# Netspeak: Dialect, Genre, Register?

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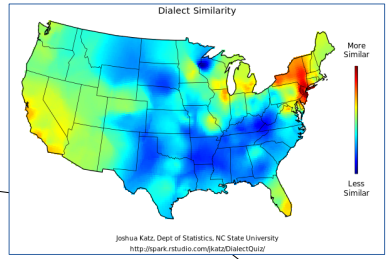
# Variation by speaker and by medium



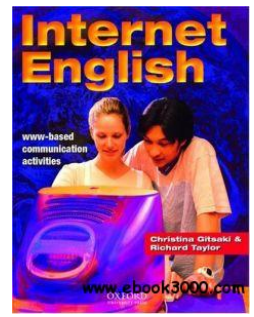

**Dialect variation**
geography, ethnicity, class, gender, ...

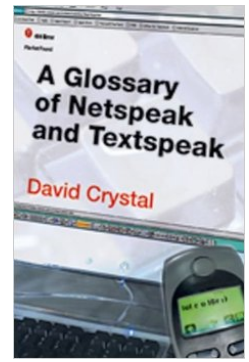
# Variation by speaker and by medium


Standard writing

**Variation by Medium**

Netspeak

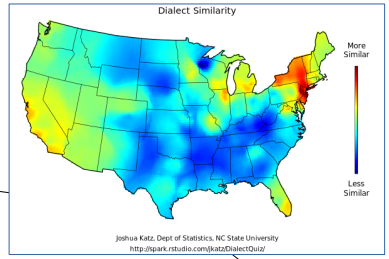


# Variation by speaker and by medium


Standard writing

**Variation by Medium**

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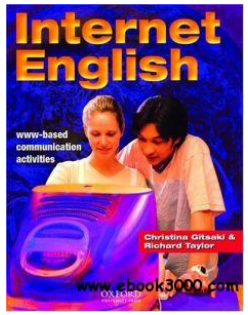
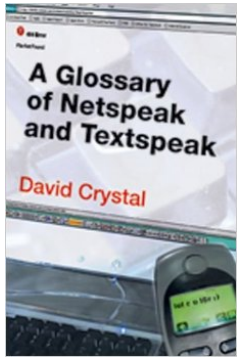
geography, ethnicity, class, gender, ...

Netspeak

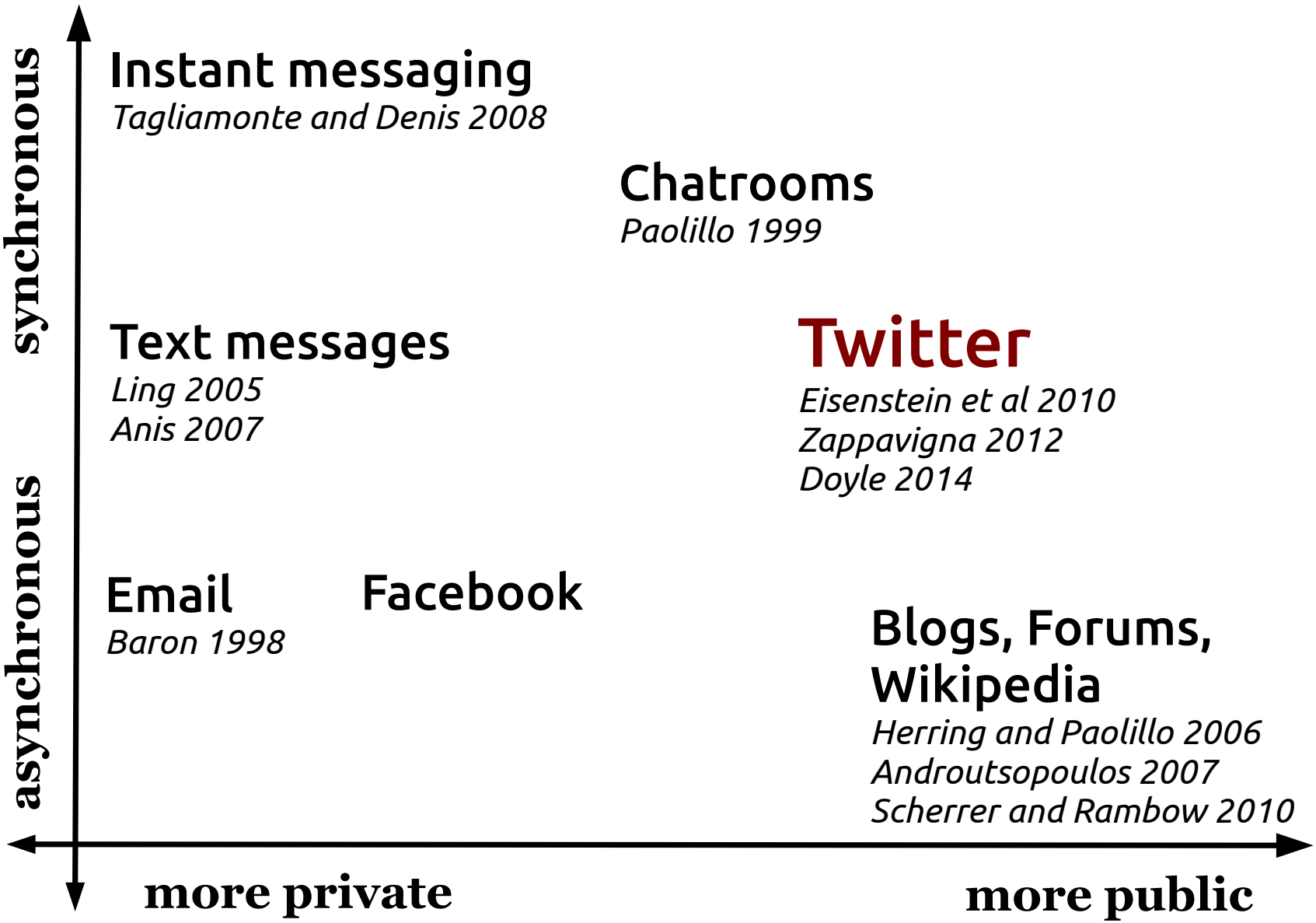


# Questions for this talk

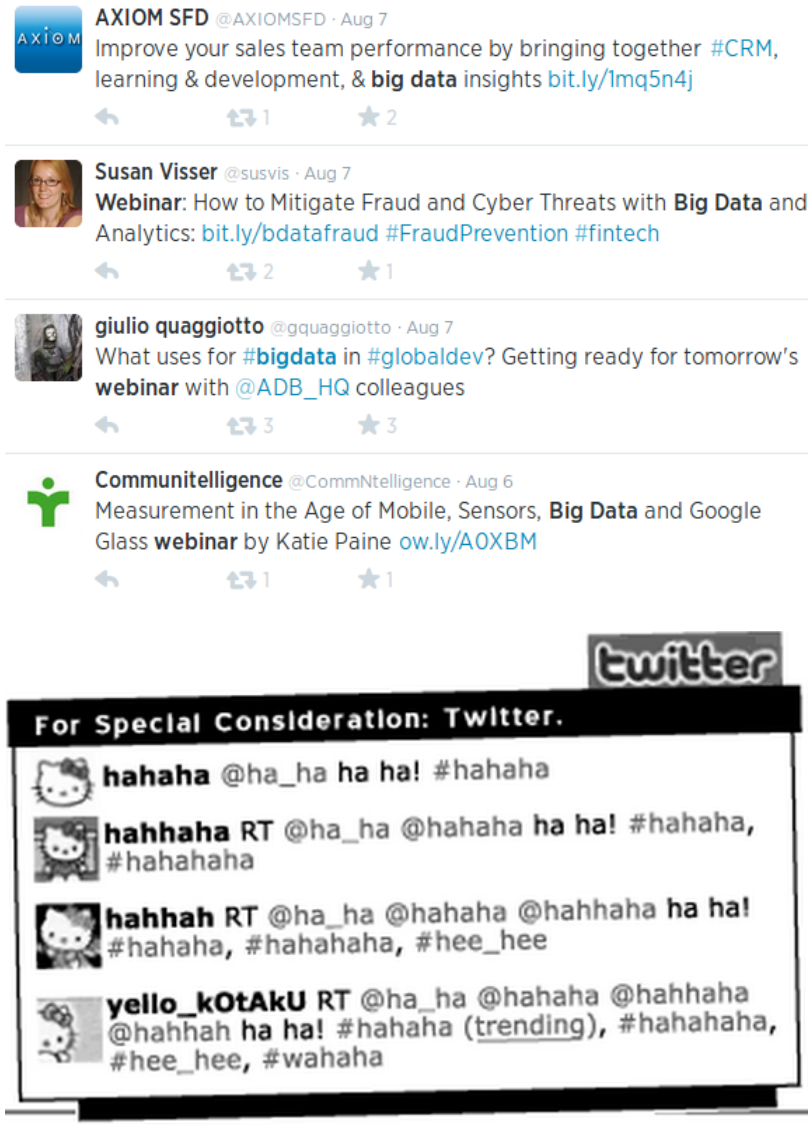
- Are spoken dialect features transcribed in digitally-mediated writing?
- How can we use large digital corpora to automatically induce dialect difference?
- Why would "netspeak" features vary with geography?

# A landscape of digital communication



# Twitter

- 140-character messages
- Each user has a custom **timeline** of people they've chosen to **follow**.
- Most data is publicly accessible, and social network and geographical metadata is available.



# Who are these people?

| | 2013 | 2014 |
|---|---|---|
| *All internet users* | *18%* | *23%** |
| Men | 17 | 24* |
| Women | 18 | 21 |
| White, Non-Hispanic | 16 | 21 * |
| Black, Non-Hispanic | 29 | 27 |
| Hispanic | 16 | 25 |
| 18-29 | 31 | 37 |
| 30-49 | 19 | 25 |
| 50-64 | 9 | 12 |
| 65+ | 5 | 10* |
| High school grad or less | 17 | 16 |
| Some college | 18 | 24 |
| College+ (n=685) | 18 | 30* |
| Less than $30,000/yr | 17 | 20 |
| $30,000-$49,999 | 18 | 21 |
| $50,000-$74,999 | 15 | 27* |
| $75,000+ | 19 | 27* |
| Urban | 18 | 25* |
| Suburban | 19 | 23 |
| Rural | 11 | 17 |

(Pew Research Center)

- % of online adults who use Twitter; per-message statistics will differ.
- Representativeness concerns are real, but there are potential solutions.
- Social media has important representativeness advantages too.

