“This is an Accepted Manuscript of an article published by Taylor & Francis in Journal of Multilingual Multicultural Development on October 3rd, 2020 available online: <https://www.tandfonline.com/doi/abs/10.1080/01434632.2020.1835929>.”

Now You See Me, Now You Mishear Me: Raciolinguistic accounts of speech perception in different English varieties

Ethan Kutlu^{1,2}

¹ Department of Linguistics, University of Florida

² Department of Psychology, University of Florida

Word Count: 6455

Address correspondence to:

Ethan Kutlu

Department of Linguistics, University of Florida

Gainesville, Florida, 32611, USA

E-mail: ethankutlu@gmail.com

Web link for this project: https://osf.io/rsxvh/?view_only=78ae0511a3fe422180b528f547cf4858

Abstract

Listeners can access information about a speaker such as age, gender identity, socioeconomic status, and their linguistic background upon hearing their speech. However, it is still not clear if listeners use these factors to assess speakers' speech. Here, an audio-visual (matched-guise) test is used to measure whether listeners' accentedness judgments can be modulated depending on the type of face that they see. American and Indian English were used as different English varieties and presented with either a White female face or a South Asian female face. Results show that listeners' accentedness judgments increased for Indian English compared to American English. Importantly, the increase in accentedness judgments was also observed when both American English and Indian English were presented with a South Asian face compared to a White face. These findings suggest that linguistic evaluations are modulated by non-linguistic factors and that speech perception is socially gated.

Keywords: audio-visual speech perception, raciolinguistics, English varieties, accentedness judgments, Indian English

Foreign accented speech has historically been distinguished from other variations of speech, such as regional dialects (Rogers, 1997). It is identified as speech that varies from “standard speech” and is assumed to have arisen from segmental (i.e., vowels or consonants) and suprasegmental (i.e., tone, intonation, stress) differences between a speaker’s first language (L1) and second language (L2) (Best, McRoberts, & Goodell, 2001; Flege, 1991; Guion, Harada, & Clark, 2004; Trofimovich & Baker, 2006)¹. The judgment process through which speakers begin categorizing sound stimuli is so rapid and efficient that foreign accented speech is usually recognized within milliseconds after the speech onset (around 100 ms, see Floccia et al., 2006, see review by Cristia et al., 2012).

The ability to perceive whether someone has a foreign accent also goes beyond linguistic processes. It is considered to be an important part of social evolution in that accent detection is shown to be a product of humans’ “natural selection building system,” and is heuristic-driven for instantaneous detection of in- versus out-group membership (Pietraszewski & Schwartz, 2014). Accents help us identify group relations (Smit & Dalton, 2000; Hoffman & Walker, 2010), as hearing someone’s accent immediately presents socio-indexical information such as race, ethnicity, place of birth, age, socioeconomic status, sexual orientation, and gender identity (Labov, 1972; Lippi-Green, 2012; McGowan, 2015). These socio-indexical cues are important in everyday conversations for both speech perception (Sumner, Kim, King, & McGowan, 2014) as well as for

¹ The author would like to emphasize that, in this paper, “native” and “non-native” are only used to allude to prior research, when necessary, and are always presented in quotations. In discussing these concepts, the author has chosen to use terms such as L1 and LX, which were shown to be more neutral, inclusive, and to not perpetuate discrimination towards multilinguals (Dewaele, 2018).

social understanding of certain facets of interlocuter identity. This second type of information is crucial in conversational engagement across professional, educational, and health settings, where someone with an out-group accent can be implicitly or explicitly treated differently due to their perceived accent (Kim et al., 2011; De Houwer, 2015; de Souza et al., 2017; Itzhak, Vingron, Baum, & Titone, 2017).

What is in accentedness judgments?

The concept of in- and out-group relations and their impacts on accentedness judgments have been examined in the literature. A well-known study by Rubin (1992) frames this under the Willingness to Communicate hypothesis which argues that depending on one's perceived group membership, their linguistic engagement with others could be different. In an extensive series of experiments, Rubin recorded a native speaker of English giving a class lecture. Half of the participants (undergraduate students) were shown an Asian face paired with the American English recording, while the other half were shown a White face with the same recording. The results showed that when presented with an Asian face, undergraduate students' comprehension ratings were lower, and they reported to have heard accented speech. This was in spite of the fact that the speech used in the experiment consisted of the same L1 American English speaker throughout. Rubin argued that the only factor that changed the accentedness ratings was the presented picture, and thus the assumed race of the speaker reduced listeners' willingness to communicate.

While Rubin's focus (1992) compared accent perception across racial profiles, other studies found discrepancies within the same race but with different nationalities. For instance, Niedzielski (1999) demonstrated that listeners who resided in Detroit changed their vowel perception depending on who they were told that they were listening to. The participants were asked to listen to different speech samples and were asked to pick the best fitting vowels to the

speech that they listened to. In all cases, participants listened to the same recordings, but half of the participants were told that they were listening to someone from Canada, while the other half was told that they were listening to someone from Detroit. Participants chose more raised diphthongs, a feature that is commonly observed in Canadian English, as the matching token when they were told that they were listening to a Canadian speaker. Participants in the Detroit condition did not choose tokens with diphthong raising. These results showed that listeners make use of social cues during their speech perception.

