

“DO YOU SOUND ASIAN WHEN YOU SPEAK ENGLISH?” RACIAL IDENTIFICATION AND VOICE IN CHINESE AND KOREAN AMERICANS’ ENGLISH

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ABSTRACT: In paired dialect identification tasks, differing only by speakers’ sex, New Yorkers were asked to identify the race and national heritage of other New Yorkers. Each task included eight speakers: two Chinese Americans, two Korean Americans, two European Americans, a Latino, and an African American. Listeners were successful at above chance rates at identifying speakers’ races, but not at differentiating the Chinese from Koreans. Acoustic analyses identified breathier voice as a factor separating the Asian Americans most frequently identified from the non-Asians and Asians least successfully identified. Also, the Chinese and Latino men’s speech appeared more syllable timed than the others’ speech. Finally, longer voicing onset times for voiceless stops and lower /ε/s and /r/s were also to be implicated in making a speaker “sound Asian.” These results support extending the study of the robust U.S. tendency for linguistic differentiation by race to Asian Americans, although this differentiation does not rise to the level of a systematic racial dialect. Instead, it is suggested that it be characterized as an ethnolinguistic repertoire along the lines suggested by ~~Sarah Bunin Benor~~.

Benor (2010)

FACEBOOK USER Mark kicked off a thread on a Chinese-oriented Facebook discussion board asking, “Do you sound Asian when you speak English?” and added the following elaboration:

I don’t mean an accent like when FOBs [Fresh Off the Boats ‘new immigrant’] try to speak English. I’ve just noticed that Asian Americans tend to have a certain quality to their talking. It’s kind of like how you can tell when a white person is talking to [] or when an African American or Latino American person is talking.

They might even be using the same vocabulary, I don’t mean slang or anything, but their voice inflections and vowel pronunciations. [...] For instance, listen to Daniel Dae Kim speak English (not on LOST, but in real life lol) when he talks and compare it to like ... (insert famous white actor). [accessed Aug. 20, 2009 (since taken down)]

Sorry, but the page disappeared before I recorded that information.

Mark's post amounts to a query about a potential folk linguistic belief in a stereotypical association between an uncertain phonological profile and an undefined Asian American identity. Nevertheless, taking his comments seriously leads to a subject of considerable sociolinguistic interest. His use of Kim—an actor who immigrated to the United States at age two—as his prime example and the clarification that he does not mean L2 accents show that he is referring to NATIVE English. Furthermore, since Kim is Korean American and the Facebook page is Chinese oriented, it is clear that Mark sees “sounding Asian” as crossing at least these national heritage lines. “Sounding Asian” brings to mind related terms such as, to use his names, sounding “white,” sounding “African American” and sounding “Latino American,” that are race-based. Mark, therefore, seems to be making the interesting claim that just like those racialized groups, Asians have an identifiable manifestation of American English.

Group members' responses also provide useful information, if only by default. They consist entirely of confusions of “sounding Asian” with learner English or denials, like one poster's claim that she sounds “typically Canadian” or another's simple “No.” Therefore, if sounding Asian reflects a real linguistic phenomenon, it must be subtle or of relatively low sociolinguistic salience; in fact, both interpretations are supported by the lack of currency of notions like “Asian American English” in the sociolinguistic literature.

Mark's question prompts us to explore how Korean and Chinese Americans fit into the ethnic mosaic of English in New York City. We consider how recognizably Asian speakers of those origins may be, how awareness of origin may vary between the two national heritages, and what features may serve as identifying cues.

PREVIOUS RESEARCH

ASIAN AMERICANS' ENGLISH, RACE, AND ETHNOLECTS. Mark's implication of race is telling. Racialized categories are not the only form of ethnic identity linked to ethnolinguistic differences in American English, but they are the most prominent. Fought's (2006) survey of ethnicity in sociolinguistics provides a chapter each on African Americans, Latinos, and European Americans; the dialectal features of Native Americans also receive prominent coverage. By contrast, Cajuns—a prominent ethnolinguistically distinct European American subgroup—only receive a single section. Fought's coverage reflects a pervasive pattern found in variationist analyses of American English since Labov's foundational (1966) study of New York City English (NYCE). Labov contrasts the minor differences between the NYCE spoken by different white

groups with the major ones between white and nonwhite groups, such as Puerto Ricans and African Americans. Later research on New York Latinos provides distinctive features not shared with African Americans or European Americans (Slomanson and Newman 2004; Newman 2010), cementing the three-way split. Similar patterns of race-based distinctions are repeated in sociolinguistic studies across the United States (Labov 2001, 2008; Wolfram and Schilling Estes 2005). Nevertheless, although Asians are constructed as a distinct racial group in U.S. culture, they have not been shown to hold a corresponding degree of ethnolinguistic distinctiveness.

This disparity can be seen in the preponderance of studies on Asian American language that explore interactional rather than variationist questions (see, e.g., Kang 2003 and studies in Reyes and Lo 2009). Of the limited body of work on variation, only Spencer (1950) and Mendoza-Denton and Iwai's (1993) examinations of Japanese Americans raised in World War II-era internment camps reveal features associated specifically with an Asian American identity. Nevertheless, it is not entirely true that beyond that special case, Asian Americans are "linguistically white," as Hall-Lew (2010, 120) puts a claim she rejects. She shows that although there is no difference in the overall proportions of low-back mergers between European Americans and Asian Americans in San Francisco, the two groups did differ in the speakers' ages at which they showed the merger. She concludes the merger is a stable variable for European Americans, but for Chinese Americans, a change in progress. Hall-Lew (2009) also shows that Chinese Americans may be leading European Americans in /l/ vocalization, although the trend is found in both communities. Ito (2010) shows that Hmong Americans in Minnesota resist an incipient COT-CAUGHT merger found in young European Americans. Finally, Wong (2007) describes how Chinese Americans in New York variably adopt /ɔ/, raising common in NYCE but not the class NYCE short- split, which appears exclusive to local vernacular European American English (EAE). However, many young European Americans do not follow the split either (Becker and Wong 2010). All these distinctions, therefore, amount to quantitative differences in rates of use of features shared with European Americans.

It is certainly the case that, as Chun (2001), Bucholtz (2004), and Reyes (2005) have shown, some Asian Americans use linguistic resources associated with African American English (AAE). Yet, those forms index some aspect of identity derived from AAE (e.g., Inner City) rather than an Asian, national, or heritage language identity. As such, this use appears similar to processes found among some European Americans (Cutler 2007, 2008). Unsurprisingly, reviewing this literature, Reyes (2005) and Lo and Reyes's

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(2009) assert there is insufficient evidence for postulating the existence of “Asian American English.”

