yet make strong claims about ideological patterns, but the "loud" native English effect observed in the data nonetheless has its own intriguing implications.

There are a number of possible reasons for the patterns observed in loudness perception. Firstly, comprehensibility may play a role in the volume ratings observed. The native English-speaking participants may have heard native-accented English as "loud" because it was the most comprehensible: they attended to it more closely because it was easiest to understand and was accordingly expected to be meaningful. Inversely, they may have stopped attending to the non-native speakers because of an expectation that non-native speech would be difficult to understand and thus less meaningful, with the resulting perception that it was quieter. Furthermore, there was also very little incentive to understand the speech: participants were not tested on the content of the stimulus sentences, which means there was little external motivation to comprehend the non-native speech, and participants may have reduced their investment in listening accordingly. In other words, listeners may "tune out" speech that requires more effort to understand than they are willing to invest, and the speech becomes "quieter" as a result.

Whether any part of this pattern can be attributed to social attitudes toward "foreignness" is unclear. Previous work certainly establishes a relationship between

social bias and comprehensibility: perceiving a speaker to be "foreign" can cause listeners to deem non-native speakers less comprehensible (Yi et al, 2013), while listeners faced with non-native speech may even stop trying to understand it owing to a subconscious social rejection of non-native speakers (Lippi-Green, 1997; Lindemann, 2002). Conversely, listeners may also be more likely to negatively evaluate non-native speakers whose speech is more difficult to process, regardless of whether they identify the speakers with specific stereotypes (Dragojevic, 2017). Together, these findings suggest that social attitudes interact with both real and perceived comprehensibility issues: perhaps "quiet" volume perceptions stem from interactions between non-native speech attitudes and comprehensibility more broadly. A lack of investment in understanding speech, and thus a lack of attention, may lead to a perception that the speech is "quiet." In other words, if listeners reject their share of the communicative burden[10] (Lippi-Green, 1997) upon hearing non-native speech— whether based on prior social bias, real processing difficulties, or both—they may accordingly hear it as quieter. This is supported by the pattern observed for ideological alignment, which suggested that less globalist participants, who are more likely to reject "foreign-sounding" non-native speech, perceived a greater difference between the volume of native English and non-native English.

[10] Lippi-Green's "communicative burden" refers to the notion that successful communication requires investment and effort from both the speaker and the listener in an interaction. The "burden" of communicating is shared between speakers and listeners, with speakers striving to be understood and listeners striving to understand. The role of the listener, therefore, is not a passive one: if the listener does not put effort into understanding their interlocutor, they are rejecting their share of the communicative burden.

In sum, if listeners use non-native accent as a cue to invest less effort in listening, this may translate to lower volume ratings, while greater attention paid to the native English speech translates as a perception that it is louder. Whether nationalism and globalism may predict the extent to which listeners will reject non-native speakers remains to be seen, but it is certainly worth investigating further. It is not unreasonable to suppose that some participants may be more willing to invest effort in understanding non-native speech while others will be quicker to dismiss it— but more data is needed to confirm if ideology can predict this behavior.

The explanation proposed above does not account for all of the patterns in the data. If comprehensibility were one of the primary factors influencing loudness ratings, we would expect non-native English speech to be rated as louder than non-English languages, since entirely separate languages would have been dramatically less comprehensible to the participants than accented English. Turkish-accented English, for instance, is likely far more comprehensible to a monolingual English speaker than L1 Turkish, so we would expect the Turkish-accented English, as the more meaningful speech, to be rated as louder than Turkish. In reality, however, there was no such difference in perception between non-native English speech and non-English languages; in fact, they received near-identical average volume ratings.

