



# They dropping copulas:

## Salient cues in the integration of speaker identity and syntax

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### Introduction

An ERP study examined the effects that social and linguistic stereotypes have on syntactic processing, to address how social information is integrated with linguistic input on-line. There is already evidence that listeners incorporate social information into language processing in real time (VanBerkum et al, 2008; Tesink et al, 2009;). Conversely, listeners use both experience and stereotypes to make inferences about a speaker's social identity from phonological cues (Staum Casasanto, 2009). Furthermore, a foreign accent can lead listeners to expect grammatical errors (Munro & Derwing, 1995) and/or fail to produce a syntactic anomaly response (Hanulikova et al, 2012).

We focused on copula deletion, a feature of African American English (AAE), expecting copula deletion to trigger a syntactic anomaly response when uttered by a white standard speaker, but not when uttered by an AAE speaker. We also included a speaker with a foreign (Indian) accent, to test whether syntactic expectations are built on a general perception of otherness or on a collection of observations of stereotypical grammatical features related to specific social and language identities.

### Copula Deletion

#### Correctly formed examples

- Who (are) you?
- She (is) my teacher.
- He (is) taking the train.

#### Incorrectly formed examples

- \*She (was) my teacher  
Intended tense is not conveyed
- \*I don't know where he (is).  
Construction fails if it cannot equate to a contraction in Standard American English
- \*But he really (is) a genius!  
Intended stress is not conveyed

### References

Goslin, J., Duffy, H., & Floccia, C. (2012). An ERP investigation of regional and foreign accent processing. *Brain and language*, 122(2), 92-102.

Friederici, A. D. (2002). Towards a neural basis of auditory sentence processing. *Trends in Cognitive Science*, 6(2), 78-84.

Hanulikova, A., van Alphen, P., van Goch, M., & Weber, A. (2012). When one person's mistake is another's standard usage: The effect of foreign accent on syntactic processing. *Journal of Cognitive Neuroscience*, 24(4), 878-887.

Staum Casasanto, L. (2009) What do listeners know about sociolinguistic variation? *University of Pennsylvania Working Papers in Linguistics: Selected papers from NWAV 37*, 15(2).

van Berkum, J. J., van den Brink, D., Tesnik, C. M., Kos, M., & Hagoort, P. (2008). The neural integration of speaker and message. *Journal of Cognitive Neuroscience*, 20, 580-591.

### Method

#### Speakers

Three female speakers recorded all versions of all experimental sentences: a White Standard speaker, an African-American speaker, and an Indian-accented speaker.

*Syntactic Manipulation*: 120 items, 2 conditions per subject  
Core structure: {He/she/it} {is/Ø} {progressive verb[(single syllable)-ing]}

	Voice/Phonology	Syntax	Example
1	White	Standard English	He called to tell us he's going to be late today
2	White	Copula Deletion	He called to tell us he (is) going to be late today
3	African-American	Standard English	He called to tell us he's going to be late today
4	African-American	Copula Deletion	He called to tell us he (is) going to be late today
5	Indian	Standard English	He called to tell us he's going to be late today
6	Indian	Copula Deletion	He called to tell us he (is) going to be late today

*Semantic Control Manipulation*: 40 items, all 6 conditions w/in subject

	Voice/Phonology	Critical sentence region
1	White	Let me finish sweeping this floor before you walk in here
2	White	Let me finish sweeping this cloud before you walk in here
3	African-American	Let me finish sweeping this floor before you walk in here
4	African-American	Let me finish sweeping this cloud before you walk in here
5	Indian	Let me finish sweeping this floor before you walk in here
6	Indian	Let me finish sweeping this cloud before you walk in here

#### Participants and Procedure

60 participants (ages 18-25), were seated in front of a computer screen, with a fixation cross while listening to 480 trials (40 items per condition). After approximately 1/8 of all trials, at random, a prompt appeared on the screen asking the participant if they heard a specific word in the previous sentence. All participants were right-handed native speakers of a variety of American English and were asked afterward how familiar they were with the zero copula construction, and to optionally indicate how they identified ethnically.