Kang and Rubin (2009) accounted for the sustained impact of race, ethnicity, and nationality in accentedness judgments by arguing that listeners use these cues to attribute stereotypes to individuals via previously established attitudes which is in line with the Reverse Linguistic Stereotyping Hypothesis (RLS, Lambert, Hodgson, Garner, & Fillenbaum, 1960; Bradac, Cargile, & Hallett, 2001), and more recently the Associative-Propositional Evaluation Model (APE, Gawronski and Bodenhausen, 2006). To illustrate, if a listener associates Southern English with negative stereotypes, they are more likely to identify all Southern English speakers' speech with the same negative stereotypes regardless of individual differences at personal and linguistic levels (Lippi-Green, 2012). These individual differences can also manifest themselves at the level of implicit and explicit evaluation processes. For instance, Pantos and Perkins (2012) assessed implicit and explicit attitudes towards accented speech in the US by using an Implicit Association Test (IAT) and a questionnaire. Their IAT measures showed an implicit bias towards having an American accent, but their questionnaire results showed the opposite as their explicit attitudes reflect more pro-foreign accent attitudes. These findings suggest that accentedness judgments may inherently have conflicting internal and external mechanisms. Therefore, it is

likely that accentedness judgments are mediated by these attitudes rather than merely by the linguistic input.

To evaluate whether visual information triggers the previously established attitudes, Babel and Russell (2015) paired Canadian English with a White face or an Asian face. Their aim was to see if the visual cue, and not the speech, could trigger a previously established attitude, and whether these attitudes increase processing cost during speech intelligibility and an increase in perceived accentedness. They found that listeners judged Canadian English spoken by Asian Canadians as more accented compared to Canadian English spoken by White Canadians. Moreover, intelligibility scores (i.e., the percent of correctly typed up auditory stimuli) were also significantly lower when participants listened to Canadian English with an Asian Canadian face versus a White Canadian face. Babel and Russell (2015) also implemented a social network measure which suggested that individuals who spent more time with Asian Canadians performed worse during the intelligibility task when they saw an Asian Canadian face with Canadian English. The authors argued that the social network analysis reflected listeners' association of accented speech with Asian individuals. Since the same speech stimuli was judged and perceived differently by listeners, Babel and Russell (2015) concluded that listeners make use of social information to trigger prior linguistic associations which could bring processing benefits in some cases and costs in others.

Raciolinguistics Lens: World Englishes and Accentedness Judgments

While the processing benefits and costs of social information in speech intelligibility and accentedness judgments have been studied at length, the roots of the associations between social and linguistic information are still relatively unexplored. In our current world, where English does not only belong to a particular set of countries or social identities (Kirkpatrick, 2008), but to a

global world and diverse sets of identities, it is important to investigate the status of the different varieties of English.

The classification of these different varieties of English is derived mostly from historical contexts (Kachru, 1992; Schneider, 2003) which were often affected and shaped by colonial movements. For instance, the act of not establishing Indian English as a norm-provider variety², a variety that is considered as the “standard” variety, goes back to historical events that occurred in India. India is known for its multilingualism: there are approximately 121 identified mother tongues spoken in the country (Census of India, 2011). English is one of the official languages of this diverse linguistic landscape. It is acquired either from birth or from a very young age by much of the population. However, the arrival of English to India was unlike its arrival to other British-ruled locations, such as Canada and Australia.

According to Kachru (1983), the differences between these varieties are a consequence of the timeline and circumstances surrounding the arrival of English. He analyzed the arrival of English under the lens of three circles. The core circle, called the inner circle, consists of countries where English is the dominant language and is spoken by “native speakers.” These varieties of English include American English, Australian English, British English, and Canadian English, among others. These inner circle varieties emerged from settler movements, identified as “norm-providers.” Therefore, English either originated in these locations or was brought to these countries via settlers. The second circle in this framework is called the outer circle. This circle contains varieties that emerged as outcomes of mostly British colonialism, including varieties like Indian English and Nigerian English. Unlike inner circle varieties, outer circle Englishes are not norm-

² For instance, inner circle varieties such as American and British English are perceived as norm-providing. These two varieties are taught across the globe as the “standard” way of speaking English.

providing and therefore, although spoken by L1 speakers, are not perceived as the mother-tongue of those living in outer circle countries. Furthermore, outer circle varieties of English are perceived as less prestigious in some cases for their speakers, and to those who speak an inner circle variety (Kachru, 1986). In the majority of outer circle cases, bi/multilingualism is a common practice, whereby English shares the status of being the official language with another language.

While the status of different Englishes is mediated by their historical context, their perception is starting to be investigated through a raciolinguistic framework, as the two groups, inner and outer circle varieties, are tightly associated with White people and People of Color communities, respectively. Subsequently, evidence linking language and accent perception to aspects of race, ethnicity, and other core components of social identity in the context of varying geo-political situations has accrued. A primary focus of raciolinguistic research has been on the issues related to the strong preferences of Whiteness in social contexts. Groundbreaking work by Flores and Rosa (2015) revealed that many language classrooms are dominated by raciolinguistic ideologies, which involve the systematic correction of certain dialects, standardization of World Englishes, and minoritization of certain groups through linguistic practices mediated by White gaze (Flores and Rosa, 2015). These ideologies are known to have shaped English teaching curricula and bilingual practices. Moreover, such ideologies provided associations with more prestige to inner circle varieties while the same cannot be said for outer circle varieties.