Additionally, if comprehension is a key factor in volume perception, we might also expect differences in perception between the different non-native accents, on the basis of participants' relative levels of exposure to the different accents. Exposure to non-native speech over time improves listener comprehension of that speech variety (e.g., Bradlow and Bent, 2008), which suggests that accents to which participants have

been exposed more frequently will be more comprehensible, and thus would receive louder volume ratings. Given the demographic makeup of the U.S., American English speakers are likely to have had some exposure to Spanish or Spanish-accented English, and it is also likely that our participants have had at least some exposure to Chinese-accented English as part of university life, as the University of Oregon has a significant population of international Chinese-speaking students (University of Oregon, 2020). It is far less likely that students have been frequently exposed to Turkish or Turkish-accented English. Participants should thus find Spanish-accented English, and perhaps Chinese-accented English, more comprehensible than Turkish-accented English— and assign higher loudness ratings accordingly. However, we do not see differences in volume perception that would clearly reflect varying degrees of exposure to different non-native English accents; for English stimuli, the Chinese and Spanish accents were indeed rated as louder than the Turkish accent, but L1 Turkish was rated as louder than both L1 Chinese and L1 Spanish (Fig. 4). It is possible that individual speakers within the stimulus set may have been more or less comprehensible on the basis of individual accent strength, a factor which could outweigh listeners' general level of exposure to a given language variety. For example, if the Turkish speakers' English was less accented than the Spanish speakers', the Turkish-accented English would have been more comprehensible to listeners than the Spanish-accented English, regardless of listeners' previous accent exposure. Including a measure for listener comprehension of stimuli would be highly useful to clarify this effect in future work.

There are a multitude of social implications for the results observed, regardless of whether the explanation proposed above is correct. If perception of non-native

speech as “quiet” does reflect a lack of attention or investment in meaning on the part of the listener, it suggests that native English-speaking listeners are less likely to put effort and attention into understanding non-native speakers, and that volume ratings do reflect a rejection of the communicative burden— in the form of quietness, rather than comprehensibility. “Quietness” may likewise contribute to social attributions (for example, perceiving a non-native speaker as reticent, uncertain, or muted), though future work explicitly eliciting language attitudes in tandem with volume perception is needed to confirm such an effect.

Even if the above explanation is not the correct one, the basic finding remains the same: listeners heard their own language variety as loud above all others, and speakers of other languages were quieter. If this effect extends to real-world interaction, it means there are true perceptual differences in how English speakers hear their interlocutor depending on the language variety of the speaker— even for the speaker’s volume. Further research with nationalist-aligning participants (who may be more likely to reject non-native speech) may clarify the extent to which social attitudes predict this effect.

Conclusion

Prior work indicates that social bias influences perception of non-native speech, but there is little research investigating perception of volume, and there is likewise little work investigating differences in listener bias within a given listener pool. In this study, native English-speaking listeners perceived the volume of their own native language as louder than non-native speech. Most participants aligned with globalist ideology, which is receptive to non-English language and accent, and the less globalist participants perceived a greater difference in volume between native- and non-native English; however, the relationship between intensity perception and social bias remains unclear. It is possible that expectations for meaningful speech influenced volume perception, leading participants to rate their own language varieties as loudest.

Non-native speakers face a number of challenges in communication, not least of which is resistance from listeners. When listeners reject their interlocutors on the basis of accent, identity, or both, the consequences range from negative social judgements to a total lack of comprehension. Differences in listeners' core social beliefs likely play a role in this dynamic, with perceptual effects that may even extend to volume perception. These attitude-based perceptions have real consequences for speakers, a fact which merits further study into the relationship between listener ideology and non-native speech volume.

