Language synchronization in social interaction

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Modeling⬅➔Adaptation

"UMAP [deals with] *systems that adapt to their individual users*, or to groups of users, *and collect and represent information about users for this purpose*."

This talk: *Language adaptation* can be used for *user modeling* (to help systems adapt).

A new frontier: Conversational synchrony

People tend to adopt the behaviors of the people they are conversing with. [Giles et al., 1991, Chartrand and Bargh,1999]

Non-verbal	posture [Condon and Ogston, 1967] nodding [Hale and Burgoon, 1984]
"Non-semantic"	pause length [Jaffe and Feldstein, 1970] backchannels [White, 1984]
Language content	word choice [Brennan and Clark, 1996] degree of self-disclosure [Derlenga et al., 1973] word classes [Niederhoffer and Pennebaker, 2002]

A new frontier: Conversational synchrony

People tend to adopt the behaviors of the people they are conversing with. [Giles et al., 1991, Chartrand and Bargh,1999]

What can conversational synchrony tell us about user relationships?

Preview of Part I*: Pairwise adaptation and power

Who's in charge?

http://www.tvacres.com/images/robots_androids_marvin_movie.jpg
Art Lien / AFP/Getty Images

*: Roman numerals: adaptation to venue ☺

Preview of Part II: Adaptation to a group and long-term engagement

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Aside: on presentation style

Your goal is not to convince your audience that you are brilliant, but that your solution is trivial.

It takes a certain strength of character to take that as one's goal.

But if people think your findings are obvious, they must also believe that you are correct.

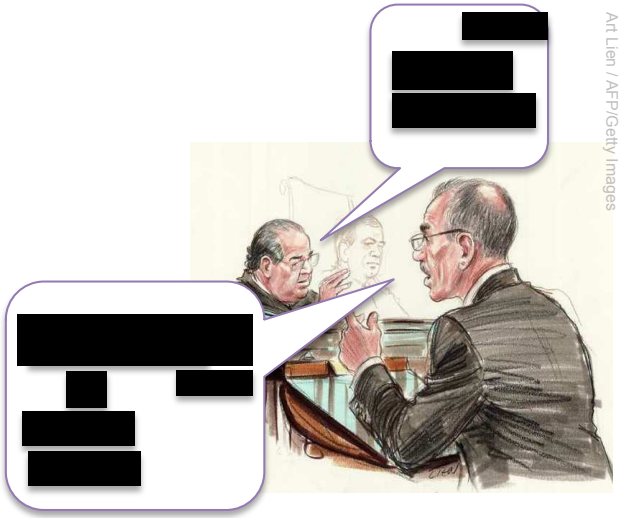
-- paraphrase of Stuart Shieber

Echoes of Power:

Language effects & power differences in social interaction

Cristian Danescu-Niculescu-Mizil, Lillian Lee, Bo Pang, & Jon Kleinberg

WWW 2012



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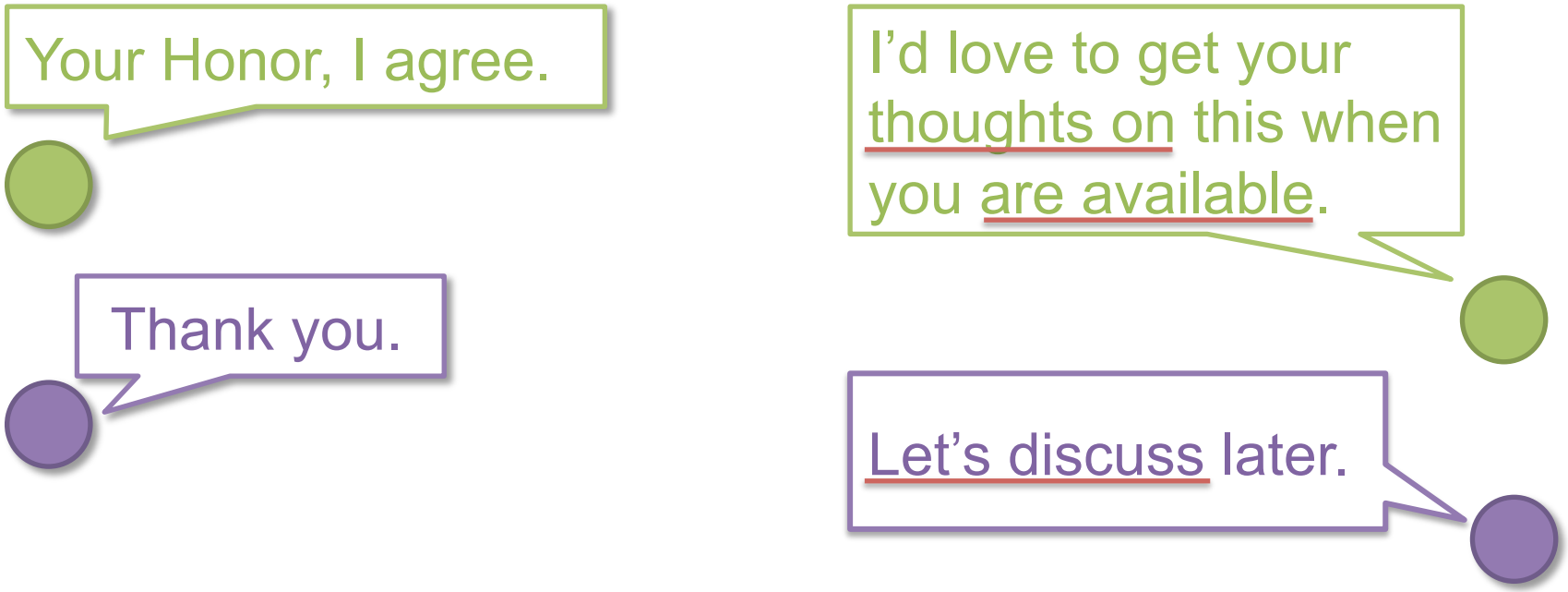
Language reveals power: “easy” cases



[Gilbert 2012;
Diehl et al. 2007, Prabhakaran et al. 2012,
Scholand et al. 2010]

What about general (domain-independent) signals?

Who has the (conversational) lead?

Communicative behaviors are "patterned and coordinated, like a dance" [Niederhoffer and Pennebaker 2002]

Look for asymmetric adaptation of linguistic *style*

Defining linguistic style coordination

Direct repetition: under speaker's control, could just be choice of topic. ☹

Function-class matching: unconscious & frequent
[Niederhoffer and Pennebaker 2002]

At least you were outside

quantifiers

It doesn't make much difference…

~~Doesn't really matter …~~

~~It's not important …~~

Measuring immediate influence

How much does speaker x_1 immediately trigger x_2's use of function-word class c?

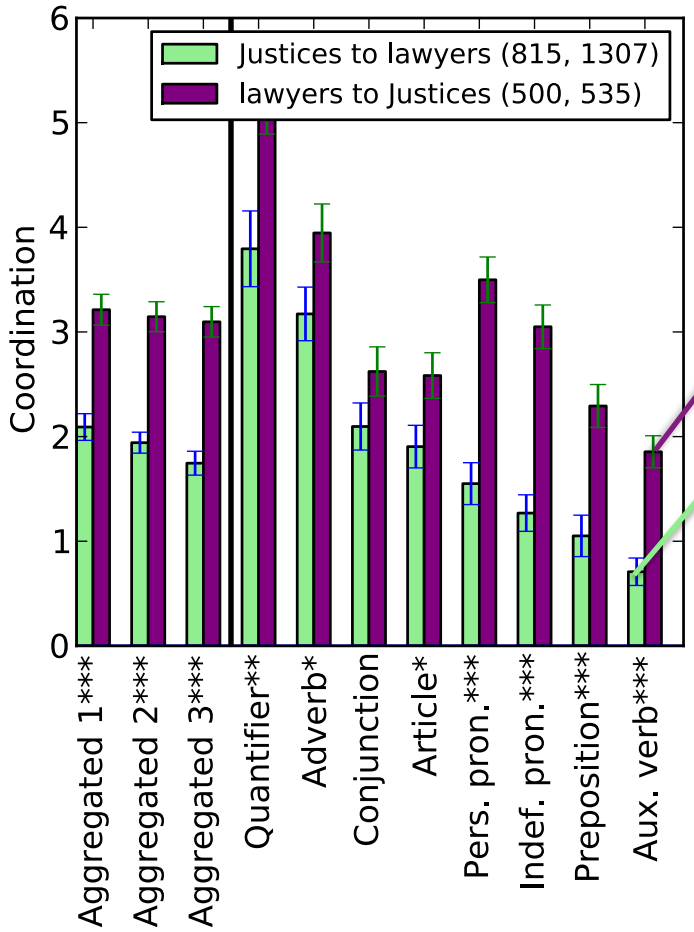
= how much does x_2 *coordinate* to x_1 on c?