A current example of raciolinguistic ideologies can be found in Indian call centers: many Indian English speakers in India are forced to go through accent neutralization training in order to be recruited by Western companies (Cowie, 2007; Chand, 2009). This process is referred to as *monolingualization* (Silverstein, 1996) and is the center of raciolinguistic ideologies. While English is one of the official languages of India, Indian English speakers are still perceived as

“non-native speakers” affecting Indian English speakers’ career and personal development, especially in North America (Ramjattan, 2019). Many Indian English speakers have to take English proficiency exams to attend schools in Western countries. No such regulations are in place for speakers of inner circle variety Englishes, as those are still perceived as norm-provider varieties. Although outer circle variety speakers speak English as their L1, the appropriateness of their language use or the legitimacy of their language use has been questioned (Flores and Rosa, 2015) with standardized testing regulations. Their language production is being targeted with “accent reduction” classes to enhance their professional aesthetic (Ramjattan, 2019), a feature that has been implemented from the perspective of the White gaze (Flores and Rosa, 2015). In English teaching classrooms, the presence of outer circle speakers is also associated with “nonnativeness,” a term that perpetuates further discrimination (Dewaele, 2018; Dewaele et al., 2020), leading to many speakers to be discriminated against and leaving language classrooms without diversity (Mahboob, 2018). Interestingly, one study found that the negative perceptions towards Indian English are at least in part fueled by low exposure, and when it is being underrepresented in the media, representation is usually accompanied by negative associations (Kutlu & Wiltshire, 2020).

The Present Study

The overarching question guiding the present study is how people’s implicit racial and linguistic biases impact judgements of speech accentedness for two varieties of English that belong to different circles (i.e., inner circle, outer circle). While previous work has investigated either the same language variety across different races or L1 or LX speakers of the same language across the same or different race (e.g., Rubin, 1992; Babel and Russell, 2015; Yi et al., 2013; Yi et al., 2014), here, we examine the interactions between language and race from a raciolinguistic perspective across two English varieties: American English and Indian English. We argue that English

varieties are perceived differently and that the overall foreignness or accentedness are mediated by the racialization of some English varieties.

Methodology

Auditory Stimuli

Following previous work on foreign accented speech, we used 120 high and low predictable English sentences from Bradlow and Alexander (2007) (see Appendix A). For American English, the recordings of two female speakers were brought in from the OSCAAR speech corpus (OSCAAR: The Online Speech/Corpora Archive and Analysis Resource). Six Indian English speakers (all speakers of Tamil or Telugu and English) were recorded. Indian English speakers were paid \$10 for each recording session, and each session took less than 2 hours. Participants first practiced the sentences by themselves and were then asked to read them out loud. Participants read every sentence twice. All recordings were done in a quiet room, and their acoustic characteristics were monitored using PRAAT (Boersma & Weenik, 2017).

Once the recordings were prepared, they were all normalized for their acoustic characteristics (i.e., volume) using PRAAT (Boersma & Weenik, 2017). A subset of all recordings from each speaker was then evaluated by 16 undergraduate student judges. This served as the norming data. We followed Babel and Russell's (2015) design, these judges listened to all sentences without any accompanying visual stimuli and were asked to type the sentences to measure the overall intelligibility (see Supplementary Material on the OSF repository). Since comprehensibility was shown to impact listeners' attitudes towards speech (Derwing and Munro, 2009), speakers who were correctly identified with their accent and who had a score of at least 85% in overall intelligibility were chosen. Based on these data, we picked four speakers for the experiment. This yielded two female speakers for each group. We implemented white noise (SNR

value of 4 dB), in order to make the experiment slightly challenging and as close to a real-world scenario as possible (e.g., presence of environment noise in everyday conversations). We defined this range by following previous perceptual studies (see McGowan, 2015) and also by asking an additional ten participants to judge the intelligibility of these sentences with a varying range of white noise.

Visual Stimuli

Visual stimuli were collected from two previously normed and controlled face databases. For South Asian faces, pictures of two female faces were randomly selected from the KKWETC face database (Satone, 2017). For White faces, two female pictures were randomly selected from the Chicago face database (Ma, Correll, & Wittenbrink, 2015). All pictures had neutral facial expressions and appearances (e.g., no piercings, tattoos, etc.). They were all converted to a black and white scale via Adobe Photoshop, and contrast was normalized across all pictures to eliminate any low-level visual processing information (e.g., luminance) as well as making pictures as similar as possible. Four White and South Asian faces (2:2 ratio) were matched with two different varieties with a full Latin-square counterbalance distribution and full randomization. This yielded four lists for the experiment.

Participants

Sixty-seven participants (female $n=44$) were tested for the experimental component of this study³. All participants were undergraduate students ($M_{\text{age}}=19.1$ years old). All participants reported that their dominant language was American English. Some of the participants were English-Spanish bilinguals of varying degrees (simultaneous, sequential). We asked all participants to complete a LexTale test in English to measure their objective English proficiency

³ All participants signed a consent form which was approved by the University of Florida's Institutional Review Board (IRB# IRB201703121).

(LexTale, Lemhöfer & Broersma, 2012). The results of LexTale shows that bilingual participants did not differ from participants monolingual participants ($M_{\text{overall}} = 85.1$, $M_{\text{monolingual}} = 85$, $M_{\text{bilingual}} = 85.2$).

Procedure

Participants completed a language background questionnaire (Li et al., 2019), a LexTale language proficiency task (Lemhöfer & Broersma, 2012), as well as the accentedness judgment task. All data collection occurred on a Macbook pro (2012 model, 13-inch, 2.5 GHz Dual-Core Intel Core i5, 8 GB RAM). The accentedness task was administered via PsychoPy (Peirce et al., 2019). The scripts can be found on the OSF account (<https://osf.io/rsxvh/>). Participants were first shown an image on the computer screen. After the onset of the image (i.e., 250 milliseconds), the auditory stimulus played. This manipulation was done to prime participants with the socio-indexical information of the speaker (i.e., speakers' race). Participants were asked to listen to the sentences and were then asked to judge (9-point Likert scale) whether the speaker had an accent or not by using the number buttons on the keyboard. Participants' responses and response times were recorded. The script was programmed such that participants were not allowed to judge a sentence without fully listening to it (Figure 1).

