

Research Question:

How do listeners use social and linguistic cues as they make sense of the language around them?

Background:

Variability in speech is not random, but rather is conditioned by social and stylistic factors. For example, in the United States, African American speakers have higher rates of t/d deletion than White speakers (Rickford, 1999). When variation such as t/d deletion becomes closely coupled with social characteristics, it becomes socially meaningful. *Socially meaningful variation* can aid the listener: knowing something about the speaker and what the speaker is likely to say enables the listener to rapidly process, and perhaps predict, the unfolding speech signal (Levy, 2008; Staum Casasanto, 2008)

Voice cues in particular appear to activate social representations of the speaker early during processing, creating *expectations* in the listener, which can dynamically alter the processing of the speech signal (Squires, 2014). Speech processing is therefore aided by a *socially informed structure* based on the integration of *social expectations* and knowledge of *socially meaningful variation* (McGowan, 2015).

Precisely how socially meaningful variation and social expectations interact during processing remains unclear. The present set of experiments seeks to address this question by systematically altering the information listeners have to inform their social expectations of the speaker. To do so, we focus on the linguistic differences between two varieties of English spoken in the United States: African American English (AAE) and Standard American English (SAE).

AAE and SAE are rule-governed varieties of English spoken in the United States which share many features, while also showing systematic differences. In particular, grammatical elements required in SAE (e.g., past tense -ed, copula, possessive marking) only variably appear in the surface form of AAE (Rickford, 1999). Thus, SAE is much less variable when compared to AAE and the surface form of AAE can gradiently differ from the surface form of SAE. AAE is a stigmatized variety in the United States in part due to these differences. Here, we investigate how the social expectations that SAE-speaking listeners may hold about AAE and AAE-speakers interact with the processing of socially meaningful variation.

Experimental Question:

How do SAE-speaking listeners use social information as they process socially meaningful variation?

- We manipulate the social information presented about the speaker: auditory cues (Exp 1), auditory cues and implicit visual priming (Exp 2), auditory cues and explicit visual information (Exp 3), and no social cues (Exp 4)

Materials:

Sentences:

- Test sentences* ($n = 48$) constructed as triads such that one version was plausible in both AAE and SAE (1a), implausible in both (1b), and plausible in AAE, but not SAE (plausible AAE; 1c):

1) Troy and his friends

- ... **have been** playing tag during recess
- ... **has been** playing tag during recess
- ... **been** playing tag during recess

- Four features, the absence of which is plausible in AAE, but not SAE, were selected to create sentence triads:

- t/d root (e.g., *That chil'/child broke the new china dishes*)
- t/d morpheme (e.g., *My mother talk'/talked crossly to the salesclerk*)
- Copula (*Rob been/has been planting roses outside*)
- Possessive marking (e.g., *I know Emma/Emma's book is overdue*)

- Filler sentences* ($n = 16$) plausible in both

- Sentences recorded by two female speakers:

- One self-identified as a native SAE-speaker, the other as a native AAE-speaker
- Speakers used their self-identified native variety during recording

Faces (Experiments 2 and 3):

- 32 female faces (16 African American, 16 European American; see Figure 1 for examples)
- Neutral expressions
- Grayscale



Figure 1. Sample faces

Language Background and Familiarity with Social Groups:

- Questionnaire assessed
- Self-reported ability to comprehend and produce AAE and SAE ranging from 1 (*poor*) to 7 (*excellent*)
- How many African Americans and European Americans participants knew, were friends with, and attended school with from 1 (*none*) to 7 (*many*)

Participant Characteristics:

Table 1. *Demographics and Self-reported Language Background and Social Group Exposure (Experiments 1-4)*

Measure	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Sample size	72 (29 male)	144 (45 male)	72 (20 male)	72 (18 male)
Age (mean)	19.75 years	19.65 years	19.42 years	19.97 years
AAE Comprehension	4.26 (.19)	3.84 (.21)	4.72 (.16)	3.63 (.17)
AAE Production	2.69 (.19)	2.28 (.17)	2.07 (.17)	2.19 (.14)
SAE Comprehension	6.54 (.07)	6.58 (.07)	6.60 (.09)	6.39 (.13)
SAE Production	6.28 (.10)	6.34 (.10)	6.24 (.12)	6.18 (.15)
Exposure to African Americans	3.17 (.14)	2.91 (.15)	3.23 (.15)	2.83 (.15)
Exposure to European Americans	5.01 (.22)	5.73 (.19)	4.88 (.23)	5.57 (.18)

Note. Values in parentheses indicate standard error.