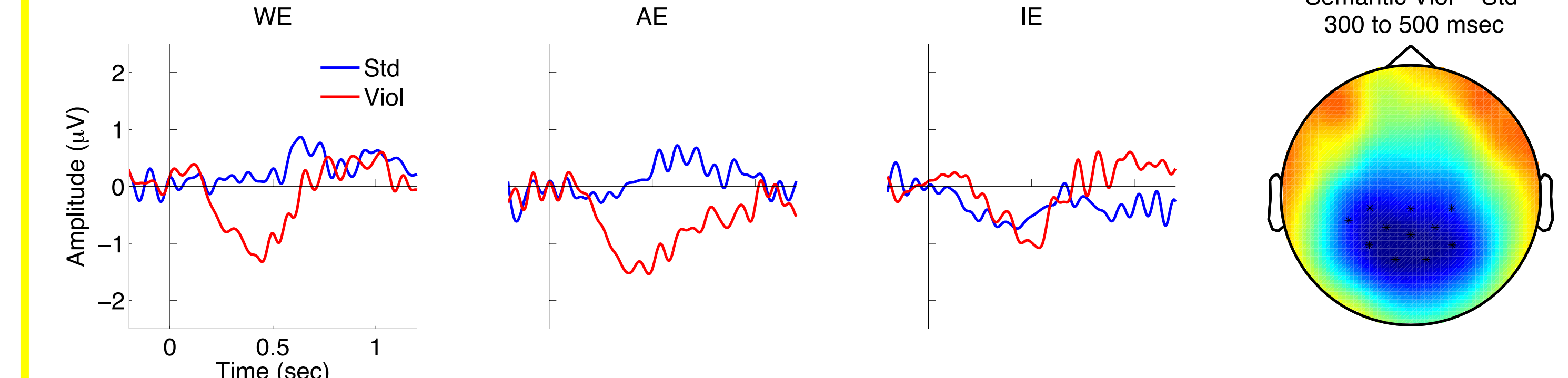
#### Recording & Analysis

Data were recorded from 61 active electrodes. Trials were time-locked to the *-ing* suffix of the progressive verb (the point of certain grammatical disambiguation) on syntactic manipulation trials and to the onset of the critical word on semantic manipulation trials. Data were analyzed in temporal windows corresponding to the P600 (syntactic manipulation) and the N400 (semantic manipulation). The mean signal voltage per trial was taken across the critical time-window for each target response. The mean of these averages was then taken by condition for each subject and submitted to 3(speaker) x 2(violation/no violation) ANOVAs.