[INSERT FIGURE 1]

The LexTale test (Lemhöfer & Broersma, 2012) was administered via a Matlab script on the same Macbook computer. Participants saw 50 words on the screen and pressed “yes” if they consider the word to be a word in English and pressed “no” if otherwise (they did not need to know the meaning of the word to recognize it as a real word). All testing was completed in a quiet room. Participants were recruited through the human participant pool. The experiment took 1.5 hours to complete and participants received 3 class credits upon their completion.

Results

Participants' accentedness judgments and reaction times were collected to assess the relationship between visual cues of race with auditory cues of accent on speech perception. The language background questionnaire was entered into an Excel sheet by three research assistants. All data were then analyzed with both SPSS and *R* 3.5.0 (R Core Team, 2018). The graphs were created with *R*'s *yarr* (Phillips, 2017) and *ggplot2* (Wickham, 2016) packages.

Accentedness Judgments

Participants were asked to listen to 60 sentences in noise that were previously assessed to have a score of more than 85% of intelligibility for both American English and Indian English. They used the 9-point scale to make their judgment. The scale was present with Osgood's rating scale format (1964) with two bipolar objects, suitable to transform a Likert-scale to semantic differential scale. This allows the judgment data to be converted to an interval type which is suitable for factorial analysis. The RT data was trimmed for any data points that are over the $3 \pm SD$ above the mean. Recall that auditory stimuli were presented 250 ms after the onset of the pictures, and reaction times were recorded when the auditory stimuli ended. Here, we expect that a longer reaction time is suggestive of less implicit processing, whereas a shorter reaction time may indicate a strong, prior association (i.e., implicit) between the particular face and accent combination (Gawronski & Bodenhausen, 2006; Gluszek & Dovidio, 2010). We expected listeners' judgments as well as their reaction times to be mediated by the visual cues that they saw on the screen. Both judgments and reaction times were analyzed with 2 x 2 within-subject ANOVA. Follow-up pairwise comparisons of significant interactions were adjusted using the Holm-Bonferroni method (Holm, 1979).

Behavioral Judgments. We detected three significant effects on accentedness judgments, including two main effects of Face ($F(1,66)=34.4, p < .001, \eta^2=.343$) and Accent ($F(1,66)=889, p < .001, \eta^2=.931$) and one higher-order interaction between Face and Accent ($F(1,66)=6.2, p = .015, \eta^2=.086$). Follow-up analyses of the significant interaction showed that both American English and Indian English were judged as less accented when presented with a White face ($t(66) = -5.6, p < .001$; $t(66) = -2.7, p = .040$). However, this affect was more prominent for American English (Mean Difference = 0.5) compared to Indian English (Mean Difference = 0.1) (see Figure 2).

[INSERT FIGURE 2]

[INSERT FIGURE 3]

A secondary analysis was conducted to see if participants' experience with another language (i.e., Spanish) could impact their accentedness judgments. Previous research showed that variability in speech could enhance speech intelligibility. Here, we wanted to see if the existence of Spanish language in everyday life could decrease overall accentedness judgments. The same model was run with the language background being the between-subject factor (Spanish bilingual ($n=33$) and monolingual separation ($n=33$)). Results showed that overall bilingualism experience did not impact accentedness judgments ($F(1,65) = 2.6, p = .110, \eta^2=.039$).

[INSERT TABLE 1]

Reaction Times. Three participants were excluded from the reaction times analysis due to mean RTs above $3 \pm SD$. The final analysis included sixty-four participants. RT data was run in the same 2X2 within-subject ANOVA. There was a main effect of face ($F(1,63)=5.62, p = .021, \eta^2=.082$) and a main effect of accent ($F(1,63)=7.57, p = .008, \eta^2=.107$). Further pairwise comparisons showed that overall South Asian faces were judged quicker compared to White faces ($t(63)=-2.3, p = .021$). Moreover, Indian English stimuli were judged slower compared to

American English stimuli ($t(63)=2.75$, $p = .008$). The same secondary analysis with language background being the between-subject variable did not yield any significant differences.

[INSERT FIGURE 4]

Discussion

This study investigated how foreign accents from two varieties of English (i.e., American versus Indian) in the context of the United States were evaluated when paired with a White versus a South Asian face. Listeners' accentedness judgments of these sentences along with their reaction times were analyzed.

There were three key findings. First, listeners' judgments of accents were mediated by the race of the speakers (i.e., the images that they were shown). Second, listeners' reaction times to the stimuli presented with a South Asian face, particularly when paired with American English, were faster compared to stimuli presented with a White face, which may reflect listeners' prior associations of faces with an expectation of an accent. Last, prior exposure to another language (i.e., Spanish) did not impact listeners' accentedness judgments. Each key result will be discussed below in turn.