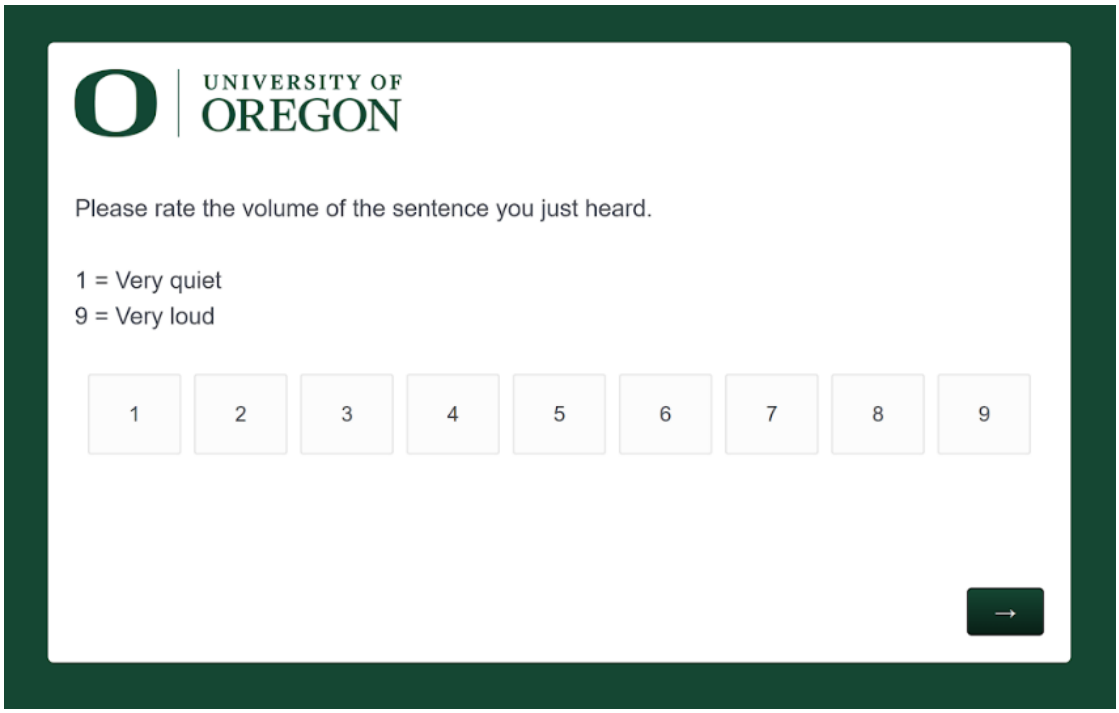
Appendices

Appendix A. Experiment materials

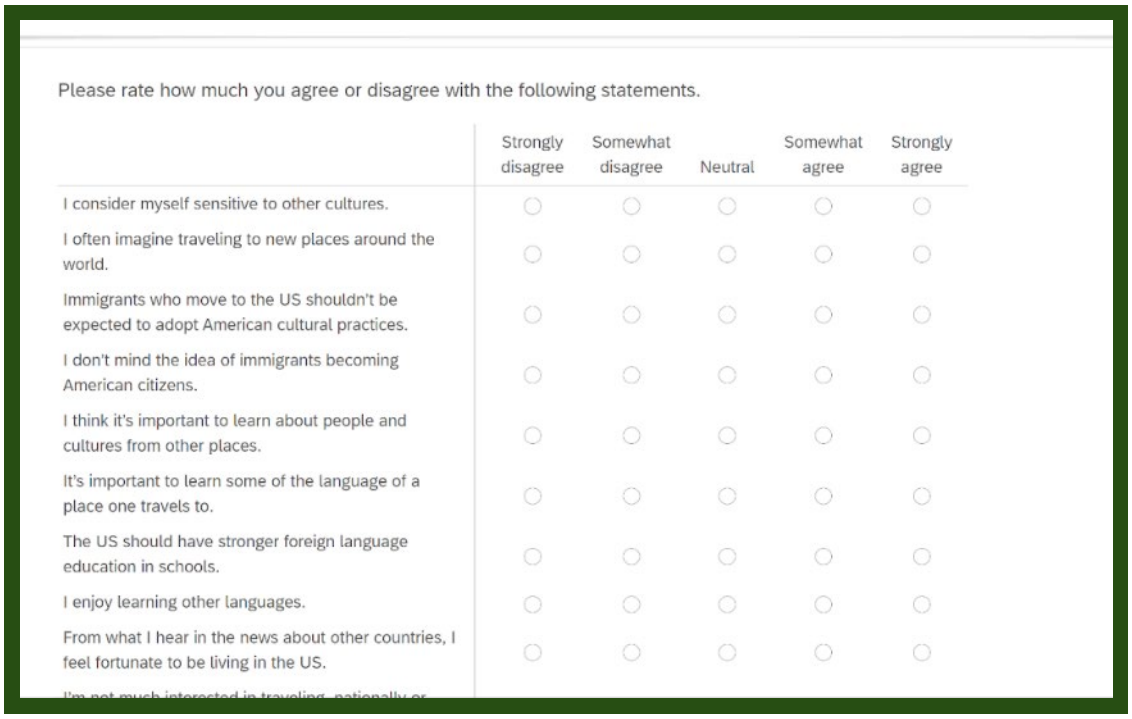
Table 1. Experiment stimuli breakdown							
	Language conditions			No. sentences per intensity per language			
	No. speakers	Speaker L1	Target language	52dB	61dB	70dB	Totals
Native English	3	English	English	7	7	7	21
Non-native English	3	Spanish	English	7	7	7	21
	3	Chinese	English	7	7	7	21
	3	Turkish	English	7	7	7	21
Native Other	3	Spanish	Spanish	7	7	7	21
	3	Chinese	Chinese	7	7	7	21
	2	Turkish	Turkish	7	7	7	21
				49	49	49	147