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- Are spoken dialect features transcribed in digitally-mediated writing?
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# Variation in digital writing

## Linguistic variables

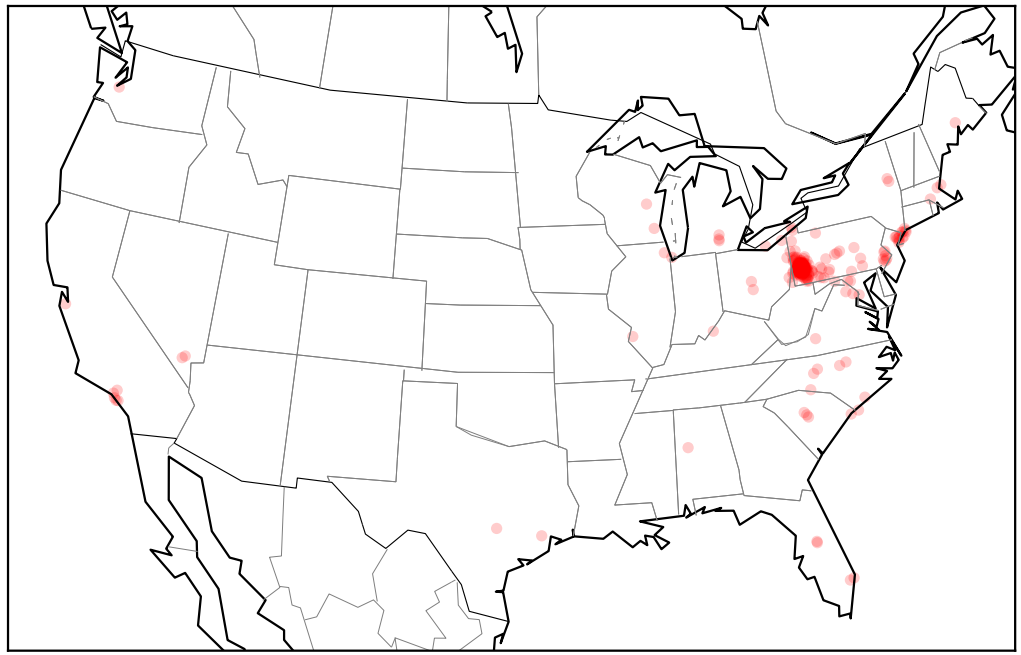
- lexical items from speech

## Social variables

- geography

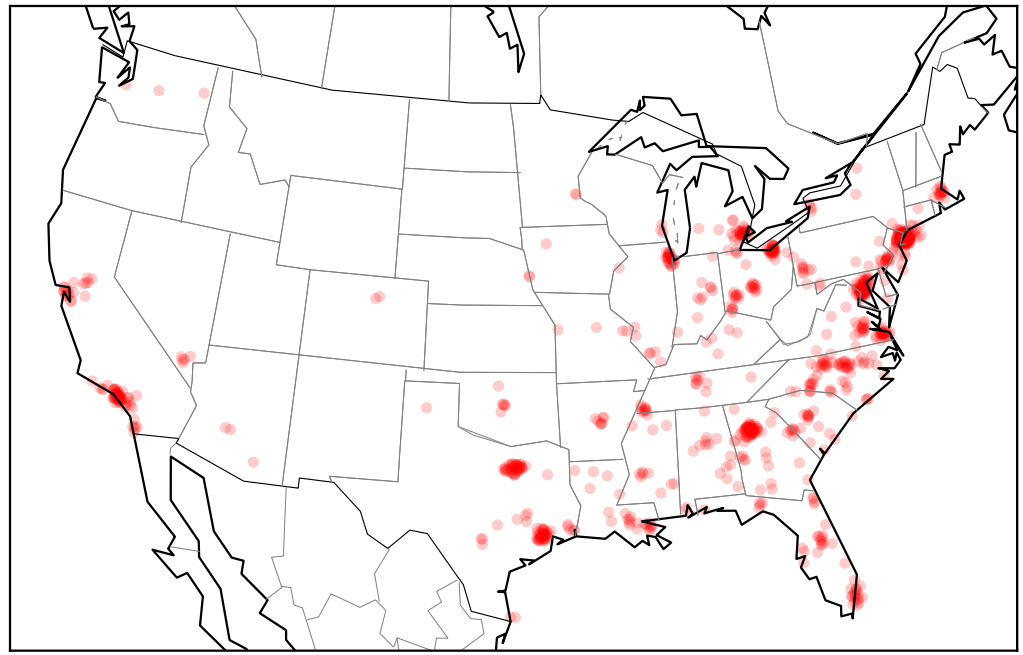
# Yinz

- 2nd-person pronoun
- Western Pennsylvania
- Very rare: appears in 535 of $10^8$ messages



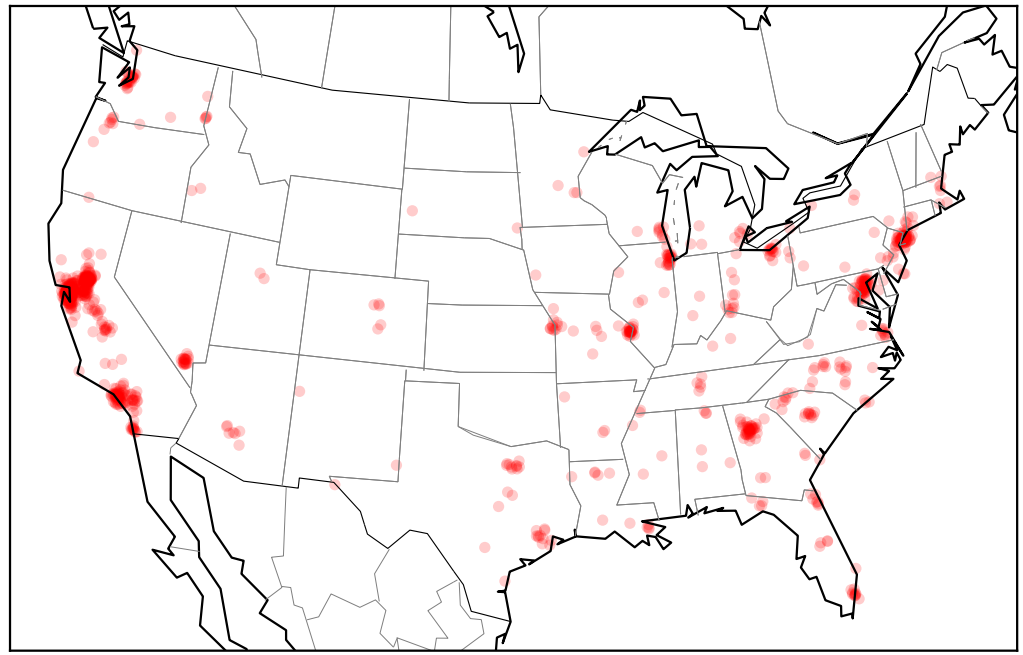
# Yall

- 2nd-person pronoun
- Southeast, African-American English
- Once per 250 messages



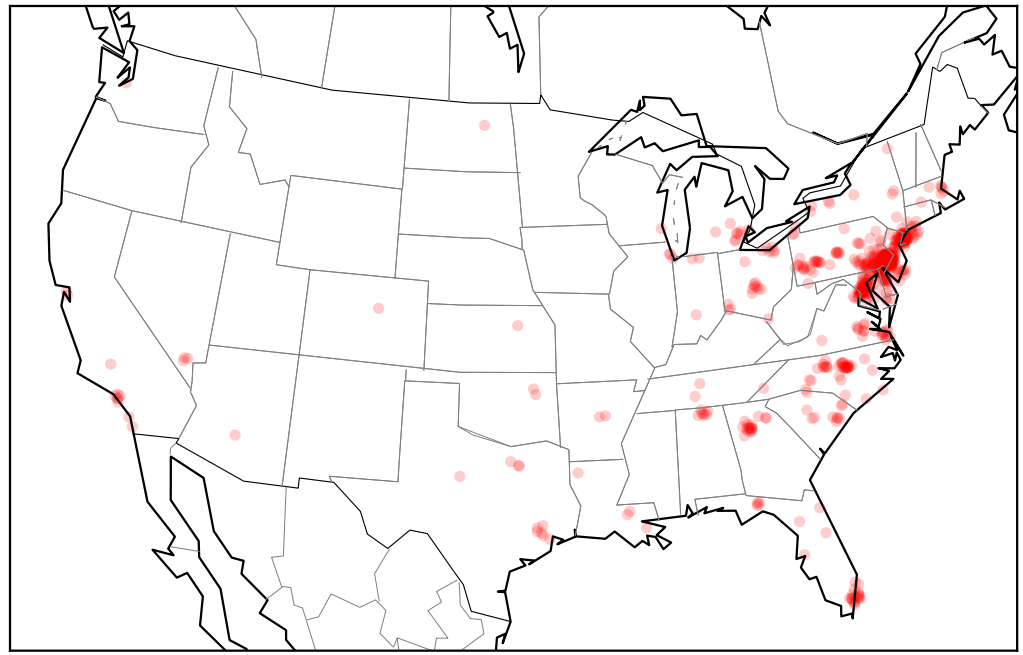
# Hella

- Intensifier, e.g.
  i got hella nervous
- Northern California[1]
- Once per 1000 messages



# Jawn

- Noun, diffuse semantics
- Philadelphia, hiphop[2]
- Once per 1000 messages



- @user ok u have heard this jawn right
- i did wear that jawn but it was kinda warm this week

# Summary of spoken dialect terms

| | rate | region |
|---|---|---|
| yinz | 200,000 | mainly used in Western PA |
| yall | 250 | ubiquitous |
| hella | 1000 | ubiquitous, but more frequent in Northern California |
| jawn | 1000 | mainly used in Philadelphia |

- Overall: mixed evidence for spoken language dialect variation in Twitter.
- But are these the right words?