Methods and Results:

Experiment 1: Integrating Voice Cues and Language (see Figure 2)

Methods: Participants listened to all sentences and indicated as quickly and accurately as possible whether the sentence was *plausible* or not.

Results: A 2 (Speaker) x 3 (Sentence Type) repeated measure ANOVA revealed:

- Significant main effects for both speaker ($F_{(1, 71)} = 8.21, p < .05$) and sentence type ($F_{(2, 142)} = 718.80, p < .0001$)
- Significant interaction ($F_{(2, 142)} = 5.13, p < .05$)
- Ratings did not differ by speaker for plausible ($t_{(71)} = .31, p = .756$) and implausible ($t_{(71)} = .33, p = .743$) sentences
- Speaker matters:* plausible AAE sentences were rated significantly more plausible when uttered by an AAE-speaker ($t_{(71)} = 3.90, p < .0001$)

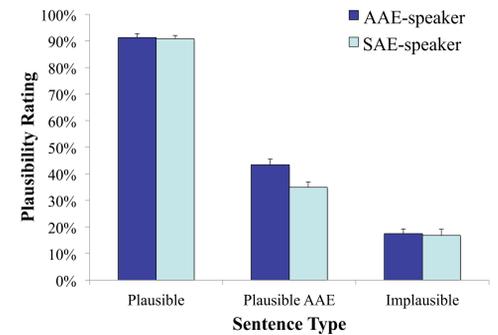


Figure 2. Plausibility rating by speaker and sentence type

Experiment 2: Implicit Integration of Race and Language (see Figure 3)

Methods: Same task as in Experiment 1, but sentences were primed with masked faces that either matched the upcoming speaker (e.g., European American face preceding SAE-speaker) or did not (e.g., African American face preceding SAE-speaker).

Results: A 2 (Speaker) x 2 (Match) x 3 (Sentence Type) repeated measure ANOVA revealed:

- Significant main effects for speaker ($F_{(1, 142)} = 5.41, p < .05$) and sentence type ($F_{(2, 142)} = 1408.92, p < .0001$) and a significant speaker x sentence type interaction ($F_{(2, 284)} = 5.82, p < .05$); no other comparisons were significant
- Follow-up tests revealed:
 - As in Experiment 1, plausible AAE sentences were rated significantly more plausible when uttered by an AAE-speaker ($t_{(141)} = 3.92, p < .0001$)
 - When primed with an African American face, participants rated both implausible sentences ($t_{(142)} = -2.58, p < .05$), and plausible AAE sentences ($t_{(142)} = -2.20, p < .05$), as significantly more plausible, *but only when uttered by the SAE-speaker*

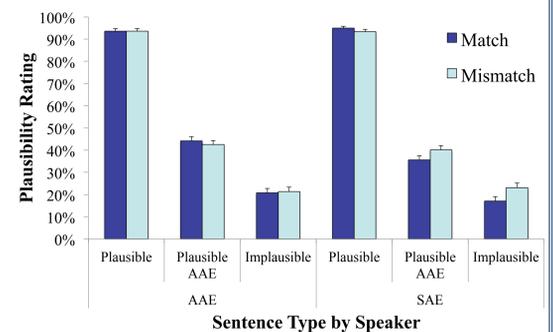


Figure 3. Plausibility rating for each speaker by sentence type and face prime (Match, Mismatch)

Experiment 3: Explicit Integration of Race and Language (see Figure 4)

Methods: Same sentences as in Experiment 1, but participants saw faces of two potential speakers (1 African American, 1 European American) for the duration of each trial. The task was to indicate as quickly and accurately as possible which face represented the most likely speaker of the sentence.