Table 1: Experiment Stimuli Breakdown

Sample pages: Volume judgement task


UNIVERSITY OF
OREGON
Please rate the volume of the sentence you just heard.
1 = Very quiet
9 = Very loud
1
2
3
4
5
6
7
8
9
→

Sample page: Questionnaire



Please rate how much you agree or disagree with the following statements.

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
I consider myself sensitive to other cultures.	○	○	○	○	○
I often imagine traveling to new places around the world.	○	○	○	○	○
Immigrants who move to the US shouldn't be expected to adopt American cultural practices.	○	○	○	○	○
I don't mind the idea of immigrants becoming American citizens.	○	○	○	○	○
I think it's important to learn about people and cultures from other places.	○	○	○	○	○
It's important to learn some of the language of a place one travels to.	○	○	○	○	○
The US should have stronger foreign language education in schools.	○	○	○	○	○
I enjoy learning other languages.	○	○	○	○	○
From what I hear in the news about other countries, I feel fortunate to be living in the US.	○	○	○	○	○
I'm not much interested in traveling nationally or					

Questionnaire: Full question set

globalist	1	I consider myself sensitive to other cultures.
	2	I often imagine traveling to new places around the world.
	3	Immigrants who move to the US shouldn't be expected to adopt American cultural practices.
	4	I don't mind the idea of immigrants becoming American citizens.
	5	I think it's important to learn about people and cultures from other places.
	6	It's important to learn some of the language of a place one travels to.
	7	The US should have stronger foreign language education in schools.
	8	I enjoy learning other languages.

nationalist	1	From what I hear in the news about other countries, I feel fortunate to be living in the US.
	2	I'm not much interested in traveling, nationally or abroad.
	3	The negative stereotypes that get attached to Americans are often unfounded or wrong.
	4	I believe being an American citizen is a special privilege.
	5	I dislike the idea of many immigrants becoming American citizens.
	6	Immigrants who move to the US should be required to learn English.
	7	English should be the official language of the US.
	8	It's annoying to me when someone uses a word from another language while speaking English.
political identity	1	My political views are usually liberal.
	2	I usually agree with the Democrat party.
	3	My political views are usually conservative.
	4	I usually agree with the Republican party.
	5	I don't identify strongly with any political party.

Appendix B. Results: Tables and figures

Loudness data

Table 2. Avg. loudness rating per intensity (all stimuli)	
Intensity (dB)	**Avg. rating**
52	2.698
61	4.766
70	7.399

Table 2: Average Loudness Rating per Intensity (All Stimuli)

Table 3. Avg. loudness rating per language variety (across intensity conditions)					
	Speaker L1	**Target language**	**Avg. rating: All participants**	**Avg. rating: Monolinguals**	**Avg. rating: Bilinguals**
Native other					
	Chinese	Chinese	4.560	4.548	4.610
	Spanish	Spanish	5.054	5.017	5.200
	Turkish	Turkish	5.116	5.096	5.197
	Avg.		**4.910**	**4.887**	**5.002**
Non-native English					
	Chinese	English	5.025	4.991	5.162
	Spanish	English	4.911	4.882	5.022
	Turkish	English	4.714	4.699	4.775
	Avg.		**4.884**	**4.857**	**4.986**
Native English					
	English	English	**5.298**	**5.257**	**5.457**