# Questions for this talk

- **Are spoken dialect features transcribed in digitally-mediated writing?**
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# Measuring regional specificity

Per region $r$,

- **Difference** in frequencies, $f_{i,r} - f_i$

| word | $c_{SF}$ | $c_{USA}$ |
|---|---|---|
| . | 11914 | 907185 |
| hella | 398 | 3332 |
| ! | 3677 | 276604 |
| , | 4898 | 382834 |
| san | 172 | 1654 |
| ? | 2435 | 185482 |
| for | 2868 | 221142 |
| sf | 133 | 364 |
| on | 2523 | 194203 |
| the | 7901 | 630319 |

# Measuring regional specificity

Per region $r$,

- **Difference** in frequencies, $f_{i,r} - f_i$
- **Log-ratio** in frequencies, $\log f_{i,r} - \log f_i = \log \frac{f_{i,r}}{f_i}$

| word | $c_{SF}$ | $c_{USA}$ |
|---|---|---|
| #mattomil | 10 | 10 |
| #bart | 6 | 6 |
| #davidlyons | 5 | 5 |
| cost= | 5 | 5 |
| #io14 | 5 | 5 |
| #know14 | 4 | 4 |
| haight | 4 | 4 |
| #gdc2014 | 4 | 4 |
| #prejudices | 4 | 4 |
| muni | 16 | 17 |

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- **Log-ratio** in frequencies, $\log f_{i,r} - \log f_i = \log \frac{f_{i,r}}{f_i}$
- **Regularized** maximum-likelihood estimate

| word | $c_{SF}$ | $c_{USA}$ |
|---|---|---|
| bart | 52 | 98 |
| #sfgiants | 56 | 138 |
| francisco | 91 | 235 |
| sf | 133 | 364 |
| oakland | 51 | 219 |
| giants | 51 | 334 |
| warriors | 46 | 368 |
| bay | 95 | 788 |
| hella | 398 | 3332 |
| fasho | 38 | 344 |

$$\hat{\eta}_r = \arg\max_{\eta} \quad \log P(\text{counts} \mid \eta; f) - \lambda|\eta|$$

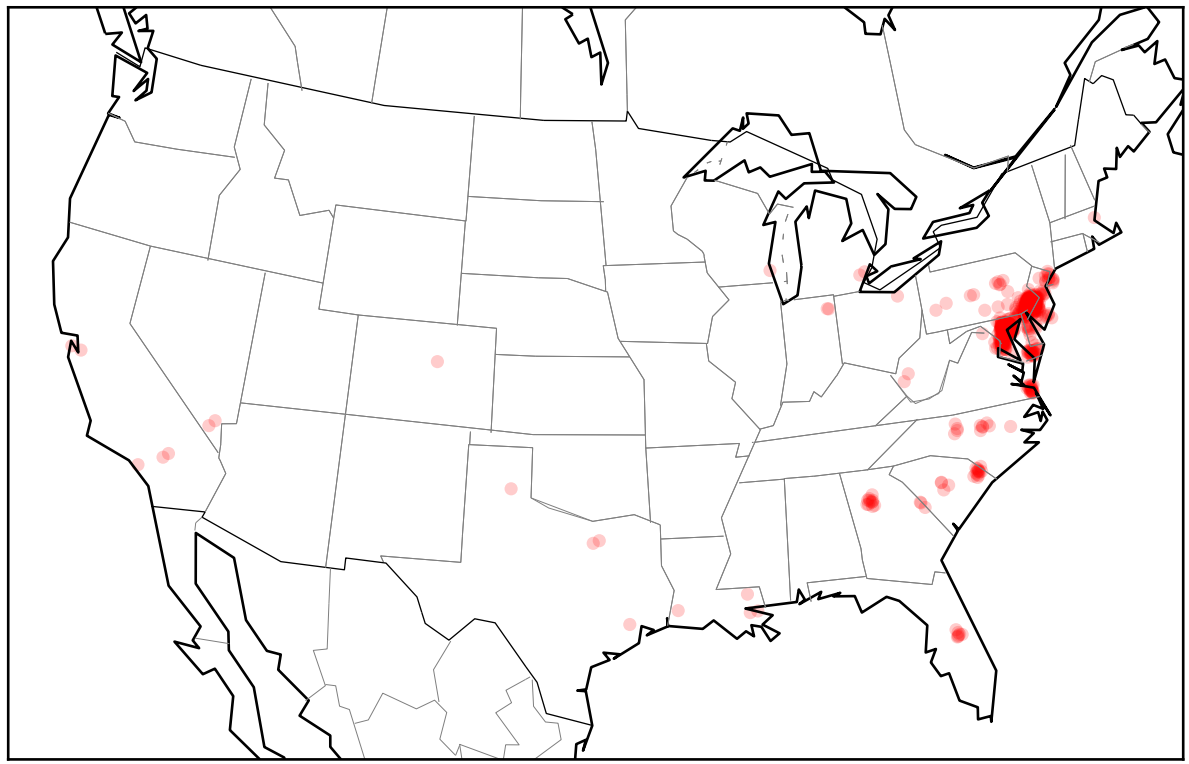
# Discovered words

- **New York**: flatbush, baii, brib, bx, staten, *mta*, odee, soho, deadass, werd
- **Los Angeles**: pasadena, venice, anaheim, *dodger*, disneyland, angeles, compton, *ucla*, *dodgers*, melrose
- **Chicago**: #chicago, lbvs, chicago, *blackhawks*, *#bears*, *#bulls*, mfs, *cubs*, burbs, bogus
- **Philadelphia**: jawn, ard, *#phillies*, *sixers*, *phils*, *wawa*, *philadelphia*, delaware, *philly*, *phillies*