Results: A 2 (Speaker) x 3 (Sentence Type) repeated measure ANOVA revealed:

- Significant main effect for speaker ($F_{(1, 71)} = 10.77, p < .05$) but not sentence type
- Significant interaction ($F_{(2, 142)} = 3.19, p < .05$)
- No significant differences in face choice across sentence type *for the sentence uttered by the SAE-speaker*
- When uttered by the AAE-speaker*, plausible sentences were associated with an African American face significantly less often (plausible vs. plausible AAE, $t_{(71)} = -2.61, p < .05$; plausible vs. implausible, $t_{(71)} = -2.50, p < .05$)

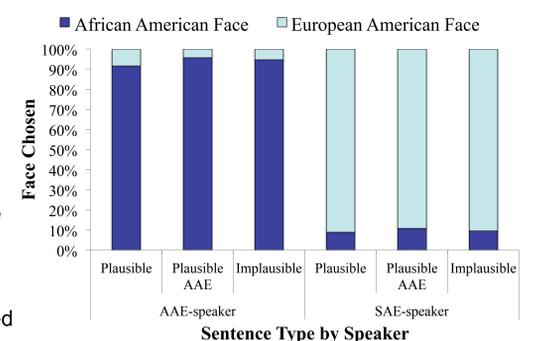


Figure 4. Face choice by speaker and sentence type

Experiment 4: Plausibility Control (see Figure 5)

Methods: Same task as in Experiment 1, but sentences presented in written format to remove overt social information (visual, auditory).

Results: t-tests revealed:

- Social information influences processing:*
- Plausible sentences were rated significantly more plausible than plausible AAE ($t_{(71)} = 36.40, p < .0001$) as well as implausible ($t_{(71)} = 33.01, p < .0001$) sentences
- Plausible AAE and implausible sentences did not differ ($t_{(71)} = 1.40, p = .17$)

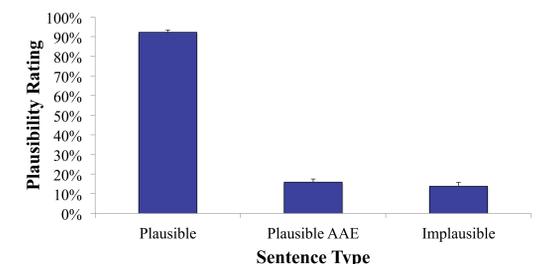


Figure 5. Plausibility rating by sentence type

Conclusions:

- Socially meaningful variation matters:*
 - SAE-speaking listeners are sensitive to the content of utterances and distinguish sentences that are plausible *from an SAE perspective* from those that are not
 - SAE-speakers appear aware of gradient linguistic differences and rate plausible AAE sentences as more plausible than implausible ones
- Social expectations matter:*
 - Visual or auditory cues to a speaker being African American are associated *significantly* more with being incorrect linguistically, while cues to being European American are not
- Stereotypes associating African Americans with incorrect language use appear to guide language processing *for SAE-speaking listeners*

References:

- Levy, R. (2008). Expectation-based syntactic comprehension. *Cognition*, 106(3), 1126-1177. doi: 10.1016/j.cognition.2007.05.006
- McGowan, K. B. (2015). Social expectation improves speech perception in noise. *Language and Speech*, 58, 502-521. doi: 10.1177/0023830914565191
- Rickford, J. R. (1999). *African American Vernacular English*. Oxford, UK: Blackwell.
- Staum Casasanto, L. (2008). Does social information influence sentence processing? 30th Annual Meeting of the Cognitive Science Society, Washington, D.C.
- Squires, L. (2014). Social differences in the processing of grammatical variation. *University of Pennsylvania Working Papers in Linguistics*, 20(2), 179-188.