Table 3: Average Loudness Rating per Language Variety (Across Intensity Conditions)

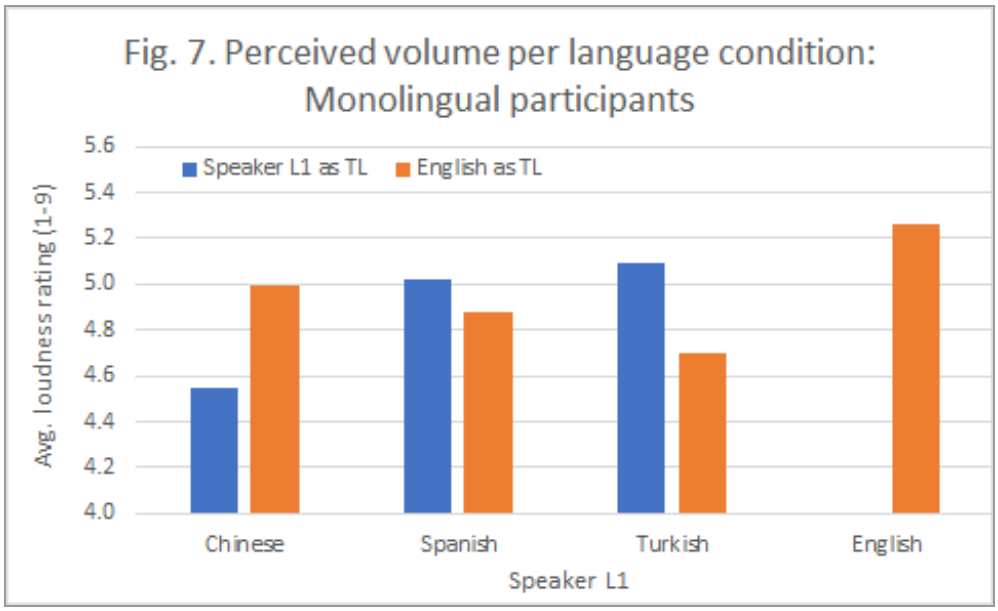


Figure 7: Perceived Volume per Language Condition: Monolingual participants