place names *entities* words

# ard

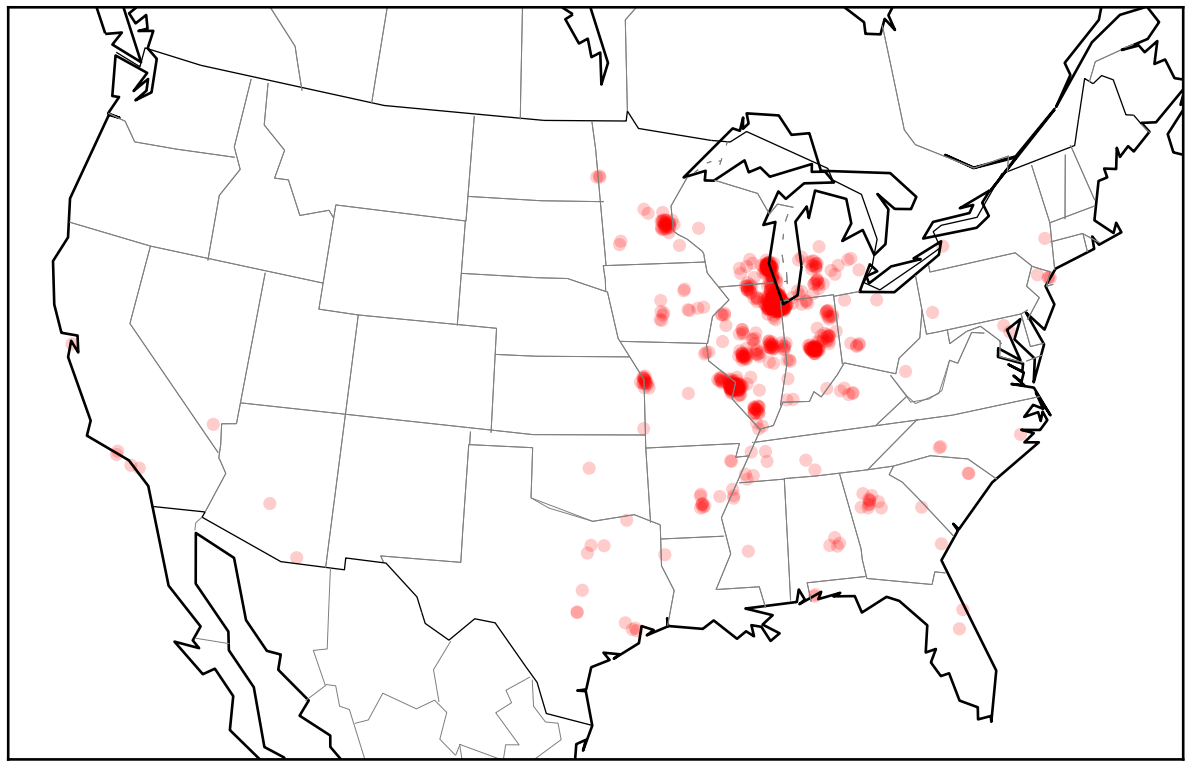
alternative spelling for alright



- @name ard let me kno
- lol u'll be ard

# lbvs

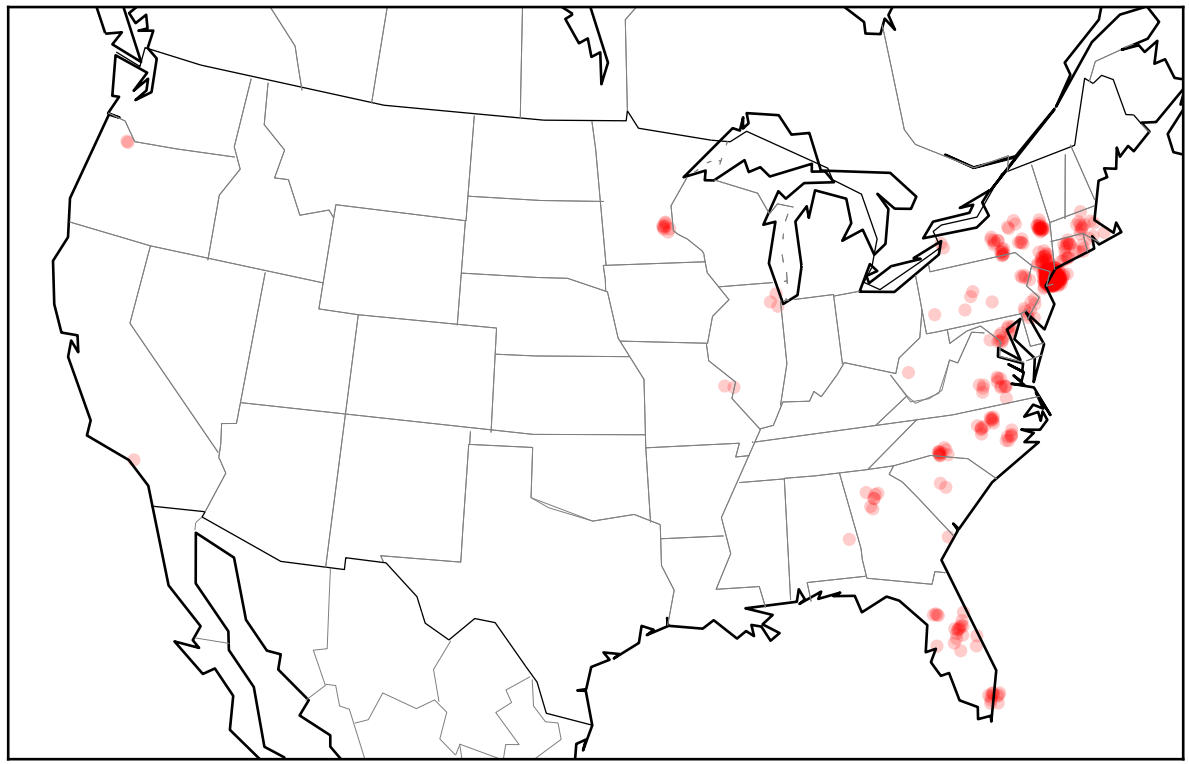
laughing but very serious



- i wanna rent a hotel room just to swim lbvs
- tell ur momma 2 buy me a car lbvs

# odee

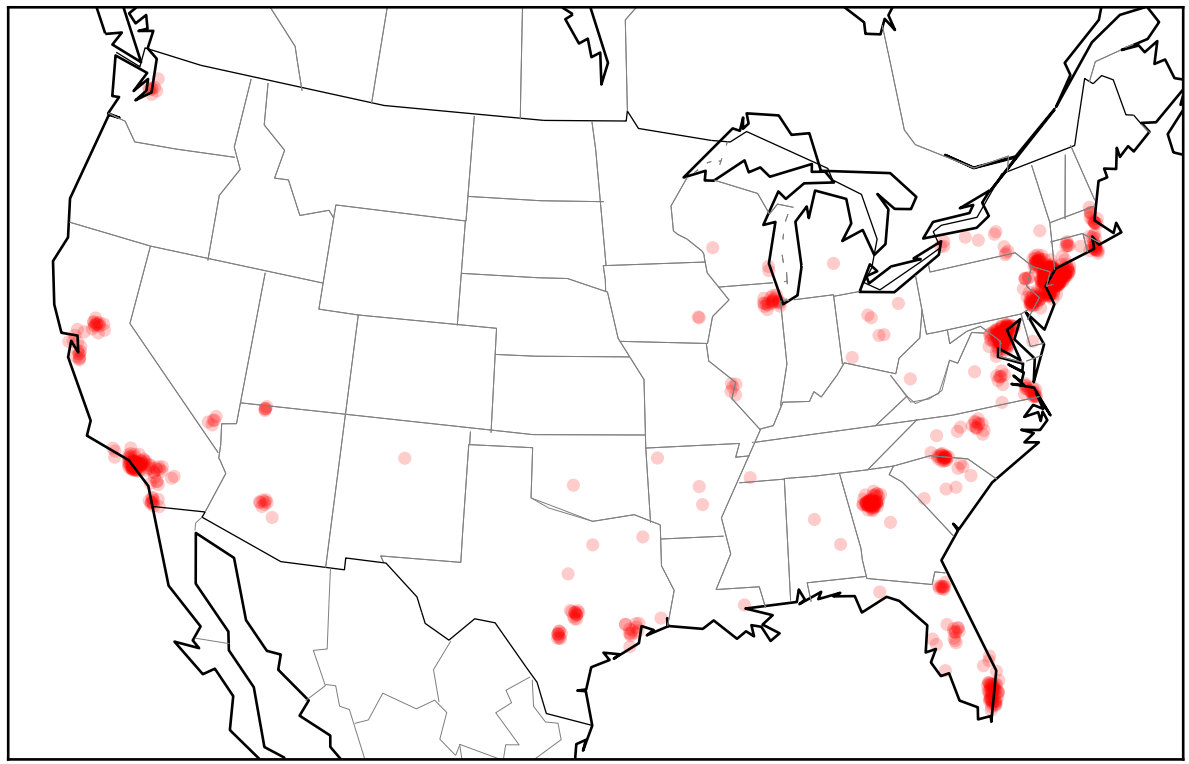
intensifier, related to overdose or overdone



- i'm odee sleepy
- she said she odee miss me
- its rainin odee :(

-_-_-

# emoticon indicating mild annoyance



- flight delayed -_- just what i need

# Variation in digital writing

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- novel orthographies

## Social variables

- geography

# Phonologically-motivated variables

-t,-d deletion jus, ol

th-stopping dis, doe

r-lessness togetha, neva, lawd, yaself, shawty

vowels tha (the), mayne (man), bruh, brah (bro)

relaxed pronunciations prolly, aight

"allegro spellings"[5] gonna, finna, fitna, bouta, tryna, iono

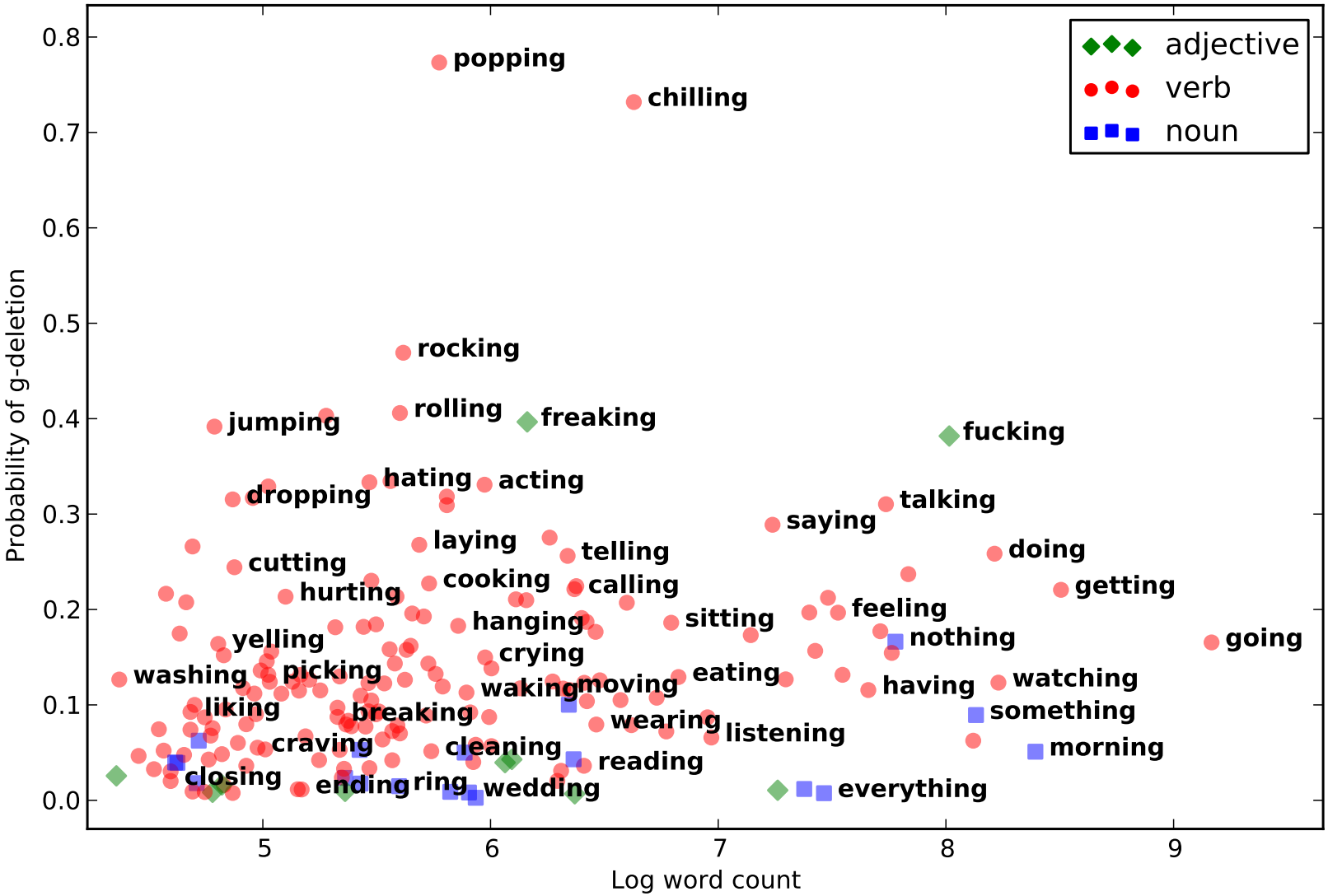
# G-deletion


- In speech, "g" is deleted more often from verbs. **Does this syntactic conditioning transfer to writing?**

# G-deletion


- In speech, "g" is deleted more often from verbs. **Does this syntactic conditioning transfer to writing?**
- Corpus: 120K tokens of top 200 unambiguous -ing words (ex. king, thing, sing)
- Part-of-speech tags from CMU Twitter tagger.[6]

# G-deletion: type-level analysis




(Colored by most common POS tag)

# G-deletion: logistic regression

| | Log odds | % | N |
|---|---|---|---|
| Verb | .227 | .200 | 89,173 |
| Noun | -.013 | .083 | 18,756 |
| Adjective | -.213 | .149 | 4,964 |
| monosyllable | -2.57 | .001 | 108,804 |
| **Total** | | .178 | 112,893 |

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| High Euro-Am county | -.194 | .117 | 28,017 |
| High Afro-Am county | .145 | .241 | 27,022 |
| High pop density county | .055 | .228 | 27,773 |
| Low pop density county | -.017 | .144 | 28,228 |
| **Total** | | .178 | 112,893 |

# Variation in digital writing

## Linguistic variables

- lexical items from speech
- novel orthographies

## Social variables

- geography

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## Linguistic variables

- lexical items from speech
- novel orthographies
- phonetically-motivated spellings

## Social variables

- geography
- demographics

# Two broad categories of variables

1. Imported from speech
   - Lexical variables (jawn, hella)
   - Phonologically-inspired variation (-g and -t,-d deletion)
   - These variables bring traces of their social and linguistic properties from speech.