This kind of muddled outcome is not necessarily surprising. Although there are reasons to think an Asian American English is unlikely, there are equally compelling reasons to imagine that such ethnolinguistic distinctiveness is quite feasible. Working against Asian distinctiveness is Asian diversity. Ethnolects are said to derive differentiation from matrix varieties through substrates (Mufwene 2001, 2008; Fought 2006; Clyne 2008), so it is hard to see how a common variety could form across even just Korean and Chinese Americans. Still, there is evidence that substrate differences can be overcome in groups constructed as common racially. For example, the relative similarity between Jewish and Italian Americans found by Labov (to which could be added any number of other groups of European origin) exists despite considerably different substrate languages.

Recent theoretical advances, however, suggest that the problem may need to be reframed away from looking for a specific Asian ethnolect. Eckert (2008, 27) discusses cases like Labov’s distinction between the small differences between different European American groups and the larger differences between European Americans and Latinos and African Americans. She points out that such differences are really of degree rather than kind and concludes that “there is no obvious way to distinguish between a dialect with ethnic features and an ethnolect.” More radically, Benor (2010) proposes replacing the concept of ethnolect with that of “ethnolinguistic repertoire.” Her point is that whereas a dialect contains ordered variation by definition, ethnic differentiation is typically inconsistent. The notion of repertoire, she argues, better captures how sometimes one feature and sometimes another is deployed by speakers as an ethnic index. Such an outcome is plausible because members of ethnic communities often intermingle with nonmembers. So, to the extent that linguistic isolation is necessary for dialect emergence (Sapir 1921; Trudgill 1992), no dialectal system is likely to materialize in modern American society. Even many members of a group as readily identifiable as New York Latinos show little evidence of systematicity in their English (Newman 2010).

STUDIES OF IDENTIFICATIONS AND CUES. Yet, however weak the support from variationist studies and theoretical accounts, a dialect identification study suggests that Asian American ethnolinguistic distinctiveness must be perceptible. Hanna (1997) had 30 European Americans and 30 Asian Americans listen to short speech excerpts from 12 second-generation Asian Americans and eight European Americans. The judges were asked to sort those voices as either white or Asian, and they were often successful at doing so. Asian

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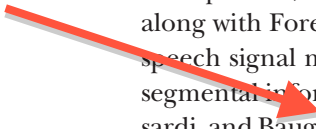
American were more successful overall than European Americans (67% to 63% correct), although this difference is not significant. A few judges achieved 85% to 90% success rates overall, and some speakers were successfully recognized by more than 90% of the judges.

Many researchers have investigated the identifiability of African Americans versus European Americans, all with a similar voice sorting design (see summaries in Thomas 2002 and Thomas and Reaser 2004). Purnell, Isardi, and Baugh (1999) added Latinos, and Wolfram et al. (2002) added Native Americans to the mix and so provided three-way examinations. We are aware of no study that has asked judges to consider four or more racial categories or that looked at racial subgroup distinctions.

Invariably in these studies, judges show robust ability to make the appropriate identifications, which prompts us to ask what features the judges are attuned to. Thomas and Reaser (2004) caution that this task is made difficult by the sheer number of potential cues and the fact that some may not even be known to investigators. One way around these problems is to reduce the potential cues available and see how different impoverishments alter identification rates. Thomas and Reaser, for example, selected atypical AAE speakers, who have many features usually associated with local EAE. They, along with Foreman (2000), used shortened excerpts and various forms of speech signal manipulation to eliminate, in turn, voicing, intonation, and segmental information. Shortening was taken to an extreme by Purnell, Idsardi, and Baugh (1999), who showed that just the word triggers strong rates of recognition. It appears that many listeners require little acoustic information to place speakers into the racial categories tested.

The low number of segmental cues available in a sample as short as Purnell, Idsardi, and Baugh's suggests that voicing is likely an important signal for many listeners in making ethnolinguistic distinctions. In fact, their AAE stimulus—John Baugh speaking in an AAE guise—showed a lower harmonics-to-noise ratio than his EAE or Chicano guises. This difference may be expected on the basis of prior phonetic research. Walton and Orlikoff's (1994) African American participants have nonsignificantly greater mean jitter (F0 frequency perturbations) and significantly greater shimmer (volume perturbations) than their European Americans. Harmonics-to-noise ratios decrease with greater jitter and shimmer. On a different voicing dimension, Thomas and Reaser (2004) show that African Americans, particularly males, tend to produce breathier phonation types than European Americans. Parallel results were found by Szakay (2008) for a different ethnolectal contrast. She noted that Pakeha (European origin) New Zealanders have breathier mean phonation types than Maoris and that this difference influenced judges' identification rates.

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The association of voice cues with ethnic differentiation extends to speech rhythm. Thomas and Carter (2006) and Carter (2007) find that Latino English in North Carolina and Texas tends to be more syllable timed than contemporary AAE or EAE (see also Fought 2003). This is presumably a substrate effect from Spanish, which tends toward greater syllable timing than English. Newman (2010) finds syllable timing in a minority of New York Latino English (NYLE) speakers, but those who did show it had rates similar to Thomas and Carter's (2006) and Carter's (2007) participants. Significantly, for the present study, Low and Grabe (1995) and Low, Grabe, and Nolan (2000) find that Singapore English is more syllable timed than British English, a presumed substrate effect from Chinese.

The varieties associated with European Americans, African Americans, and Latinos present numerous well-studied segmental contrasts with each other. By contrast, Asian Americans have only been found to differ ~~little~~ ^{only} in rates of segmental variants from their local EAEs, as discussed above. Therefore, the sociophonetic question is not which of a surfeit of known possible cues are listeners attuned to but whether distinctive features can be identified as potential cues. Given this background, this study explores the following questions:

1. How able are judges of different backgrounds to discern speakers of Asian background compared to those who index other racialized groups?
2. Are these judges able to distinguish Korean from Chinese Americans?
3. Can any phonetic cues be identified as potentially indexing Asian identity?

The first two questions are tackled in an identification study, and the third in a sociophonetic one.

IDENTIFICATION STUDY

IDENTIFICATION METHODS. The research was initiated in an undergraduate sociolinguistic research seminar at Queens College/CUNY, a public institution that draws students principally from middle- to working-class backgrounds, mostly from New York City and neighboring suburbs. When the question was proposed, it became apparent that the phenomenon of "sounding Asian" was at least accessible to most students, in particular the Asian Americans. Two, Kimberly Chan and Bobby Kang, initiated a pilot study by recording eight male voices, consisting of two Chinese Americans, two Korean Americans, two European Americans, one African American, and one Latino. The student researchers selected the speakers from classmates and friends. A second pilot was performed the following year with female voices by another student,

Mei Chin Chang, who similarly selected voices from among classmates and acquaintances. The second author of this paper, also an undergraduate, replicated both experiments after fixing problems in the pilots. All speakers were raised in New York since age four, and all were college students except one college-bound high school student. In both years, the class listened to the voices and eliminated those that sounded notably vernacular. Also, both original African Americans were eliminated and replaced because they were deemed not detectable as AAE speakers, and the original Latino man was replaced because he had an odd, robotic-sounding reading style.