Previous matched-guise literature showed extensively that listeners' perception of accents was mediated by visual cues (Rubin, 1992; Babel and Russell, 2015). Although the majority of these studies measured attitudes towards English learners or speakers of English as a second language, the status of different varieties of Englishes has not been studied extensively. Moreover, applying a raciolinguistic framework to speech perception in the presence of visual information has not been discussed. Here, listeners judged two different varieties of Englishes, one variety being their own and the other variety being a more racialized English: Indian English. Results showed that, overall, Indian English recordings were judged as more accented regardless of the

visual information. This was expected as participants indicated little-to-no exposure to Indian English. Importantly, listeners judged speech presented with South Asian faces as more accented compared to speech presented with White faces, regardless of the English variety that they were listening to. Since the only difference was the images and not the recordings, results here suggest that accentedness judgments are mediated by visual cues. These findings suggest that listeners' perception of accents is driven from raciolinguistic ideologies such that a Person of Color can be more accented compared to a White person, or that White speakers' language production is more standard-like hence the lower accentedness judgments for both American and Indian English when presented with White faces.

Another interesting finding was that the reaction times towards speech paired with South Asian faces were significantly faster compared to RTs for speech stimuli paired with White faces. This finding was particularly strong for South Asian faces that were matched with American English recordings. These results align with the Associative-Propositional Evaluation model (APE) (Gawronski and Bodenhausen, 2006; Pantos and Perkins, 2012). According to the APE model implicit and explicit evaluations are produced by two different mental processes. Here, the unconscious bias towards South Asian faces having more of an accent was also measured by quicker RTs towards South Asian faces such that upon seeing a South Asian face, listeners' accentedness judgments were quicker, and overall in the direction of having a heavier accent. Moreover, listeners judged American English paired with South Asian faces the quickest suggesting that listeners judged South Asian faces to be more accented.

Whereas previous literature found impact of exposure to variability on accent perception (Bradlow and Bent, 2008; Bease-Berk et al., 2013), here an exposure to Spanish was not generalized over overall accentedness judgments. This is expected as the Spanish bilingual group

showed a monolingual tendency (i.e., compartmentalized bilingualism). This was measured with the language entropy measure (Gullifer and Titone, 2019). Language entropy measures the diversity of language use. It ranges from 0 to 1 where 0 indicates single language use and 1 indicates balanced bilingualism. The overall entropy score of our sample was 0.5 which indicates that our sample mostly had English dominance or monolingual tendency. It would be ideal to test if bilinguals with more simultaneous language maintenance or monolinguals in more diverse geographical locations would show differences regarding their accentedness judgments.

Results shared here have further implications for language teaching. Research in teaching English while being an LX speaker (the traditional *non-native English-speaking teacher* (NNEST)) showed that many English Language Teaching (ELT) platforms use job advertisements that require L1 English (traditional view *native speaker of English*) which is often mixed with some other discriminatory features such as race (Mahboob & Golden, 2013; Mahboob, 2018). For speakers of English varieties who are racialized and belong to multilingual communities, this is not an easy requirement to satisfy. For instance, an L1 Indian English speaker may not have the same opportunities as an L1 British English speaker has. Therefore, there is an underlying assumption that “nativeness” is associated with Whiteness or an assumption that legitimized language practices are only observed in White communities (Rosa, 2016). In fact, this has been discussed extensively in a recent article by Dewaele et al. (2020) where the authors systematically showed that even the usage of NNEST and NEST is problematic as they perpetuate stigmatization towards speakers of varieties that were historically identified with “deficit” views. Moving forward, it is important that race be incorporated in all aspects of language studies. With such approaches, language science as a field can work towards becoming free of perpetuating the deficit models so engrained with historical colonial practices.

Conclusion

This study examined the impact of racial information on two English varieties. We found that visual information (i.e., racial identity of faces) affected listeners' accentedness judgments. Our results expand accounts of Willingness to Communicate (Kang and Rubin, 2009) and the Associative-Propositional Evaluation Model (Gawronski and Bodenhausen, 2006) to different English varieties. Here, we found that when the speech stimuli were presented with a South Asian face, listeners judged their own variety of English as being accented. Our results are also in line with results from Babel and Russell (2015) in that stereotyped associations impact speech perception.

We also brought a novel raciolinguistic perspective into socio-phonetic examinations of World Englishes. Results in future accentedness and intelligibility studies could also potentially differ since the population's background is crucial in both accentedness judgments and intelligibility as shown in our study. For example, current debates on race studies show that East Asian immigrants are shown to be higher in the assimilation ranking to European groups (Alba & Nee, 2003), approaching a "near-White" category in the USA (Bonilla-Silva, 2004; Lee & Bean, 2010). Therefore, the tendency for investigations of accentedness judgments with self-identifying Asian groups, which are considered "less-foreign" as compared to other minority groups, could potentially impact foreign accented speech judgments.

Overall, this study aimed to broaden the current views on accentedness judgments by testing two different English variety by manipulating the visual information. Results support previous accounts on the social perception of speech as well as broadens the discussion to include raciolinguistic frameworks of English varieties. Ultimately, this research aims to better recognize the underlying linguistic, social, and racial roots of accent discrimination to help improve the

linguistic stigmatization that multilingual and multicultural minorities have to bear on a regular basis.

Declaration of interest statement

The author declares that there is no conflict of interest.

Acknowledgements

I would like to thank the reviewers for their invaluable contribution, as well as Stefanie Wulff, Caroline Wiltshire, Lisa S. Scott, Mehrgol Tiv, and Debra Titone for their comments and feedback on this project. I also would like to thank Sabrina Fiske for her help in data collection.