2. Endogenous to digital writing
   - Abbreviations (ard, lbvs, odee, ctfu, asl, ...)
   - Emoticons (-__-)
   - Why should these vary with geography?

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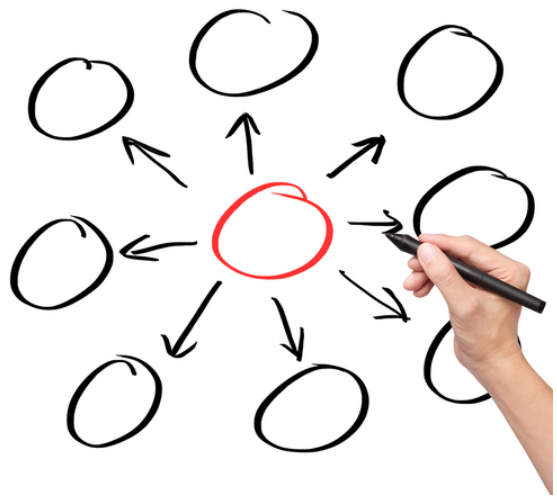
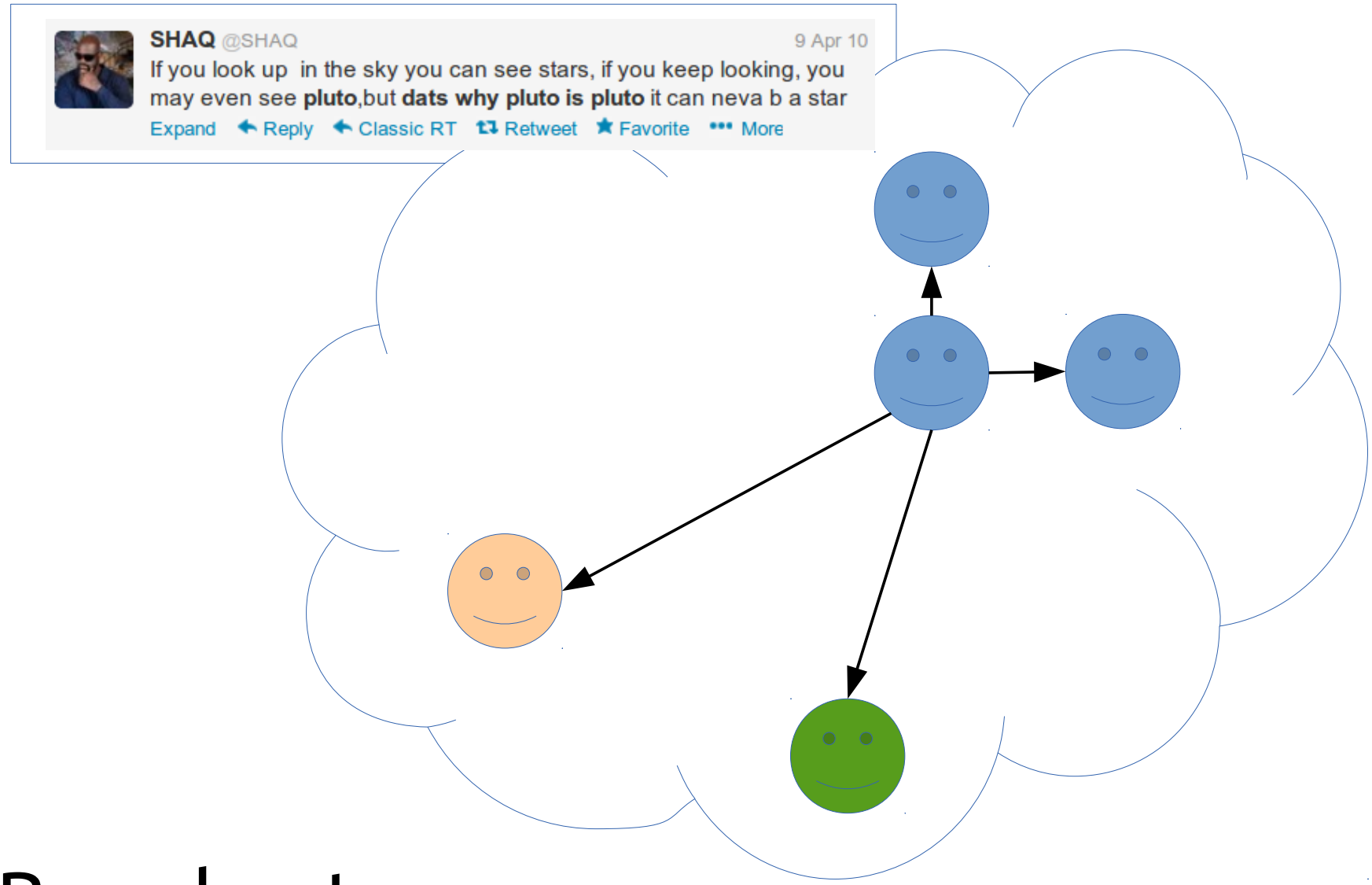
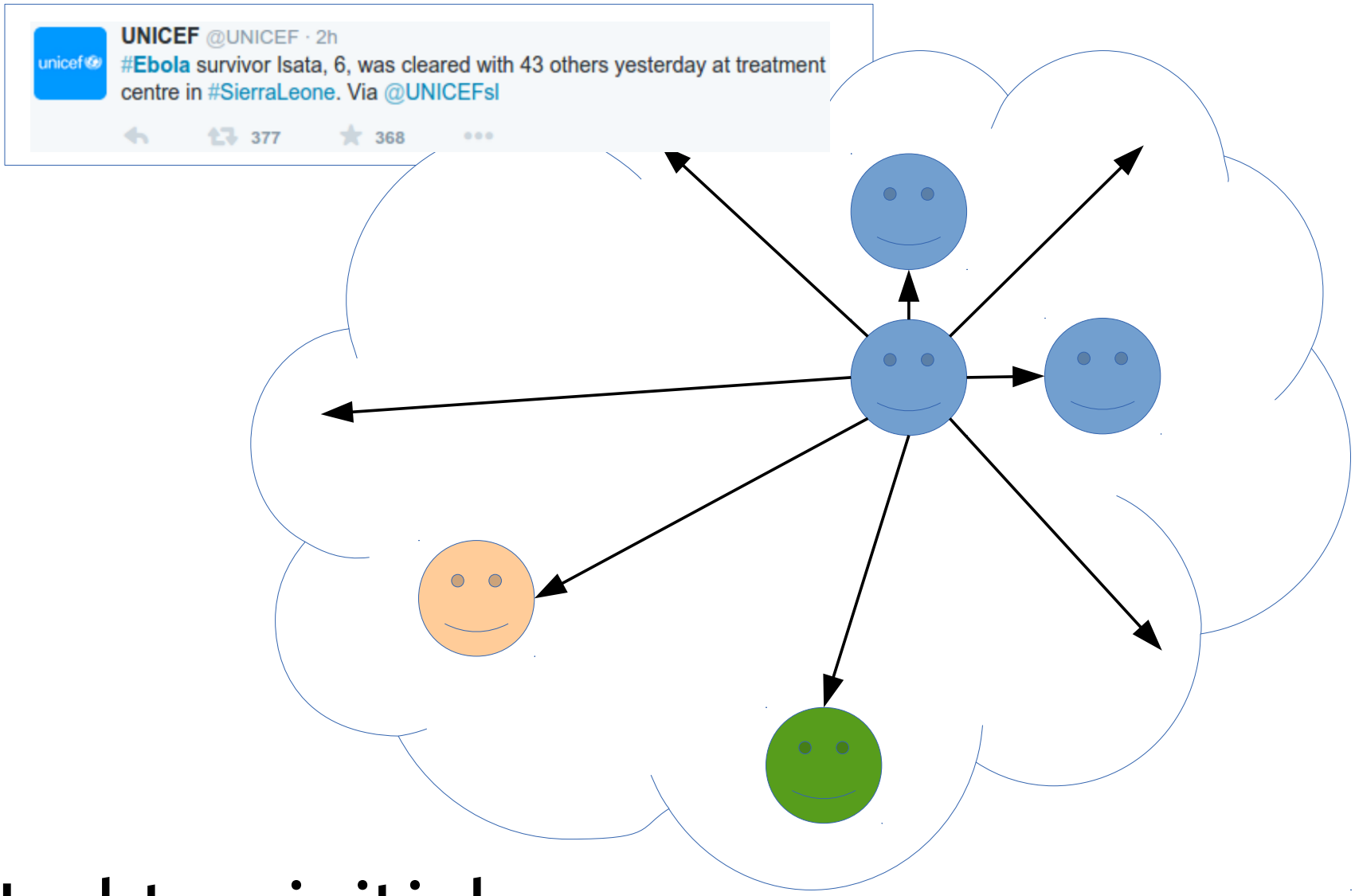
# Language variation in a social network

- Linguistic innovations diffuse to new authors through social networks.
- In Twitter, 97% of strong ties are geographically local.
- Does this explain geographical variation in netspeak?