More than one European American speaker was included because of the dialectal alignments of Asians with that group assumed in earlier studies. The African American and Latino provide comparison with the two other well-established racial groups in the city: AAE (see, e.g., Rickford 1999; Green 2002; Thomas 2007) and NYLE (Wolfram 1974; Sломanson and Newman 2004; Newman 2010), respectively. Their presence also avoids the potential confounding effect of lumping all voices perceived as nonwhite into an Asian category.

Hanna (1997) used extemporaneous excerpts. However, other student-initiated studies showed potential confounding effects of topic that were unpredictable and difficult to surmount.¹ In this task we used a 60-word passage adapted from a news item on a coyote captured in Central Park (see appendix 1) and thus unrelated to the subject of race and language. The readings were recorded with an Olympus DS 20 digital recorder. In addition to the more standard stylistics, a potential problem in reading aloud involves reading miscues and hesitations (Thomas 2002), which we edited out of the sound file to the extent possible using Praat (<http://www.praat.org/>).

Judges were students in Introduction to Psychology, Introduction to Linguistics, and Elementary Chinese classes at Queens College and a seminar on ethnicity and language at another four-year CUNY college. Over 80% were from the psychology classes because students in that course were given experiment participation credit. Only eight judges were from the Chinese language class and were added to increase the number of Asian Americans in the sample; **native-born Chinese Americans** were represented in that the class. Given the demographic makeup of the city and colleges involved, it is virtually inevitable that students of all backgrounds interact face-to-face on a fairly regular basis with Korean and Chinese American native speakers of English. They can be expected, therefore, to be able to distinguish such speakers if specific features are available and they are attuned to the connection between those features and racial categories.

Judges were asked to identify the speakers as black, white, Hispanic, or Asian. Data from 116 judges who listened to the men and 111 to the women

Note: this should solve the confusion.

were used after elimination of all who (1) were not raised in New York from first grade, (2) did not attempt all identifications, or (3) gave random answers (presumably to get research participation credits with no effort).²

Data were collected using the Survey module of Blackboard instructional software, in which the sound files were embedded, with the order of voices changed several times to reduce sequencing effects. Judges could complete the survey at home or on campus using their own headsets. Thus, no researcher was present as participants responded. Answers were collected automatically and anonymously; in the Survey module, names are not attached to results. Judges were told not to expect an even distribution of races among the voices, and after indicating the race of each speaker they answered two questions about their confidence in their choices and six subjective response questions before moving on the next speaker (see appendix B). Those results are not reported here.

After the last speaker, judges gave demographic information, including their ethnicity, place of birth, and answered the qualifying question of whether they had attended first grade in New York. Results were downloaded from Blackboard in a database readable by MS Excel, with only judges' ethnic identifications requiring interpretation. These resulted in the following classifications: European American, African American, Latino, East Asian, South Asian, mixed, other, and no answer. Judges' demographics are presented in figure 1 for men's and women's voices. These data were tabulated in Excel for descriptive statistics and diagrams.

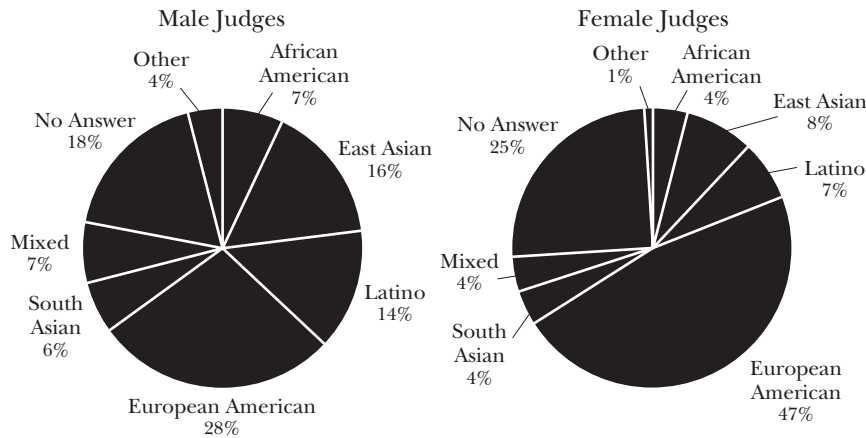
Significance for four-way identifications was calculated using the χ^2 test function in Graphpad Prism 5.0 for Mac. Adjusted Wald Confidence Intervals (Agresti and Coull 1998) were used to determine the significance of proportions calculated with Graphpad's online calculator. Diagrams were produced in Excel (<http://www.graphpad.com/quickcalcs/ConfInterval1.cfm>).

IDENTIFICATION RESULTS. Figure 2 show the results of the racial identification task for men's voices and women's voices separately. In figure 2 and subsequently, male speakers are labeled mC1 and mC2 for the Chinese American men, mK1 and mK2 for the Korean American men, mW1 and mW2 for the European Americans, mB for the African American, and mH for the Latino. Women are identified in the same way: fC1, fC2, fK1, and so on. Results were highly significant ($\chi^2 = 997.6$, $df = 21$, $< .001$ for men and $\chi^2 = 0.1012$, $df = 21$, $< .001$ for women).

The NYLE speakers were recognized as Hispanic by over 90% of judges, and the African Americans were recognized as black by over three-quarters. Three of the four European Americans were recognized by well over half as white. The results for Asians were in line with Hanna's (1997) range.