References

- Alba, R. D., & Nee, V. (2009). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Babel, M., & Russell, J. (2015). Expectations and speech intelligibility. *The Journal of the Acoustical Society of America*, 137(5), 2823-2833.
- Baese-Berk, M. M., Bradlow, A. R., & Wright, B. A. (2013). Accent-independent adaptation to foreign accented speech. *The Journal of the Acoustical Society of America*, 133(3).
- Best, C. T., McRoberts, G. W., & Goodell, E. (2001). Discrimination of non-native consonant contrasts varying in perceptual assimilation to the listener's native phonological system. *The Journal of the Acoustical Society of America*, 109(2), 775-794.
- Bradlow, A. R., & Alexander, J. A. (2007). Semantic and phonetic enhancements for speech-in-noise recognition by native and non-native listeners. *The Journal of the Acoustical Society of America*, 121(4), 2339-2349.
- Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. *Cognition*, 106(2), 707-729.
- Bonilla-Silva, E. (2004). From bi-racial to tri-racial: Towards a new system of racial stratification in the USA. *Ethnic and racial studies*, 27(6), 931-950.
- Boersma, P., & Weenik, D. (2017). *PRAAT: A System for Doing Phonetics by Computer*, v. 5.3.02, Institute of Phonetics Sciences, University of Amsterdam.
- Bradac, J. J., Cargile, A. C., & Hallett, J. S. (2001). Language attitudes: Retrospect, conspect, and prospect. *The new handbook of language and social psychology*, 3.
- Chand, V. (2009). [v] at is going on? Local and global ideologies about Indian English. *Language in Society*, 38(4), 393-419.
- Cristia, A., Seidl, A., Vaughn, C., Schmale, R., Bradlow, A., & Floccia, C. (2012). Linguistic processing of accented speech across the lifespan. *Frontiers in psychology*, 3, 479.
- Cowie, C. (2007). The accents of outsourcing: the meanings of "neutral" in the Indian call centre industry. *World Englishes*, 26(3), 316-330.
- De Houwer, A. (2015). Harmonious bilingual development: Young families' well-being in language contact situations. *International Journal of Bilingualism*, 19(2), 169-184.
- de Souza, L. E. C., Pereira, C. R., Camino, L., de Lima, T. J. S., & Torres, A. R. R. (2016). The legitimizing role of accent on discrimination against immigrants. *European Journal of Social Psychology*, 46(5), 609-620.

- Derwing, T. M., & Munro, M. J. (2009). Comprehensibility as a factor in listener interaction preferences: Implications for the workplace. *Canadian Modern Language Review*, 66(2), 181-202.
- Dewaele, J. M. (2018). Why the dichotomy 'L1 versus LX user' is better than 'native versus non-native speaker'. *Applied Linguistics*, 39(2), 236-240.
- Dewaele, J. M., Mercer, S., Talbot, K., & von Blanckenburg, M. (2020). Are EFL pre-service teachers' judgment of teaching competence swayed by the belief that the EFL teacher is a L1 or LX user of English?. *European Journal of Applied Linguistics*, 1(ahead-of-print).
- Flege, J. E. (1991). Age of learning affects the authenticity of voice-onset time (VOT) in stop consonants produced in a second language. *Journal of the Acoustical Society of America*, 89 (1), 395-411.
- Floccia, C., Goslin, J., Girard, F., & Konopczynski, G. (2006). Does a regional accent perturb speech processing?. *Journal of Experimental Psychology: Human Perception and Performance*, 32(5), 1276.
- Flores, N., & Rosa, J. (2015). Undoing appropriateness: Raciolinguistic ideologies and language diversity in education. *Harvard Educational Review*, 85(2), 149-171.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: an integrative review of implicit and explicit attitude change. *Psychological bulletin*, 132(5), 692.
- Gluszek, A., & Dovidio, J. F. (2010). The way they speak: A social psychological perspective on the stigma of nonnative accents in communication. *Personality and social psychology review*, 14(2), 214-237.
- Gullifer, J. W., & Titone, D. (2019). Characterizing the social diversity of bilingualism using language entropy. *Bilingualism: Language and Cognition*, 1-12.
- Guion, S. G., Harada, T., & Clark, J. J. (2004). Early and late Spanish-English bilinguals' acquisition of English word stress patterns. *Bilingualism: Language and Cognition*, 7(3), 207-226.
- Hoffman, M. F., & Walker, J. A. (2010). Ethnolects and the city: Ethnic orientation and linguistic variation in Toronto English. *Language variation and change*, 22(1), 37.
- Holm, S. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian journal of statistics*, 65-70.
- IBM Corp. (2019). *IBM SPSS Statistics for Windows*, Version 26.0. Armonk, NY: IBM Corp.