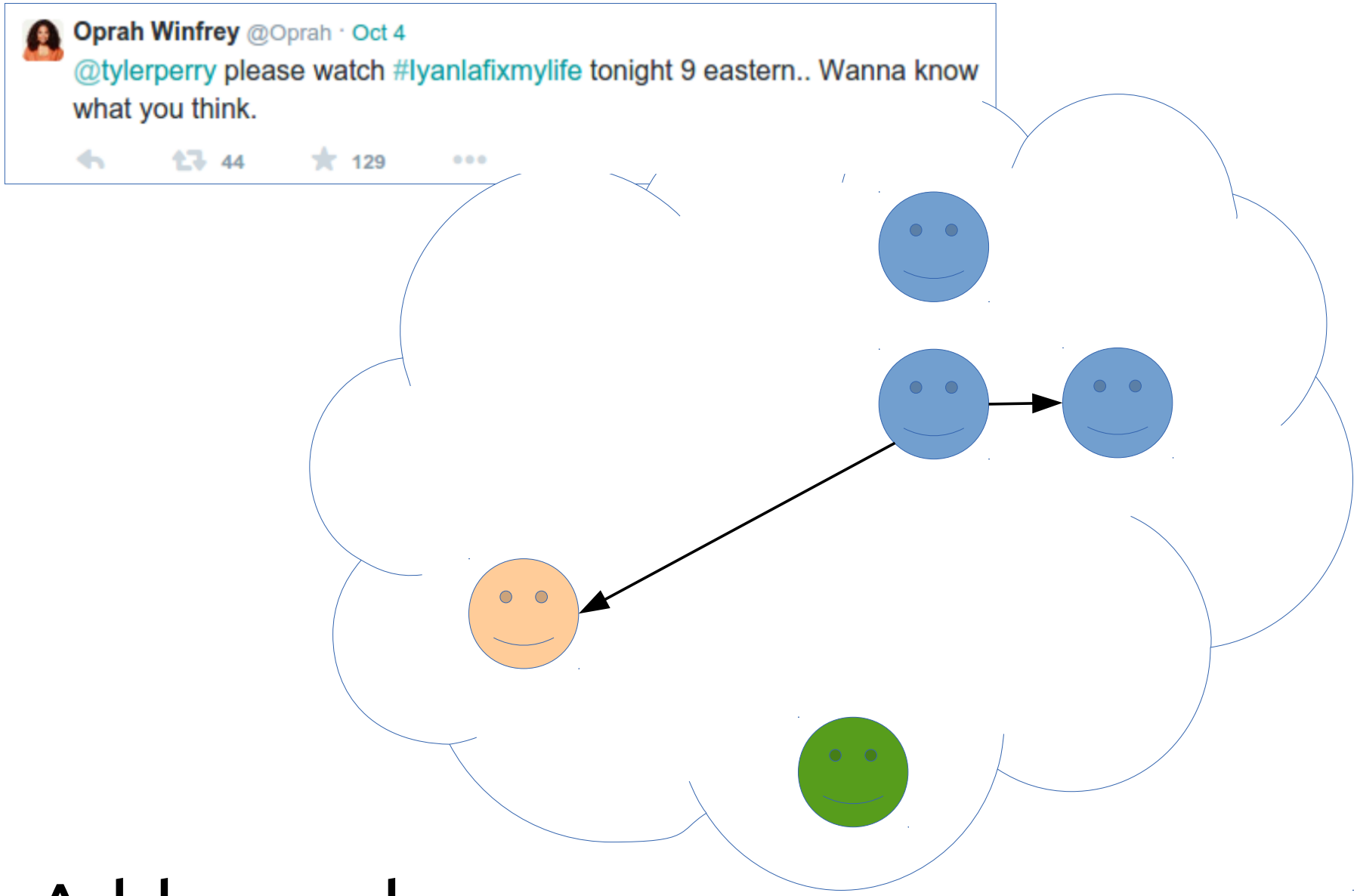



SHAQ @SHAQ
9 Apr 10
If you look up in the sky you can see stars, if you keep looking, you may even see pluto,but dats why pluto is pluto it can neva b a star
Expand
Reply
Classic RT
Retweet
Favorite
More

# Broadcast

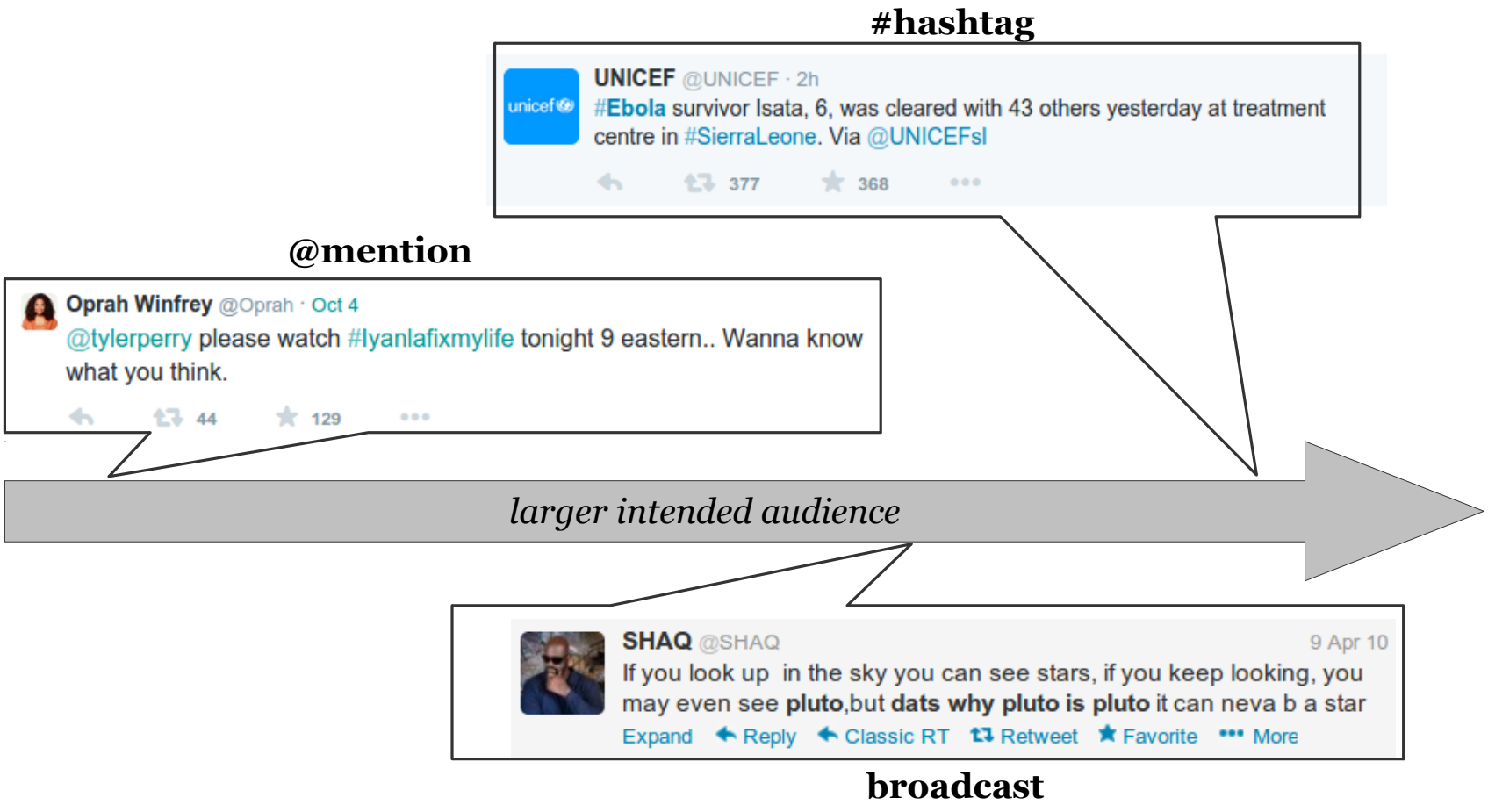



# Hashtag-initial


Oprah Winfrey @Oprah · Oct 4
@tylerperry please watch #Iyanlafixmylife tonight 9 eastern.. Wanna know what you think.
44
129