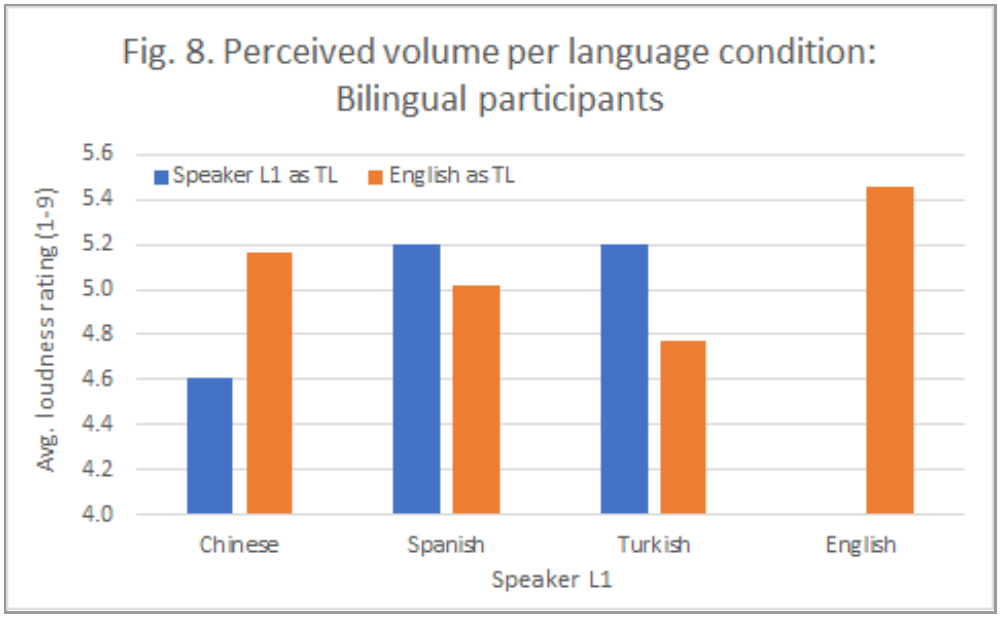


Figure 8: Perceived Volume per Language Condition: Bilingual Participants

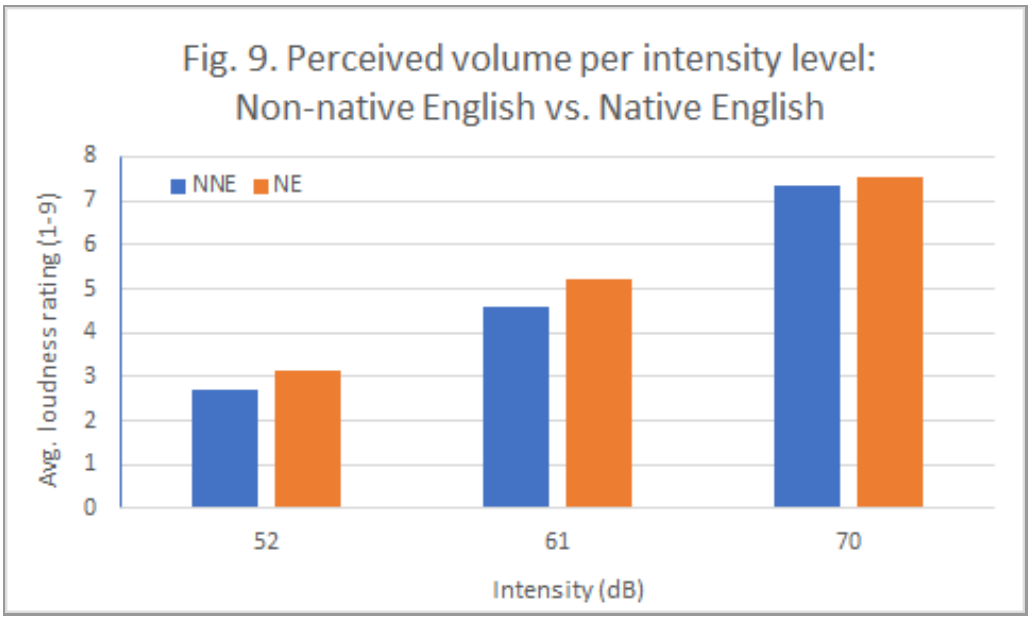


Figure 9: Perceived Volume per Intensity Level: Non-Native English vs. Native English