- Itzhak, I., Vingron, N., Baum, S. R., & Titone, D. (2017). Bilingualism in the real world: How proficiency, emotion, and personality in a second language impact communication in clinical and legal settings. *Translational Issues in Psychological Science*, 3(1), 48.
- Kachru, B. B. (1986). *The alchemy of English*. Oxford, England: Pergamon Press.
- Kachru, B. B. (1992). Teaching world Englishes. *The other tongue: English across cultures*, 2, 355-366.
- Kang, O., & Rubin, D. L. (2009). Reverse linguistic stereotyping: Measuring the effect of listener expectations on speech evaluation. *Journal of Language and Social Psychology*, 28(4), 441-456.
- Kirkpatrick, A., Deterding, D., & Wong, J. (2008). The international intelligibility of Judgments of Intelligibility and Foreign Accent by Listeners of Different Language Backgrounds Hong Kong English. *World Englishes*, 27, 480-500.
- Kim, S. Y., Wang, Y., Deng, S., Alvarez, R., & Li, J. (2011). Accent, perpetual foreigner stereotype, and perceived discrimination as indirect links between English proficiency and depressive symptoms in Chinese American adolescents. *Developmental psychology*, 47(1), 289.
- Kutlu, E., & Wiltshire, C. (2020). Where do negative stereotypes come from? The case of Indian English in the USA. *Proc Ling Soc Amer*5(1). 74–82.
- Labov, W. (1972). *Language in the inner city: Studies in the Black English vernacular* (No. 3). University of Pennsylvania Press.
- Lambert, W. E., Hodgson, R. C., Gardner, R. C., & Fillenbaum, S. (1960). Evaluational reactions to spoken languages. *The Journal of Abnormal and Social Psychology*, 60(1), 44.
- Lee, J., & Bean, F. D. (2010). *The diversity paradox: Immigration and the color line in twenty-first century America*. Russell Sage Foundation.
- Lemhöfer, K., & Broersma, M. (2012). Introducing LexTALE: A quick and valid lexical test for advanced learners of English. *Behavior research methods*, 44(2), 325-343.
- Li, P., Zhang, F., Yu, A., & Zhao, X. (2019). Language History Questionnaire (LHQ3): An enhanced tool for assessing multilingual experience. *Bilingualism: Language and Cognition*, 1-7.
- Lippi-Green, R. (2012). *English with an accent: Language, ideology and discrimination in the United States*. Routledge.
- Ma, D. S., Correll, J., & Wittenbrink, B. (2015). The Chicago face database: A free stimulus set of faces and norming data. *Behavior research methods*, 47(4), 1122-1135.

- Mahboob, A., & Golden, R. (2013). Looking for native speakers of English: Discrimination in English language teaching job advertisements. *Age*, 3(18), 21.
- Mahboob, A. (2018). Beyond global Englishes: Teaching English as a dynamic language. *RELC journal*, 49(1), 36-57.
- McGowan, K. B. (2015). Social expectation improves speech perception in noise. *Language and Speech*, 58(4), 502-521.
- Osgood, C. E. (1964). Semantic differential technique in the comparative study of cultures. *American Anthropologist*, 66, 79– 98.
- Niedzielski, N. (1999). The effect of social information on the perception of sociolinguistic variables. *Journal of language and social psychology*, 18(1), 62-85.
- Nguyễn, T. A. T., & Ingram, J. (2016). Vietnamese accented English: Foreign accent and intelligibility judgement by listeners of different language backgrounds. *Journal of English as an International Language*, 11(1), 19-38.
- Pantos, A. J., & Perkins, A. W. (2013). Measuring implicit and explicit attitudes toward foreign accented speech. *Journal of Language and Social Psychology*, 32(1), 3-20.
- Peirce, J., Gray, J. R., Simpson, S., MacAskill, M., Höchenberger, R., Sogo, H., ... & Lindeløv, J. K. (2019). PsychoPy2: Experiments in behavior made easy. *Behavior research methods*, 51(1), 195-203.
- Phillips, H. (2017). *yarr: A Companion to the e-Book "YaRrr!: The Pirate's Guide to R*. R package version 0.1.5. <https://CRAN.R-project.org/package=yarr>
- Pietraszewski, D., & Schwartz, A. (2014). Evidence that accent is a dedicated dimension of social categorization, not a byproduct of coalitional categorization. *Evolution and Human Behavior*, 35(1), 51-57.
- Ramjattan, V. A. (2019). Racist nativist microaggressions and the professional resistance of racialized English language teachers in Toronto. *Race Ethnicity and Education*, 22(3), 374-390.
- Registrar General, I. (2011). *Census of India 2011: provisional population totals-India data sheet*. Office of the Registrar General Census Commissioner, India. Indian Census Bureau.
- Rogers C. (1997). *Intelligibility of Chinese-accented English*. Unpublished Ph.D. dissertation, Indiana University.
- Rosa, J. D. (2016). Standardization, racialization, languagelessness: Raciolinguistic ideologies across communicative contexts. *Journal of Linguistic Anthropology*, 26(2), 162-183.

- R Core Team (2018). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Rubin, D. L. (1992). Nonlanguage factors affecting undergraduates' judgments of nonnative English-speaking teaching assistants. *Research in Higher education*, 33(4), 511-531.
- Satone, M. (2017). KKWETC Indian Face Database. *International Journal of Engineering Trends and Technology (IJETT)*, 54(1).
- Schneider, E. W. (2003). The dynamics of New Englishes: From identity construction to dialect birth. *Language*, 79(2), 233-281.
- Silverstein, M. (1996). Monoglot 'standard' in America: Standardization and metaphors of linguistic hegemony. *The matrix of language: Contemporary linguistic anthropology*, 284306.
- Smit, U., & Dalton, C. (2000). Motivational patterns in advanced EFL pronunciation learners. *IRAL-International Review of Applied Linguistics in Language Teaching*, 38(3-4), 229-246.
- Sumner, M., Kim, S. K., King, E., & McGowan, K. B. (2014). The socially weighted encoding of spoken words: A dual-route approach to speech perception. *Frontiers in psychology*, 4, 1015.
- Trofimovich, P., & Baker, W. (2006). Learning second language suprasegmentals: Effect of L2 experience on prosody and fluency characteristics of L2 speech. *Studies in Second Language Acquisition*, 28, 1-30.
- Yi, H. G., Phelps, J. E., Smiljanic, R., & Chandrasekaran, B. (2013). Reduced efficiency of audiovisual integration for nonnative speech. *The Journal of the Acoustical Society of America*, 134(5), EL387-EL393.
- Yi, H. G., Smiljanic, R., & Chandrasekaran, B. (2014). The neural processing of foreign-accented speech and its relationship to listener bias. *Frontiers in human neuroscience*, 8, 768.
- Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York.