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figure 1
Ethnic Breakdown of Judges

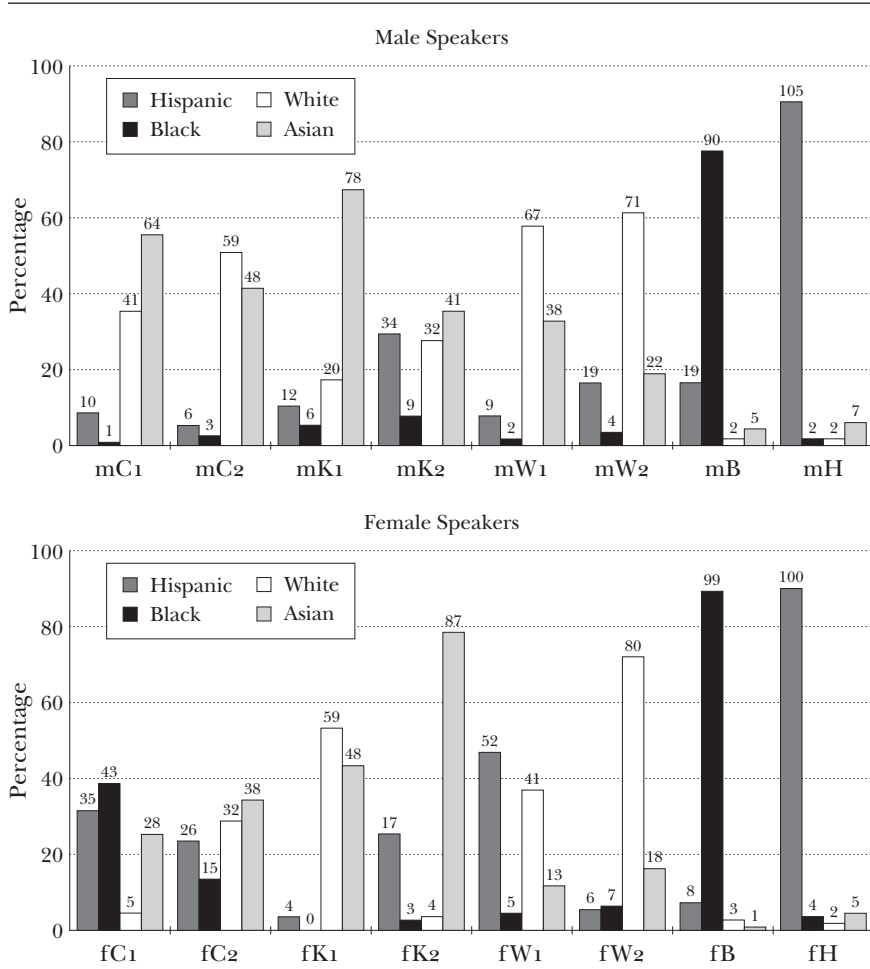


The two most successfully identified speakers, both Korean American (fK2 and mK1), were selected as Asian by over two-thirds of the judges, followed by one Chinese American man (mC1), who was selected by over half. The others were less consistently identified. More judges identified two speakers (mC2 and fK1) as white than Asian. By contrast, one speaker mK2 was recognized as Asian by a plurality of judges, although by fewer total than the two who were more often thought to be white. Misidentifications were also interesting, considering the alignment of Asians with whites in previous research. Both Chinese men and one Korean woman (fK1) were indeed mostly thought to be white by those judges unable to identify them as Asian. However, the remaining Asian speakers displayed a heterogeneous array of misidentifications with two Korean Americans, one man and one woman, most frequently confused with Hispanics, and one Chinese American woman, most commonly thought to be black. In the end, however, it is important not to lose track of the principal result: all the Asian Americans received more identifications as Asian than any non-Asian Americans in their single sex comparison group.

Hanna found nonsignificantly higher rates of successful Asian identifications by Asian American judges. Here, this trend arrives at significance, though barely in the case of the men's voices. Figure 3 shows the 95% Adjusted Wald Confidence Intervals (C.I.s) for both sexes.

In contrast to the sensitivity to racialized group differences, evidence for judges' ability to distinguish between Korean and Chinese Americans is weak. Figure 4 shows the 95% Adjusted Wald C.I.s. for these identifica-

figure 2
Racial Indentifications by Judges



tions for men and women, respectively, with Chinese identifications as 1 and Korean as 0. Although the low end of mC2's 95% C.I. is above .5, the grand mean—indicated by the dotted line—shows an overall bias toward Chinese identifications, and the lower tail of the 95% C.I. falls below this level. It is, therefore, unclear with what level of security we can say that mC2 was identified by phonetic cues or what extent it is prudent to worry that those successful recognitions were result of the general bias toward Chinese identifications. A similar conclusion, though in the other direction, is noted for mK2. By contrast, none of the females even approaches significance in identifications except fK2, who does so in the wrong direction.

figure 3

Mean and 95% Confidence Intervals of Accurate Identifications of Asian American

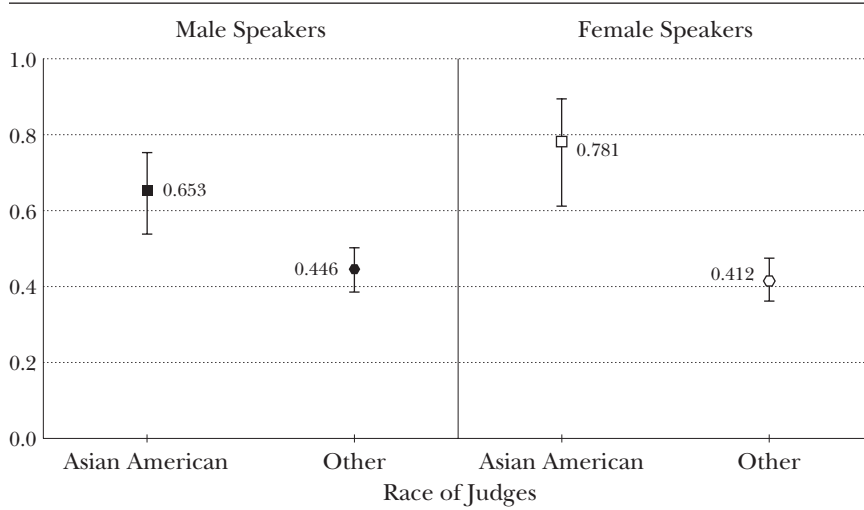
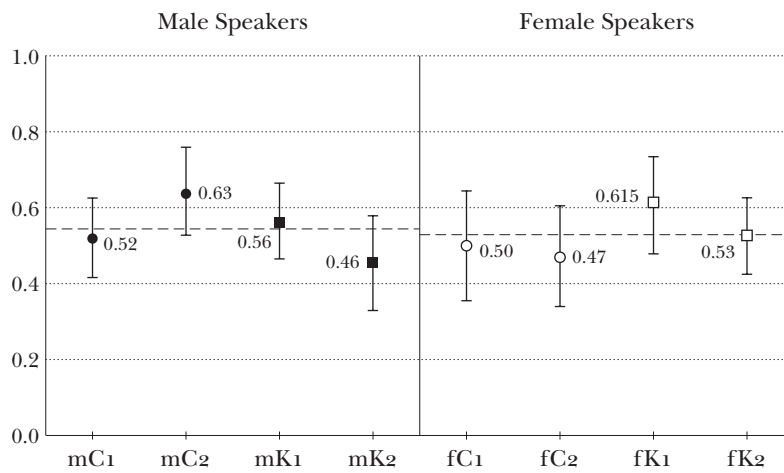


figure 4

Mean and 95% Confidence Intervals of Chinese versus Korean National Heritage Identification



DISCUSSION OF IDENTIFICATION RESULTS. The results show that identifying Chinese and Korean Americans' voices as Asian does not appear to be as perceptually robust for these judges as doing so for blacks and Latinos, although the range approximates that of whites. Nevertheless, the identification data

are clear enough to point to a degree attunement by these judges to sounds associated with an Asian American identity. In other words, Mark's notion of "sounding Asian" does have, it appears, an empirical basis. Consequently, there must be a feature, set of features, or pattern of feature organization that participants can associate with Asian American identity.