[Danescu-Niculescu-Mizil, Dumais, Gamon 2011]

Pr (x_2 uses c | x_1 uses c, x_2 immediately replies)

– Pr (x_2 uses c | x_2 immediately replies to x_1)

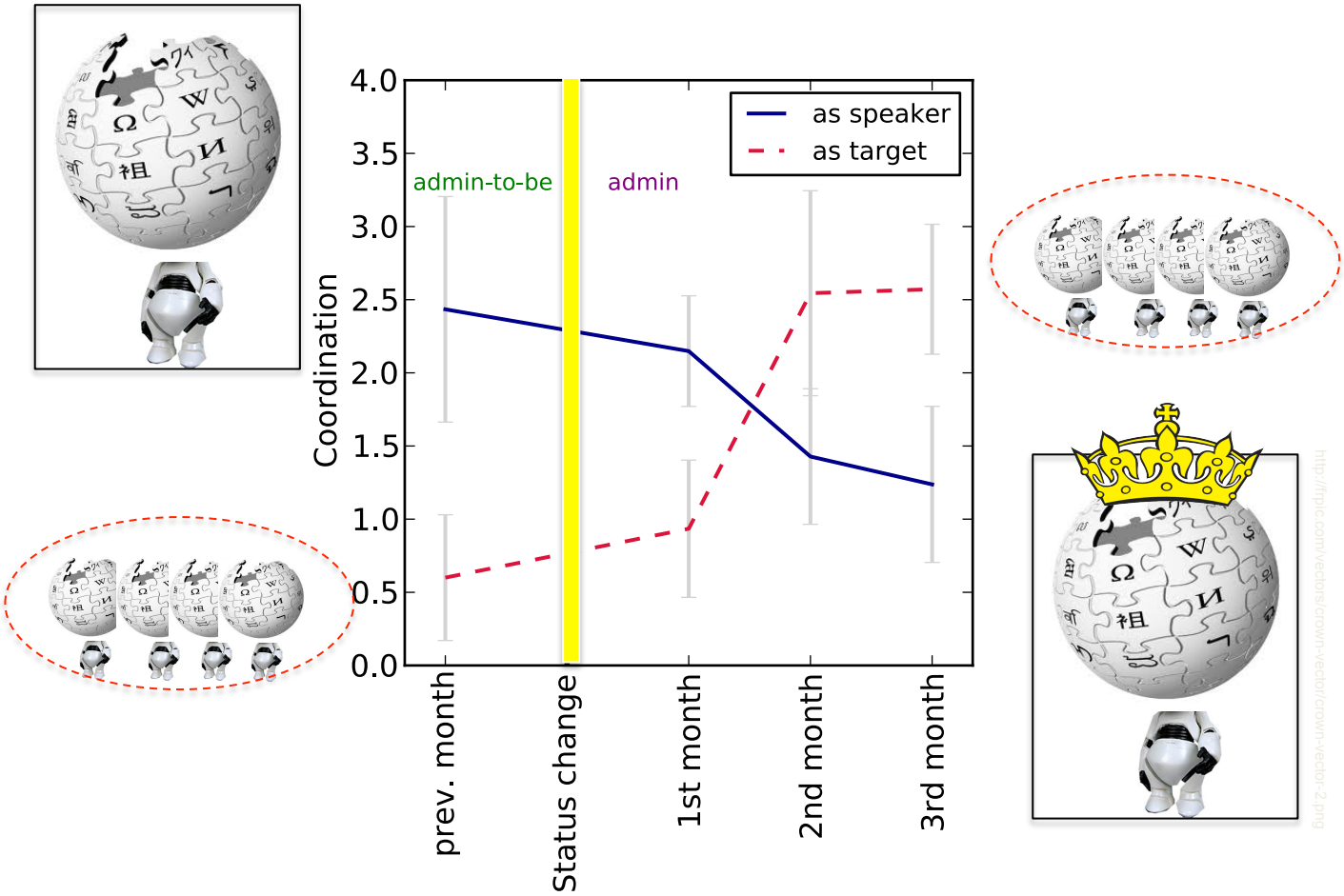
Status in US Supreme Court transcripts