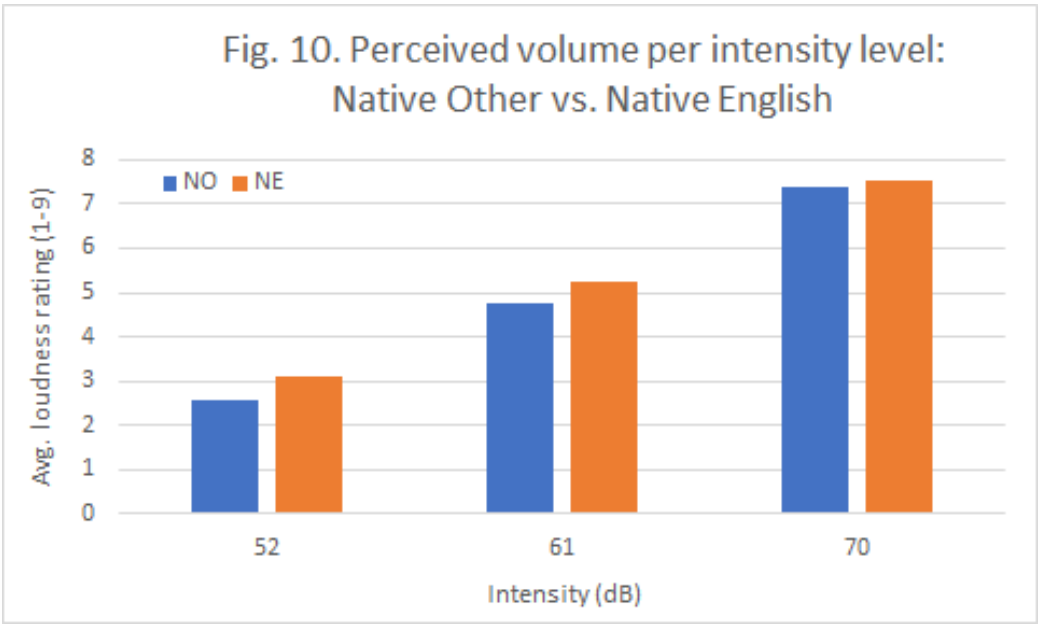


Figure 10: Perceived Volume per Intensity Level: Native Other vs. Native English

Ideology data

Table 4. Frequency of ideological alignment scores (All participants; n = 74)			
Score	**Frequency**	**Score**	**Frequency**
-32	0	-16	8
-31	0	-15	1
-30	3	-14	1
-28	2	-13	2
-27	3	-12	4
-26	2	-11	3
-25	1	-10	1
-24	4	-9	2
-23	5	-7	2
-22	3	-4	2
-21	5	-2	1
-20	6	-1	1
-19	5	0	0
-18	2	2	2
-17	3		

Table 4: Frequency of Ideological Alignment Scores (All Participants)

Table 5. Difference in perceived volume of English stimuli per participant (Monolingual only)									
Participant	Ideology score	Avg. rating: Native English	Avg. rating: Non-native English	Difference	Participant	Ideology score	Avg. rating: Native English	Avg. rating: Non-native English	Difference
1	-16	4.71	4.51	0.21	31	-23	5.05	4.62	0.43
2	-7	5.10	4.76	0.33	32	-13	4.81	4.35	0.46
3	2	5.24	4.10	1.14	33	-16	5.33	4.97	0.37
4	-11	5.48	4.44	1.03	34	-4	6.24	6.13	0.11
5	-24	4.90	5.00	-0.10	35	-21	6.43	5.78	0.65
6	-19	5.52	5.17	0.35	36	-24	4.29	4.35	-0.06
7	-9	5.95	5.35	0.60	37	-17	6.14	5.90	0.24
8	-23	3.24	3.54	-0.30	38	-16	6.29	6.00	0.29
9	-11	6.62	5.51	1.11	39	-2	4.52	4.05	0.48
10	-19	6.00	5.13	0.87	40	-30	4.67	4.24	0.43
11	-22	5.19	4.46	0.73	41	-12	6.05	5.40	0.65
12	-22	5.95	5.46	0.49	42	-20	4.29	4.25	0.03
13	-23	5.67	5.00	0.67	43	-21	6.62	5.76	0.86
14	-27	5.95	5.70	0.25	44	-12	5.57	4.65	0.92
15	-26	5.81	5.40	0.41	45	-16	4.52	4.46	0.06
16	-12	5.10	4.70	0.40	46	-18	4.14	3.86	0.29
17	-9	5.57	5.10	0.48	47	-23	5.71	5.62	0.10
18	-20	3.90	4.51	-0.60	48	-7	5.48	5.43	0.05
19	-17	4.95	4.49	0.46	49	-30	4.81	4.43	0.38
20	-16	5.29	4.87	0.41	50	-20	5.43	4.98	0.44
21	-18	5.90	4.97	0.94	51	-14	3.90	3.73	0.17
22	-26	4.29	4.51	-0.22	52	-20	5.14	4.65	0.49
23	-21	5.14	5.02	0.13	53	-1	4.71	4.43	0.29
24	-23	5.71	5.60	0.11	54	-21	5.10	4.49	0.60
25	-25	4.05	3.59	0.46	55	-27	5.14	4.98	0.16
26	-16	4.67	4.25	0.41	56	-22	4.19	4.14	0.05
27	-10	4.57	4.03	0.54	57	-21	5.76	5.54	0.22
28	-20	7.10	6.24	0.86	58	-16	6.38	5.86	0.52
29	-12	5.38	4.73	0.65	59	-27	4.62	4.06	0.56
30	-19	5.90	5.35	0.56					

Table 5: Difference in Perceived Volume of Native- vs. Non-Native English Stimuli per Participant

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