Another interesting result is that, although prior research generally aligns Asian Americans' speech with EAE, this assumption is not supported; only three Asian speakers were typically taken to be white when misidentified. Turning to the internal Asian American difference, the evidence for or against a Korean-Chinese distinction is unclear. There were no significant correlations, but in two cases the numbers were suggestive. On this point, we would like to mention that a number of students—not all Asian American—in classes expressed surprise at the inconclusive data, and a few were able to make those distinctions quite accurately. Also, this study is limited to these two Asian heritage groups. Perhaps further research will confirm the ability of some judges to make other identifications.

SOCIOPHONETIC STUDY

SOCIOPHONETIC METHODS. All phonetic analyses were conducted with Praat. Suprasegmental features measured include jitter, shimmer (which affect the harmonics to noise ratio), phonation type, and rhythm.

Jitter, shimmer, and phonation type were measured with the help of scripts originally written by Christian DiCanio and modified by José Alberto Elías Ulloa. These scripts were set to record data from vowels longer than 60 ms. "Jitter local" and "shimmer local" are measurable directly in Praat, with Excel readable results produced by the script. Only vowels longer than that length for all speakers in the single-sex comparison group were measured to maintain phonetic contexts equivalent across speakers. Output was then analyzed statistically with a Repeated Measures ANOVA in Graphpad Prism for Mac 5.0.

Phonation type has to be measured indirectly, and a number of potential proxies are available (Gobl and Chasaide 2003). Following Szakay (2008), the proxy used for this measure was the mean difference between the amplitudes of the first and second harmonics (H_1-H_2) in the central third of the vowels, again only those over 60 ms. long for all speakers. This difference represents spectral tilt, which in turn is associated with phonation type (Gordon and Ladefoged 2001; Gobl and Chasaide 2003; Szakay 2008; DiCanio 2009). Outputs were analyzed as above.

Elías (accent on
the "i")

Rhythm was measured via the formula developed by Grabe and Low (2002) called the normalized Pairwise Variability Index (nPVI). This index compares the durations of adjacent vowels and corrects for speaking rate. In this case, only vowels not elided by any speakers in their comparison group were included. The higher the nPVI, the greater the difference between the vowel durations and consequently the more stress timed the extract of speech is; the lower the index, the more it is syllable timed. The formula used was supplied by Erik Thomas, and following Thomas and Carter (2006), the median for each speaker was considered the measure of central tendency due to the skewed nature of the output. Consequently, significance was determined by a Friedman test (the nonparametric equivalent of a repeated measures ANOVA) in Prism.

Note: Why "voicing" rather than "voice"?

Whereas the examination of suprasegmental features responds to findings in other studies of racial dialect differentiation, segmental features were chosen on diverse criteria. One was the voicing onset time (VOT) for voiceless stops, which was selected on the basis of contrastive phonetics between English on the one hand and Chinese and Korean on the other. Table 1 shows that English has been shown to have shorter aspirations than Cantonese and especially Korean. VOT length of /p/ and /t/ was measured in Praat from the stop burst to the beginning of a robust second formant of the following words: , , , , , , , and .

The relative position of /ɛ/ became of interest because ongoing research on the full vowel systems of a variety of New Yorkers showed a Chinese American man with a low and notably back /ɛ/. The formants of /ɛ/ were measured in Praat using a script (Hemsley 2010) that creates output readable by NORM (Thomas and Kendall 2010). The vowel formant data based on three tokens, , , and , were normalized for each speaker using the Bark Difference Metric in NORM.³

The final segmental feature is onset /r/. It is well known that phonologies of many Chinese dialects and Korean lead to merger of the two liquids among speakers of these languages learning English. Although mergers are

table 1
Mean Voicing Onset Times
(Lisker and Abramson 1964, 394, 397; cited in Cho and Ladefoged 1997, 19)

	<i>English</i>	<i>Cantonese</i>	<i>Korean</i>
[p ^h]	58 ms.	77 ms.	91 ms.
[t ^h]	70 ms.	75 ms.	94 ms.
[k ^h]	80 ms.	87 ms.	126 ms.

categorically absent among native speakers, some phonetic differences may remain. This is practical, however, only for onset and intervocalic /r/s due to the frequent elision or vocalization of coda and syllabic /r/ among all racialized groups in NYCE. Examining even these prevocalic /r/s is a challenge. For one thing, Guenther et al. (1999, 2854) note that /r/ “has long been associated with relatively large amounts of articulatory variability.” Probably the best-known source of this variability involves tongue configurations that vary along a continuum between retroflexed and bunched (Westbury, Hashi, and Lindstrom 1998; Teide et al. 2004). Yet the bunched versus retroflex realization has remarkably little acoustic consequence (Twist et al. 2007), with all configurations providing a similar acoustic signature of rhoticity. This involves an F₃ that is radically lowered to 60–80% of its value in [ə] (Hagiwara 1995), to the point that it sometimes merges with F₂ into what Stevens (2000) calls FR. Hagiwara observes that rhoticity can be perceptually reduced by less F₃ lowering.

Another perceptible difference discussed by phoneticians is a continuum between what are sometimes called light and dark /r/s (Olive, Greenwood, and Coleman 1993). Lighter /r/ corresponds to syllable codas and darker /r/ to onsets, exactly the inverse of the corresponding /l/ distributions. As with /l/, dark /r/ is velarized with a consequent similarity to back vowels; whereas light /r/ presents similarities to front vowels (Olive, Greenwood, and Coleman 1993, 216). More generally, as Espy-Wilson et al. (2000, 344) put it, “F₁ and F₂ values are predictable from the general articulatory shape of /r/, and accordingly overlap with those of vowels with similar place and height features.” This is significant for variationist research because a number of phoneticians note considerable cross-speaker variation in degree of lightness and darkness (Olive, Greenwood, and Coleman 1993; Hagiwara 1995; Espy-Wilson et al. 2000). In addition, there is considerable variation in formant trajectories and transition patterns to neighboring sounds (Hagiwara 1995). In sum, /r/ is a far more complex site for possible variation that has been explored in variationist and dialectological research.