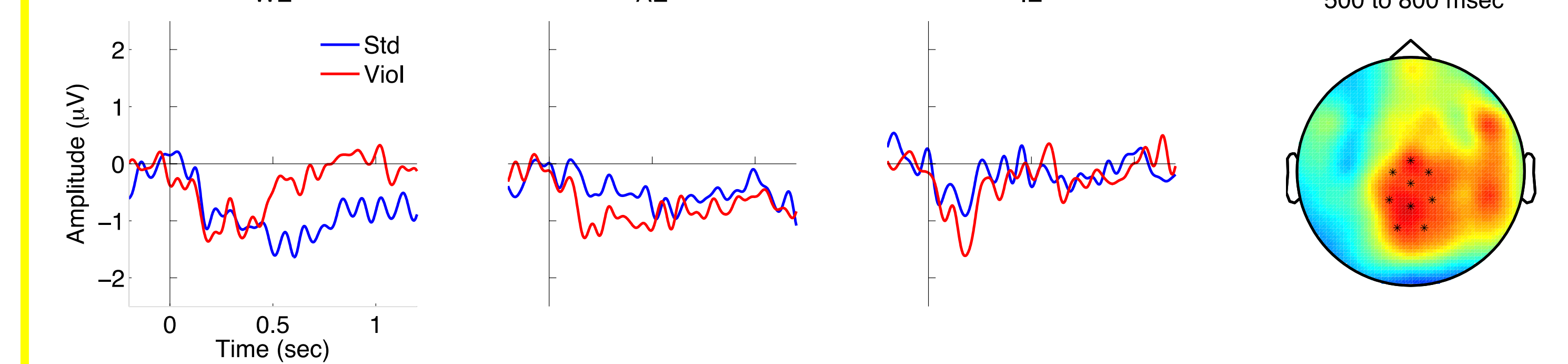
### Results

There was a significant interaction between syntactic violation and speaker ( $F(2,118) = 3.10, p < .01$ ) such that there was a P600 for the Standard condition ( $t(59) = -3.30, p < 0.01$ ) but not for the AAVE condition ( $t(59) = .50, p = 0.62$ ) nor the Indian condition ( $t(59) = -.10, p = 0.93$ ). We found significant N400 results for lexical semantic violations in the Standard and AAVE conditions only. A reduced N400 for foreign, but not regional, accents was also reported by Goslin et al. (2012).

#### N400

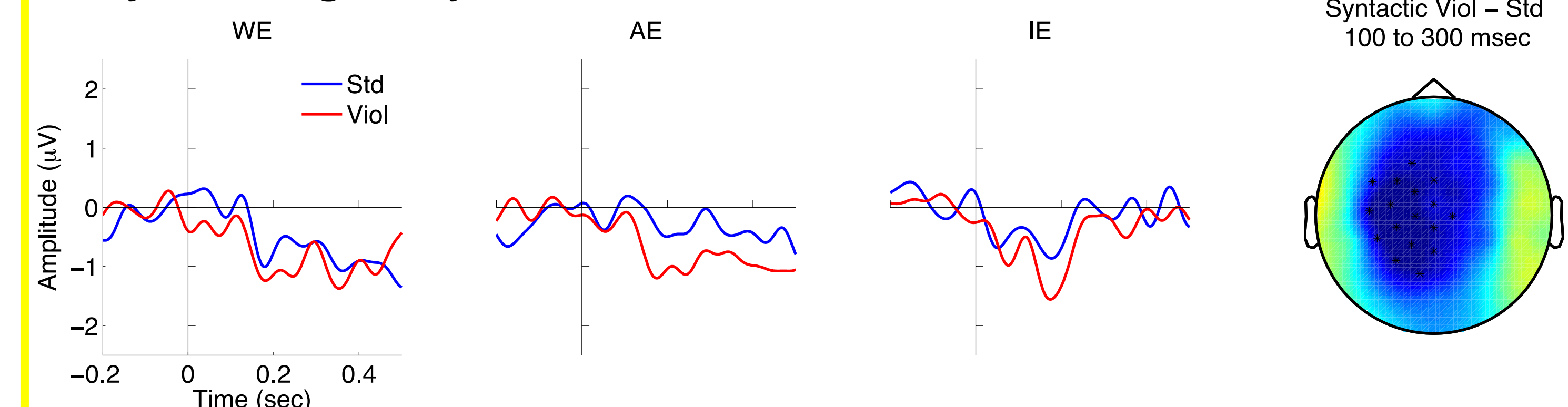


#### P600



Visual inspection of the data revealed a 100-300 ms left-lateralized negativity for syntactic violations. This effect resembles the "ELAN" component that is sensitive to word-category information (e.g. Friederici, 2002). Post-hoc analysis showed a main effect of violation ( $F(1,59) = 10.37, p < .01$ ) but no interaction by speaker ( $p > .5$ ).

#### Early Left Negativity



### Conclusions

The perception of non-standard speech (in the AAVE and Indian conditions) led to lowered expectations for standard syntax, without clear evidence for dialect-specific syntactic expectations. These results suggest that listeners found copula deletion ungrammatical when listening to a Standard speaker, but not when listening to a speaker of a non-standard variety of English, regardless of whether the specific variety they hear is characterized by rules allowing for this construction. This supports the hypothesis that listeners do not apply dialect-specific knowledge on-line when processing the syntax of a non-standard variety of their native language; rather, listeners loosen their expectations for standard syntax.