Appendix A

High predictability sentences

1. The meat from a pig is called pork.
2. For dessert he had apple pie.
3. Sugar tastes very sweet.
4. The color of a lemon is yellow.
5. My clock was wrong so I got to school late.
6. In spring, the plants are full of green leaves.
7. A bicycle has two wheels.
8. She made the bed with clean sheets.
9. The sport shirt has short sleeves.
10. He washed his hands with soap and water.
11. The child dropped the dish and it broke.
12. The bread was made from whole wheat.
13. The opposite of hot is cold.
14. A wristwatch is used to tell the time.
15. The war plane dropped a bomb.
16. She cut the cake with a knife.
17. A chair has four legs.
18. Cut the meat into small pieces.
19. The team was trained by their coach.
20. The lady wears earrings in her ears.
21. People wear shoes on their feet.
22. When sheep graze in a field, they eat grass.
23. A rose is a type of flower.
24. Football is a dangerous sport.
25. The heavy rains caused a flood.
26. Bob wore a watch on his wrist.
27. Monday is the first day of the week.
28. The pan that was just in the oven is very hot.

29. Rain falls from clouds in the sky.
30. The boy laughed because the joke was very funny.
31. To cool her drink, she added a few cubes of ice.
32. A quarter is worth twenty-five cents.
33. An orange is a type of fruit.
34. People wear scarves around their necks.
35. I wrote my name on a piece of paper.
36. For your birthday I baked a cake.
37. Birds build their nests in trees.
38. My parents, sister and I are a family.
39. The good boy is helping his mother and father.
40. People wear gloves on their hands.
41. A book tells a story.
42. A pigeon is a kind of bird.
43. The sick woman went to see a doctor.
44. The lady uses a hairbrush to brush her hair.
45. At breakfast he drank some orange juice.
46. Last night, they had beef for dinner.
47. A racecar can go very fast.
48. Many people like to start the day with a cup of coffee.
49. He brought the book to school from home.
50. I wear my hat on my head.
51. Red and green are colors.
52. The stars come out at night.
53. February has twenty-eight days.
54. The picture is hung high on the bedroom wall.
55. We heard the ticking of the clock.
56. She laid the meal on the table.
57. She looked at herself in her mirror.
58. Elephants are big animals.

59. After my bath, I dried off with a towel.

60. In the morning it gets light, and in the evening it gets dark.

Low predictability sentences

1. Dad looked at the pork.

2. Mom talked about the pie.

3. We think that it is sweet.

4. Mom thinks that it is yellow.

5. He thinks that it is late.

6. She talked about the leaves.

7. He read about the wheels.

8. Dad talked about the sheets.

9. He looked at the sleeves.

10. We talked about the water.

11. We heard that it broke.

12. Dad pointed at the wheat.

13. She thinks that it is cold.

14. This is her favorite time.

15. Dad talked about the bomb.

16. Mom read about the knife.

17. She looked at her legs.

18. There are many pieces.

19. We read about the coach.

20. She pointed at his ears.

21. Mom looked at her feet.

22. Dad pointed at the grass.

23. She read about the flower.

24. This is her favorite sport.

25. He read about the flood.

26. He looked at her wrist.

27. This is her favorite week.

28. Mom thinks that it is hot.
29. Dad read about the sky.
30. Dad thinks that it is funny.
31. He talked about the ice.
32. He pointed at the cents.
33. He pointed at the fruit.
34. She talked about their necks.
35. We talked about the paper.
36. This is her favorite cake.
37. He read about the trees.
38. We read about the family.
39. Mom pointed at his father.
40. She looked at her hands.
41. We looked at the story.
42. We pointed at the bird.
43. Mom talked about the doctor.
44. He pointed at his hair.
45. Mom looked at the juice.
46. He talked about the dinner.
47. She thinks that it is fast.
48. Mom pointed at the coffee.
49. She pointed at the home.
50. She pointed at her head.
51. Mom read about the colors.
52. This is her favorite night.
53. There are many days.
54. We pointed at the wall.
55. She looked at the clock.
56. Dad read about the table.
57. We looked at the mirror.

58. He pointed at the animals.

59. Dad looked at the towel.

60. Dad thinks that it is dark.

Tables

		White Face	South Asian Face
Accentedness Judgments	American English	M= 1.8, SD=1.05	M= 2.3, SD=1.1
	Indian English	M= 7.1, SD=1.09	M= 7.3, SD= 1.1
Reaction Times	American English	M= 1.530 ms, SD=.10ms	M= 1.329 ms, SD=.09ms
	Indian English	M= 1.772 ms, SD=.11ms	M= 1.645 ms, SD=.10ms

Table 1. Mean (M) and Standard Deviation (SD) results for both accentedness judgments and reaction times

Figures

Figure 1

Figure 2

Figure 3

Figure 4

Figure Captions

Figure 1. The design of the accentedness task with a White face on the left and a South Asian face on the right.

Figure 2. Accentedness judgments for each accent condition. AccentScore represents the accentedness judgments (9-point scale). The density shows the amount accentedness scores for a given variety (American or Indian English).

Figure 3. Accentedness judgments for each face condition. AccentScore represents the accentedness judgments (9-point scale). The density shows the amount accentedness scores for a given image (South Asian or White). Overall, South Asian faces have higher density for accentedness.

Figure 4. Accentedness judgments reaction times (AccentRT in milliseconds) for each face and accent condition. Bar line depicts the mean, and the band shows 95% Confidence Interval. Each data point refers to one participant.