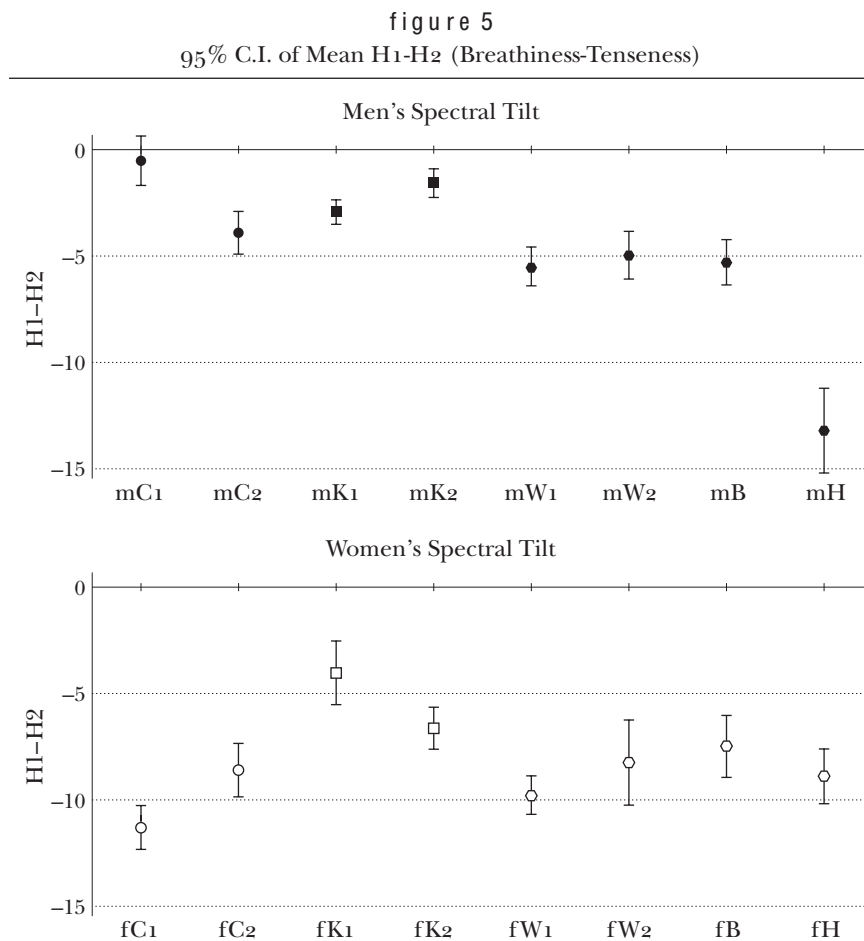
Six /r/s per speaker— , , , , , and —were measured at either the F₃ minimum (the point of greatest rhoticity) or, in the cases where F₂ and F₃ could not be distinguished, at the midpoint of FR. Data were not normalized because normalization absent a complete vowel system relies on the F₃, which in the case of rhotics can produce spurious results. Also, due to the complexity of the acoustics of rhotics, each token also received qualitative description.

SOCIOPHONETIC RESULTS. In terms of the components of harmonics to noise ratio, we found no evidence for any role of jitter, which had no significant

Note: The "R" should be a subscript in F-R. Note that while 3 is subscript in F₃, 1 and 2 are not throughout

variation among the speakers, and although there were some significant differences for shimmer, these broke down individualistically. These factors are therefore not discussed further. Phonation type, by contrast, differed between most Asians and non-Asians. Figure 5 shows the results based on a Repeated Measures ANOVA of the difference between the first and second harmonics (H_1-H_2) for the same 36 vowels for each speaker.

All the Asian American men and the two Korean women have higher spectral tilts than all the non-Asians, although for one man and one woman, not significantly so. Note that fC1 and fC2, the two exceptions, were misidentified as non-Asians more than half the time; so these data tend to support the idea that breathier voice is characteristic of “sounding Asian.”



Rhythm, by contrast, does not set Asians off against other groups, but the Chinese men and the Latino man were significantly more syllable timed than at least some of the others, although the women's median nPVI scores hardly varied and are not discussed further. The results for men can be seen in figure 6, which shows the 95% C.Is. based on a Friedman test.

From the perspective of substrate, greater syllable timing for Chinese Americans is not surprising given that it shows up in Chinese influenced varieties like Singapore English (Low and Grabe 1995; Grabe and Low 2002). In Korean, by contrast, the status of stress is controversial, but it would not be expected to influence English in the same way.

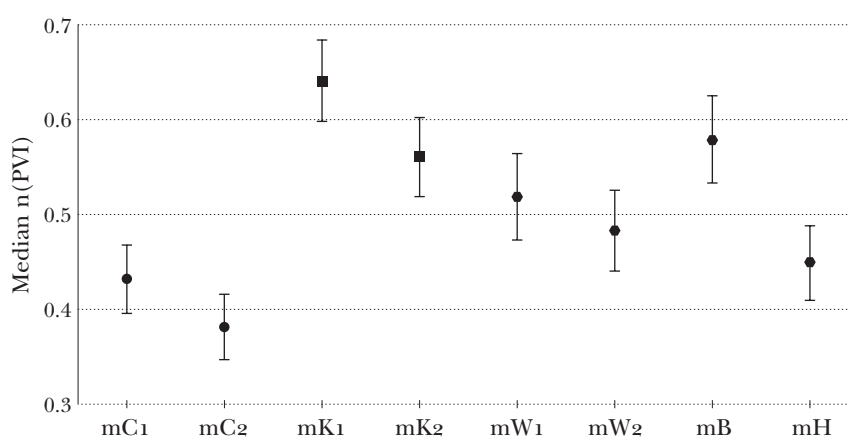
The Repeated Measures ANOVA showed highly significant differences ($F = 6.942, < .001$) between speakers' mean VOTs of the six $[k^h]$ s and three $[p^h]$ s, although with such a low numbers of tokens, it was almost impossible for most individual confidence intervals not to overlap. Therefore, figure 7 plots only the means for all speakers.

Four Korean and one Chinese American woman show longer mean VOTs than the non-Asians, with the other Chinese American woman essentially equal to fW_2 , the non-Asian with the highest mean VOT. Spanish substrate influence appears a likely source for the low mean VOTs in the female Latino, but this does not affect her male counterpart. Figure 8 shows the plot of the normalized mean vowels for each speaker.