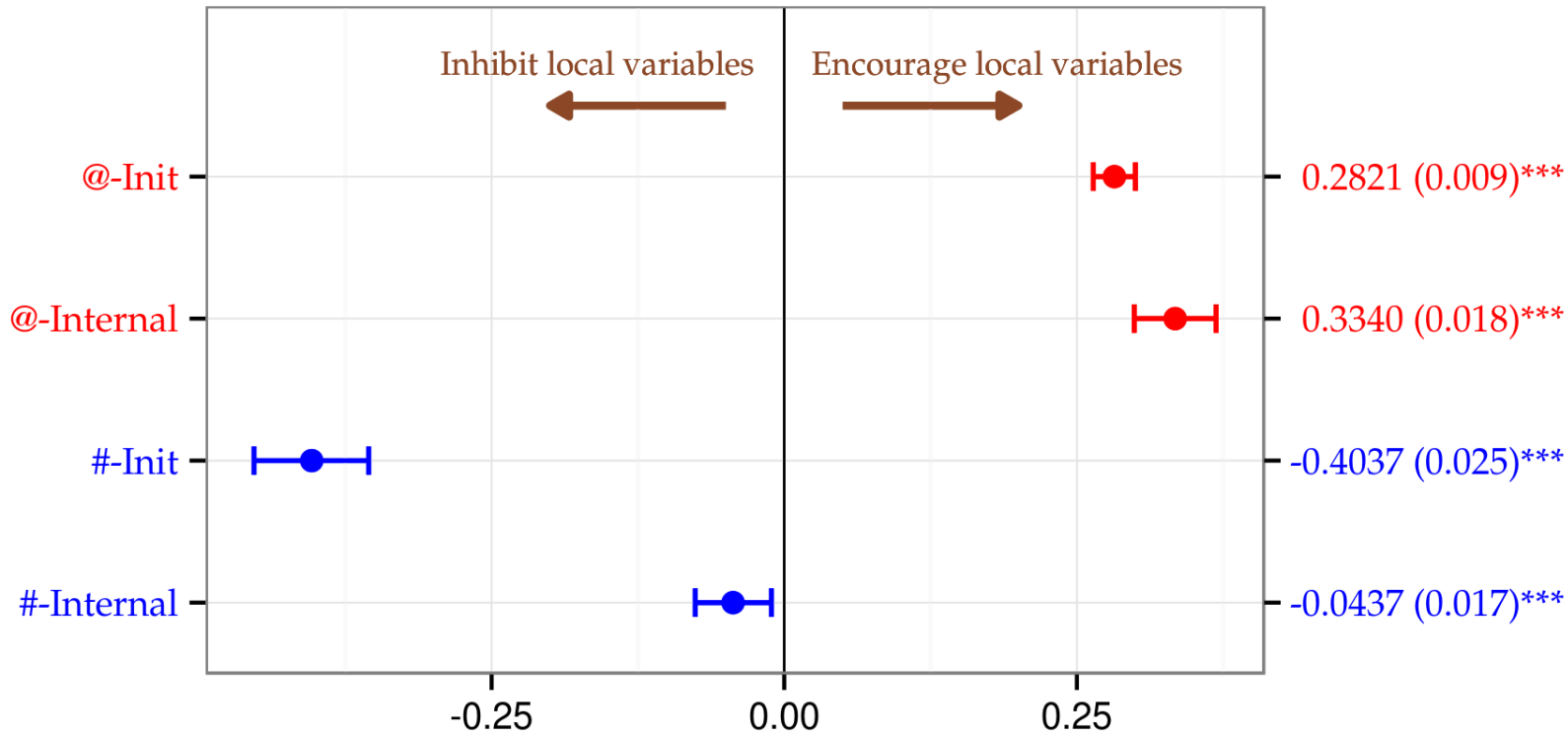
# Addressed

# Audience size



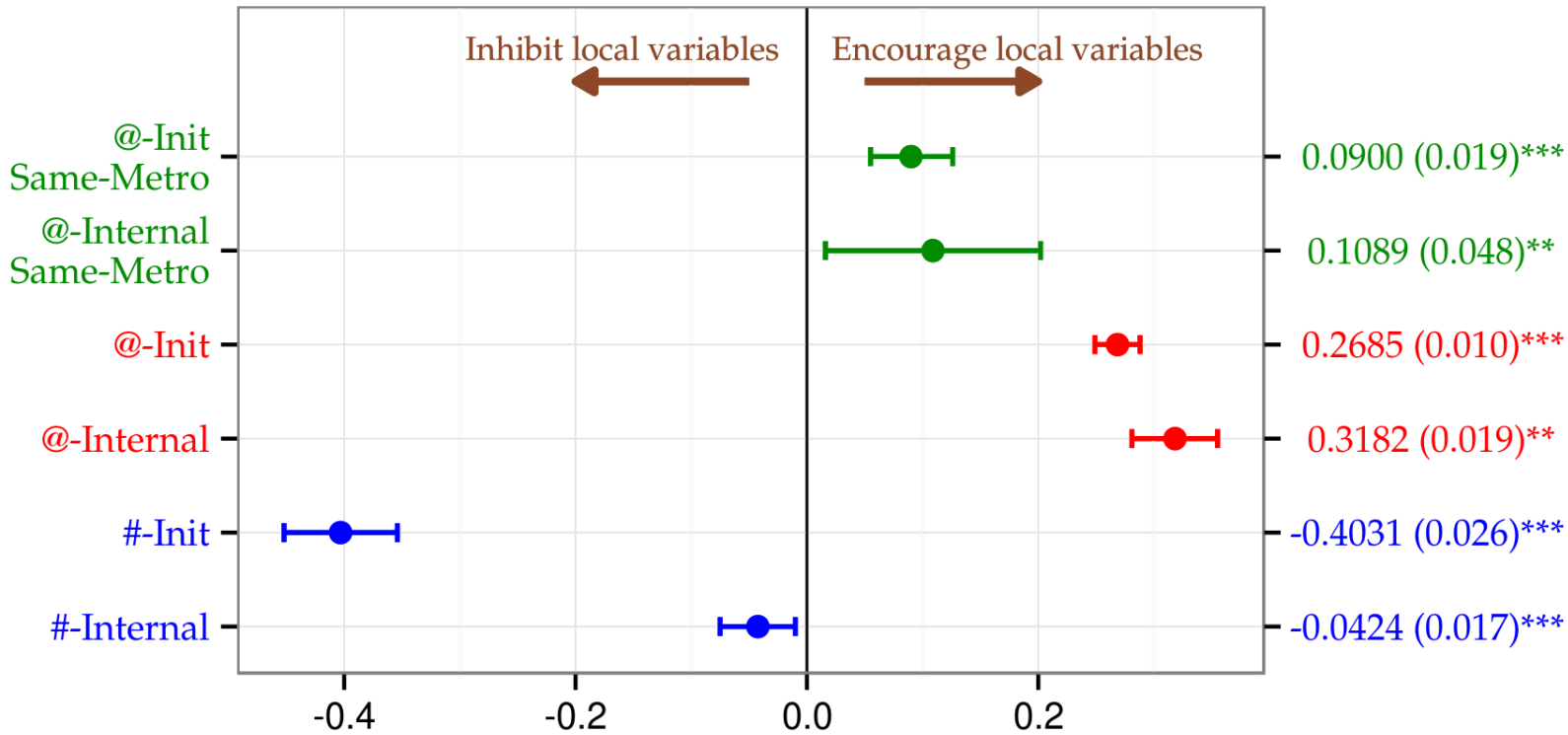
# Small audience → more local language

Logistic regression from context to local netspeak:



# Local audience → more local language

Logistic regression from context to local netspeak:




Do people know that these words are local, and deliberately use them with local audiences?

# Local audience $\rightarrow$ netspeak language?

Logistic regression from context to **non-local** netspeak:
e.g., lol, im, lmao, ya, haha ...

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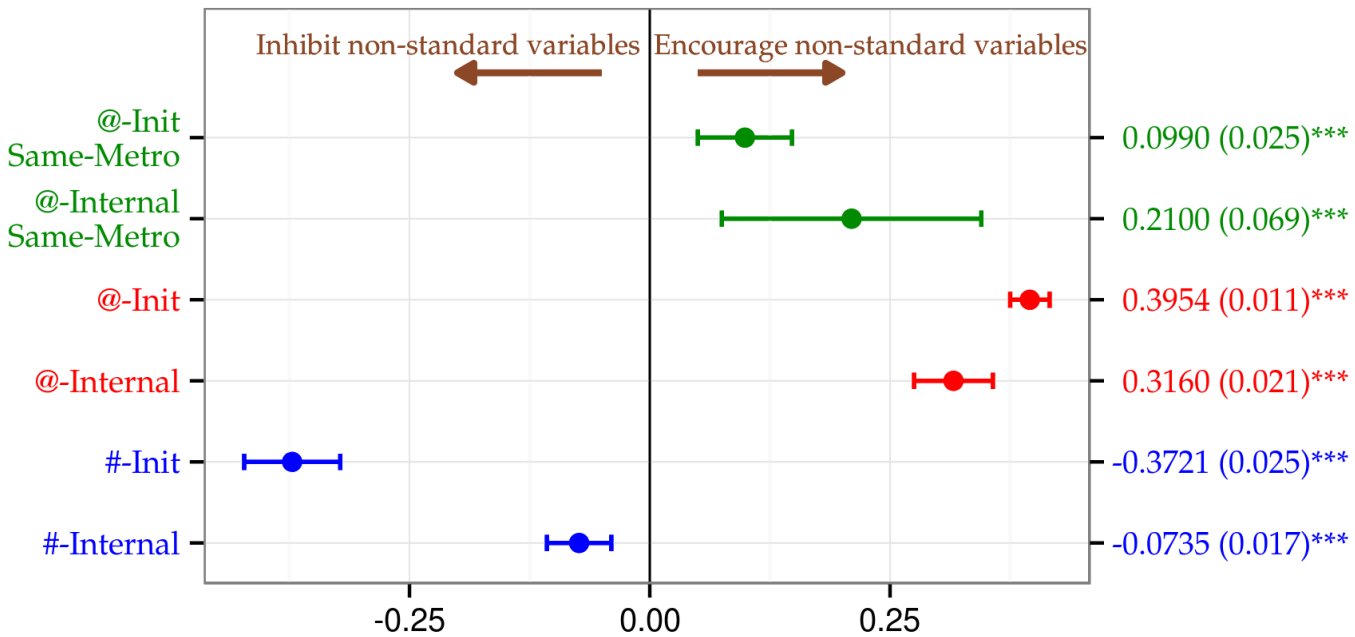