Six of the eight Asian Americans' produce $/\epsilon/s$ in the lowest quarter of the quadrant, below the normalized 9.2 difference between Z_3-Z_1 , a space

Note: please put sentence starting with "Figure 8..." into the following paragraph

figure 6 Median PVI Scores
95% Confidence Intervals of Mean H_1-H_2 (Breathiness-Tenseness) of Men's Voices



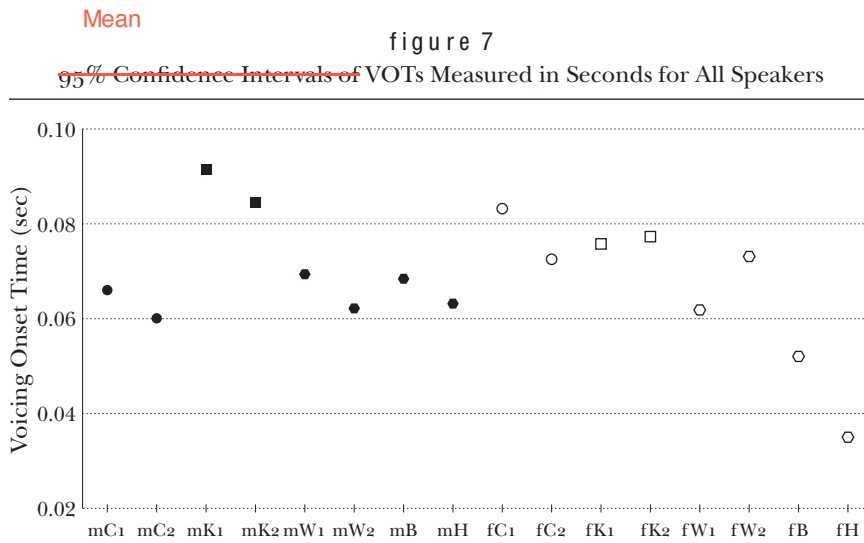
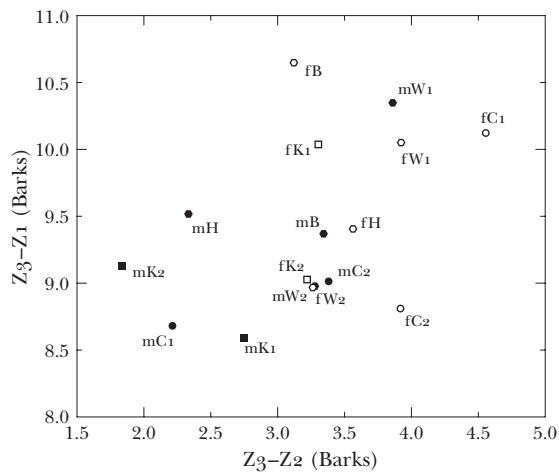


figure 8
Mean Formant Values for /ε/ Bark Difference, Normalized



shared by only two non-Asians, fW2 and mW2. Moreover, the three speakers with the lowest normalized positions are Asians. However, unlike the original speaker who motivated study of this variable, only the /ε/s of two Asians were back. There is no evidence of difference between the two national heritages in these data.

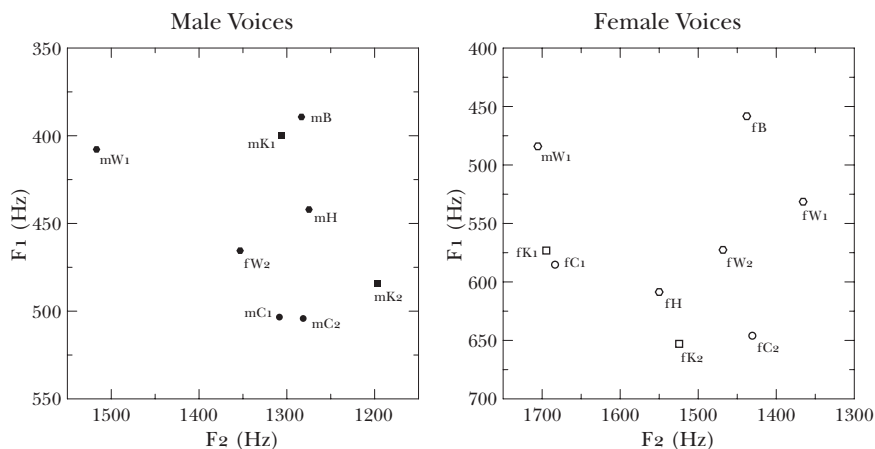
Results for /r/ show considerable variation even beyond F1 and F2, particularly for the two Latinos. For the Latino man, intervocalic tokens showed a clear tap, presumably a substrate effect from Spanish. For his female counterpart, the F3 was very high (mean = 2649 hz., 1099 hz. above the mean F2), and her impression was less of rhoticity than labialization. The Asian men and fC2 showed somewhat lower F3s—and so greater rhoticity—than the non-Asians, but the effect was minimal. The most interesting differences were found in traditional F1-F2 plots, as shown in figure 9.

The difference was not so much on the light-dark dimension but in height. It is possible to appreciate that seven of the eight Asians cluster at the lower region of the charts, with five of these much lower. The least extreme zone of this lower region of the women's vowel space is shared by fK1 and fC1 with the non-Asians fH and fW2, but fH is hardly rhotic, and so sounds quite different. Only, mK1 has a relatively high position.

DISCUSSION OF SOCIOPHONETIC DATA

The relatively prominent role of voice quality—which does not appear to be very salient in discussions of dialectal difference—could explain in part why “sounding Asian” has so far passed unobserved. Furthermore, it appears likely that the segmental cues are not very salient either. The VOT scores and /ε/ appear to be at the edges of the ranges of the non-Asians. Prevocalic /r/ appears better differentiated, with seven out of eight of the Asians with low

figure 9
Mean F1 and F2 Values for /r/ Men and Women



this realizations, five of them quite lower than non-Asians, but just how noticeable it is not yet known. On this point, in class discussions of what “sounding Asian” variables might be, only the /r/ is ever mentioned, but it is hard to tell to what extent this is due to its stereotyped role in L2 speech as opposed to actual perceptions of L1 Asian American English speakers.

two Table 2 shows the distribution of the potential features of “sounding Asian” identified here. Two plusses in the top three rows indicate that the difference is significantly greater than all non-Asians (except for the Hispanic man for VOT). One plus indicates a feature in the “Asian range” but not significantly different. In the fourth and fifth rows, two plusses indicate a lower /ε/ and /r/, respectively, than all non-Asians.