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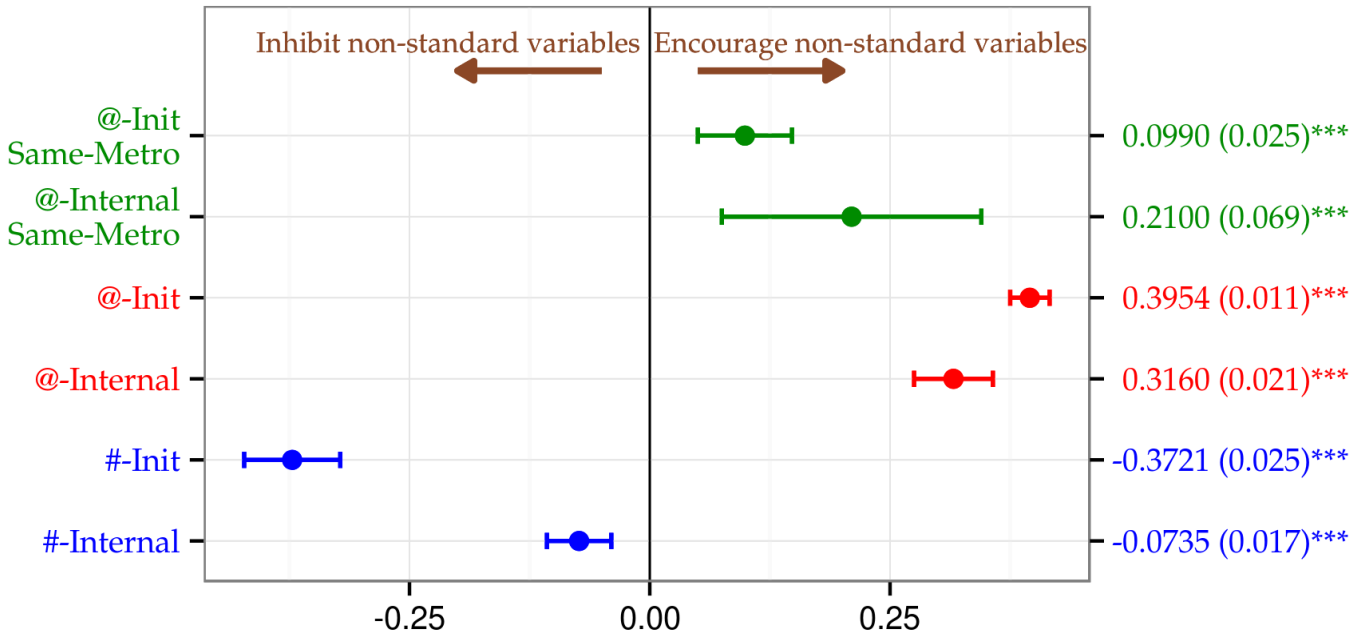


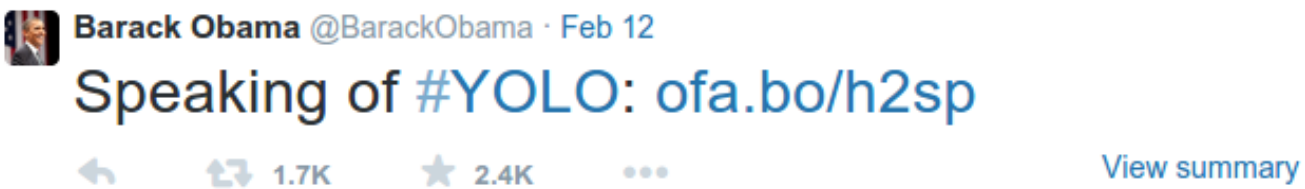

Non-standard words are used more often with local audiences, even when the word itself is not local.

# Questions for this talk

- Are spoken dialect features transcribed in digitally-mediated writing?
- How can we use large digital corpora to automatically induce dialect difference?
- **Why would "netspeak" features vary with geography?**

# Summary

- Just as in speech, variation in digital writing is driven by a complex interplay of linguistic and social (and technological!) factors.
- The relaxed enforcement of standard language in digital media is transforming the social and communicative role of writing.



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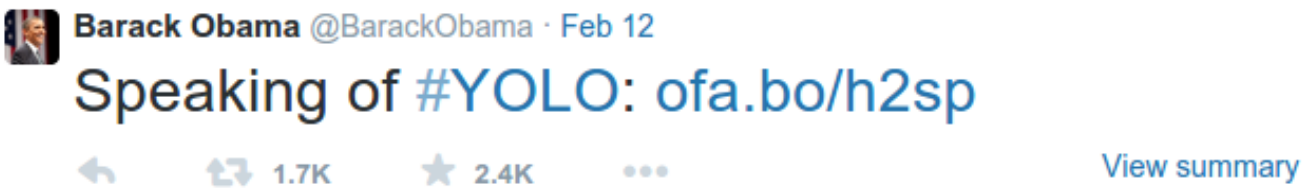


**Thanks** to my collaborators David Bamman, Umashanthi Pavalanathan, Tyler Schnoebelen, and to support from the National Science Foundation.

# References I


[1] Mary Bucholtz, Nancy Bermudez, Victor Fung, Lisa Edwards, and Rosalva Vargas. Hella nor cal or totally so cal? the perceptual dialectology of california. *Journal of English Linguistics*, 35(4):325–352, 2007.

[2] H. Samy Alim. Hip hop nation language. In Alessandro Duranti, editor, *Linguistic Anthropology: A Reader*, pages 272–289. Wiley-Blackwell, Malden, MA, 2009.

[3] Jacob Eisenstein, Amr Ahmed, and Eric P. Xing. Sparse additive generative models of text. In *Proceedings of the International Conference on Machine Learning (ICML)*, pages 1041–1048, Seattle, WA, 2011.

[4] Jacob Eisenstein. Written dialect variation in online social media. In Charles Boberg, John Nerbonne, and Dom Watt, editors, *Handbook of Dialectology*. Wiley, 2015.

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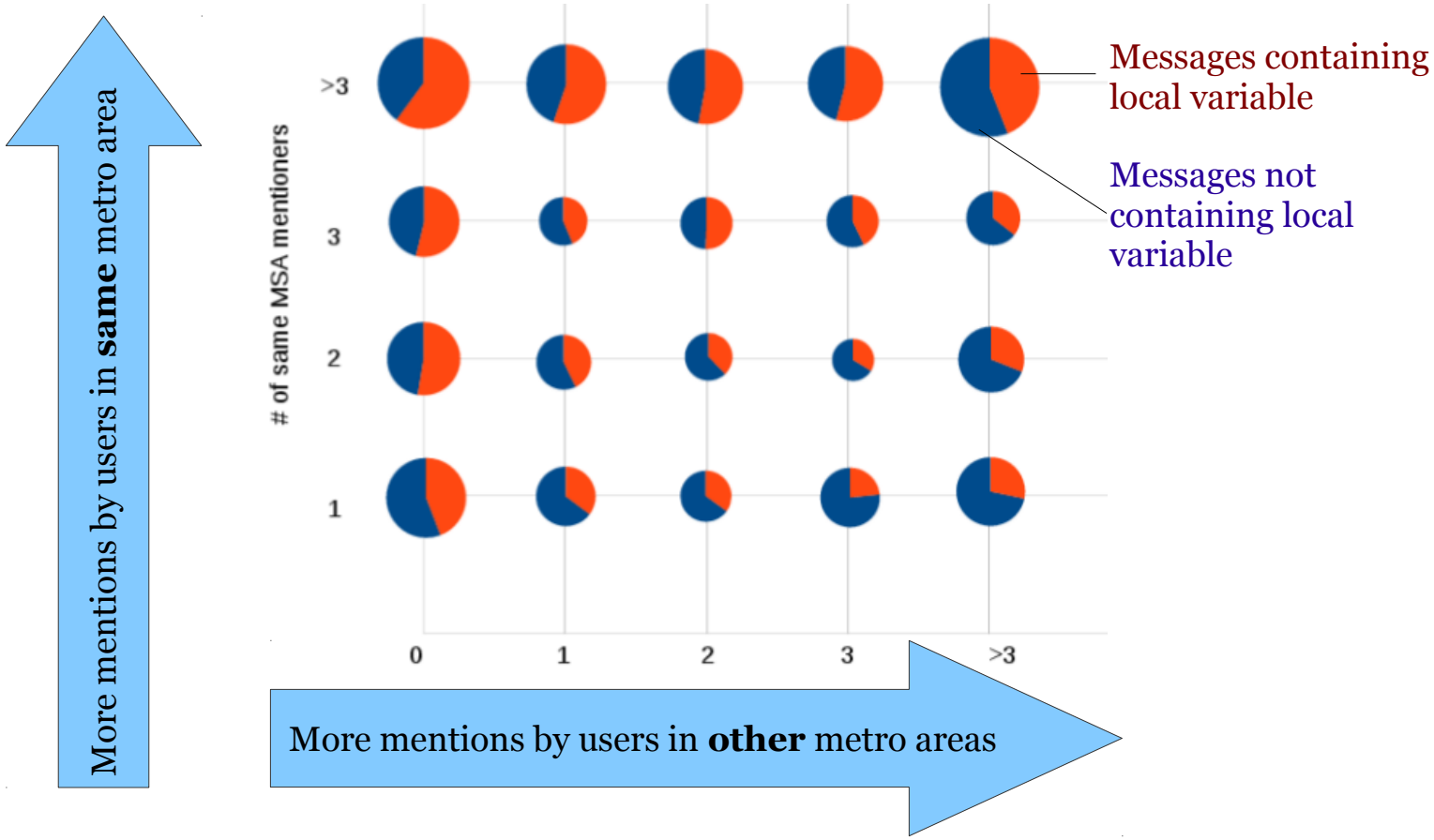
# References II


[6] Kevin Gimpel, Nathan Schneider, Brendan O'Connor, Dipanjan Das, Daniel Mills, Jacob Eisenstein, Michael Heilman, Dani Yogatama, Jeffrey Flanigan, and Noah A. Smith. Part-of-speech tagging for Twitter: annotation, features, and experiments. In *Proceedings of the Association for Computational Linguistics (ACL)*, pages 42–47, Portland, OR, 2011.

[7] Jacob Eisenstein. Systematic patterning in phonologically-motivated orthographic variation. *Journal of Sociolinguistics*, in press, 2015.

[8] Umashanthi Pavalanathan and Jacob Eisenstein. Audience-modulated variation in online social media. *American Speech*, (in press), 2015.

# Local audience → more local language




Do people know that these words are local, and deliberately use them with local audiences?

# Methodological pros and cons

- Orders of magnitude more data
  (enabling the study of rare linguistic phenomena
  and the **induction** of unknown variables)
- Biased, non-representative population sample
- Informal communication, outside the interview setting
- Metadata on location, time, and social networks