It is worth noting that no Asian American speaker presents all the potential cues, and neither does any lack all. Other aspects worth commenting on are the lack of systematicity in feature distribution and the limited explanatory power of the feature distribution in relation to the rates of identification. The least identified speaker, fC1 does have the lowest total of plusses, showing only low /r/ and long VOT. Also, fK2, her most successfully identified counterpart, presents all except syllable timing, which would not be expected as a Korean substrate effect, but three of these features are not very robust. The most successfully identified male speaker, mK1, presents only three features, fewer than the less frequently identified mK2. In fact, the two most frequently identified speakers have fewer plusses overall than three speakers— mC1, mC2, and mK2—who were only moderately identified. Probably, some features are more salient to more judges than others and/or there are other features that they are attuned to that have yet to be uncovered. It is also likely that certain combinations of features are key.

two A fascinating observation about the issue of combinations was brought up by Mark Liberman (2010), who commented on an earlier version of this article. He points to the parallel between using this kind of weak and somewhat equivocal evidence in identifying a type of speaker and how Alan

table 2
Distribution of “Asian Sounding” Variants among Asian Speakers

	<i>mC1</i>	<i>mC2</i>	<i>mK1</i>	<i>Mk2</i>	<i>fC1</i>	<i>fC2</i>	<i>fK1</i>	<i>fK2</i>
Breathiness	++	+	++	++			++	+
Timing	+	++						
Long VOT			++	++	++	+	++	++
Low /ε/	++	+	++	+		++		+
Low /r/	++	++		++	+	++	+	++
total	7	6	6	7	3	5	5	6

Turing and colleagues broke the Nazi enigma code during World War II. For the code breakers, each piece of evidence gradually increased the odds in favor of one solution:

The point is just that separate pieces of individually-weak evidence can combine to yield a judgment that has a high probability of being correct.

In the same way, we can make a reliable linguistic judgment even if there is no cue that provides strong evidence on its own. It's even easier to explain how someone might be able to make a judgment that's unreliable—but still much better than chance guessing—by combining a number of weak sources of evidence in a case like the perception of “Asian” speech. [Lieberman 2010]

Although at first glance it may seem a stretch from guessing identities to a grueling effort to break codes, Lieberman cites cognitive scientists as arguing that, “(much) animal (and human) decision-making works in a similar way” (Lieberman 2010: 15, 2010 @ 7:58 am). Perhaps, although it is clearly a speculative hypothesis at this point, if more features are found that potentially index an Asian American identity, a more convincing association between feature appearance in speakers and the rates by which they are identified would result.

CONCLUSION

In sum, this study provides empirical support for Facebook user Mark's intuition regarding “sounding Asian.” Asian Americans—at least Korean and Chinese Americans—are indeed distinct pieces in the U.S. racial dialectal mosaic, instead of relatively minor variations on European American patterns. Perhaps the cues to racial identity are fewer and subtler than, say, for African Americans or Latinos in New York. Certainly, that lack of sociophonetic saliency and idiosyncratic distribution of features among speakers suggest that this study does not provide sufficient evidence to refute Reyes (2005) and Lo and Reyes's (2009) assertion that there is no Asian American English along the lines of African American English. On the other hand, the features do exist, and therefore the Asian Americans' uniqueness seems to best characterized in terms of an ethnolinguistic repertoire (Benor 2010). By selecting from a set of features, consciously or unconsciously, Asian American speakers can index their racialized group identity even though this crosses national heritage lines.

Given the understudied state of Asian Americans in variationist research, it is worth closing this article programmatically. We have mentioned a number of times that this study has likely only identified some components of

what Mark meant by “sounding Asian.” To find a fuller set of potential cues, research involving longer extemporaneous samples will be needed. The place of other Asian American groups and Asian Americans in other parts of the United States also needs to be established. It is therefore hoped that our study will provide stimulus and a starting point for others to work on this neglected—though culturally and demographically important—group of Americans.

APPENDIX 1 The Passage Used

A wily coyote led sharpshooters armed with tranquilizer guns on a merry chase through Central Park before being captured on Wednesday. At one point, authorities tried to corner the animal in the southeast corner of the park, by Wollman Rink. The clever creature jumped into the water, ducked under a bridge, then scampered through the rink grounds and ran off.

APPENDIX 2 The Survey Sample

Question 1

I have read the attached informed Consent document and agree to continue the survey. KMBT25020051016192824.pdf

- Yes No

Question 2

What ethnicity would you guess this speaker is?
anc.wav

1. White
 2. Black
 3. Hispanic
 4. Asian

Question 3

How confident are you about your selection?

- sure almost sure reasonably sure not that sure just a guess

Question 4

If Asian, is the speaker Chinese or Korean?

- Chinese
 Korean

Question 5

How confident are you about your selection?

- sure almost sure reasonably sure not that sure just a guess

Question 6

The speaker sounds like an intelligent person.

1. disagree 2. somewhat disagree 3. somewhat disagree 4. agree

Question 7

The speaker sounds like a slacker.

1. disagree 2. somewhat disagree 3. somewhat disagree 4. agree

Question 8

The speaker sounds like he's probably fun to be around.

1. disagree 2. somewhat disagree 3. somewhat disagree 4. agree

Question 9

The speaker sounds like a loner.

1. disagree 2. somewhat disagree 3. somewhat disagree 4. agree

NOTES

An earlier version of this article was presented at the conference on Experimental Approaches to Perception and Production of Language Variation at the University of Groningen, Nov. 11–12, 2010. We would like to thank Christian DiCanio, José Alberto Elías Ulloa, and Gordon Hemsley for their help in producing and modifying Praat scripts. Also, we would like to acknowledge the help of Jane Stuart Smith for her help disentangling the complex acoustics of /r/. Finally, we want to acknowledge Angela Reyes, who provided comments on an earlier version. Obviously, any misuse of the scripts, confusions about /r/, or tortured or erroneous arguments are not their fault.

1. Danny Yang, then a high school student under the first author's supervision, did the first version in 2004 using extemporaneous speech. In his report he expressed concern that judges may have been reluctant to identify one Chinese American—who he felt sounded very Asian—because he talked about participating in a fight. Danny suggested that this violated a stereotype of Asians as physically passive. In another case, a then undergraduate Melanie Camurati explored the ability of judges to differentiate Italian and Jewish New Yorkers. She noted one speaker was mainly considered Italian by Jews and Jewish by Italians. She suggested that this was because this speaker complained in the excerpt recorded, provoking rejection by both groups.

see note
below

2. Responses suspicious of random guessing were identified by those who answered wrongly on either of the two most frequently correctly identified speakers (the African Americans and Latinos). If the remainder of the answers approached chance rates, the judge was eliminated.
3. One speaker, the African American woman, may have an incipient PIN-PEN merger. Of course the nasality of the two of three tokens may have also affected the other speakers in complex ways (see Thomas 2011). Thomas 2010

Because of the large number of errors in the reference list below (see arrows indicating missing text) I'm resending the reference list with the missing references included and extras eliminated

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