low status to high status

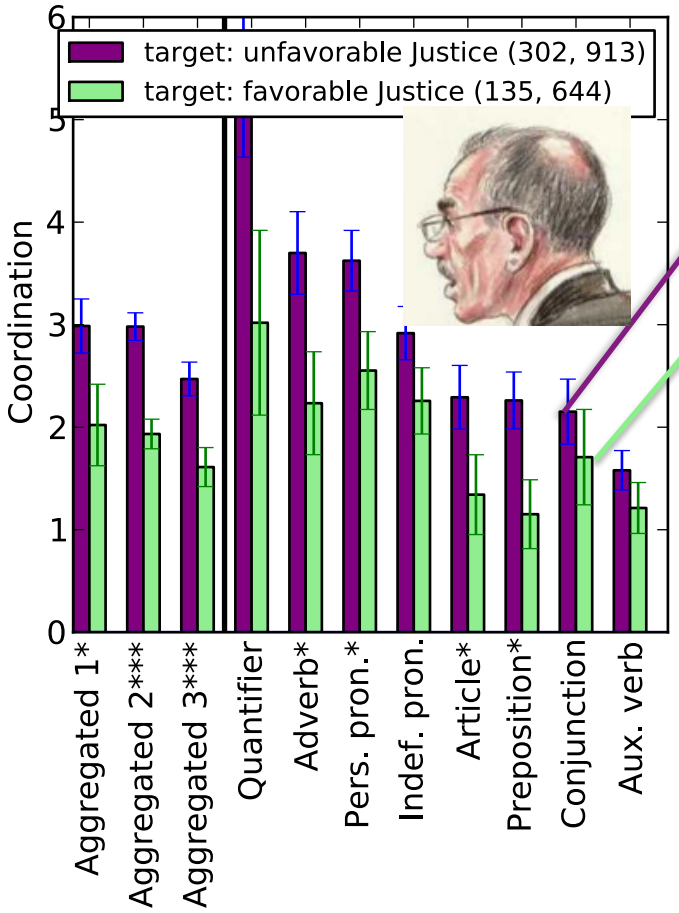
high status to low status

Status change in Wikipedia



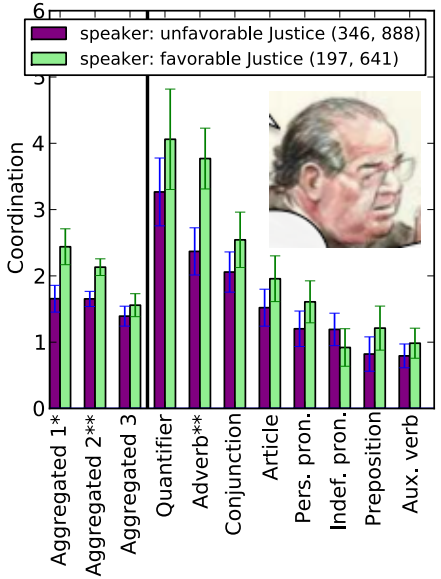
Dependence in Supreme Court transcripts

[Emerson 1962]

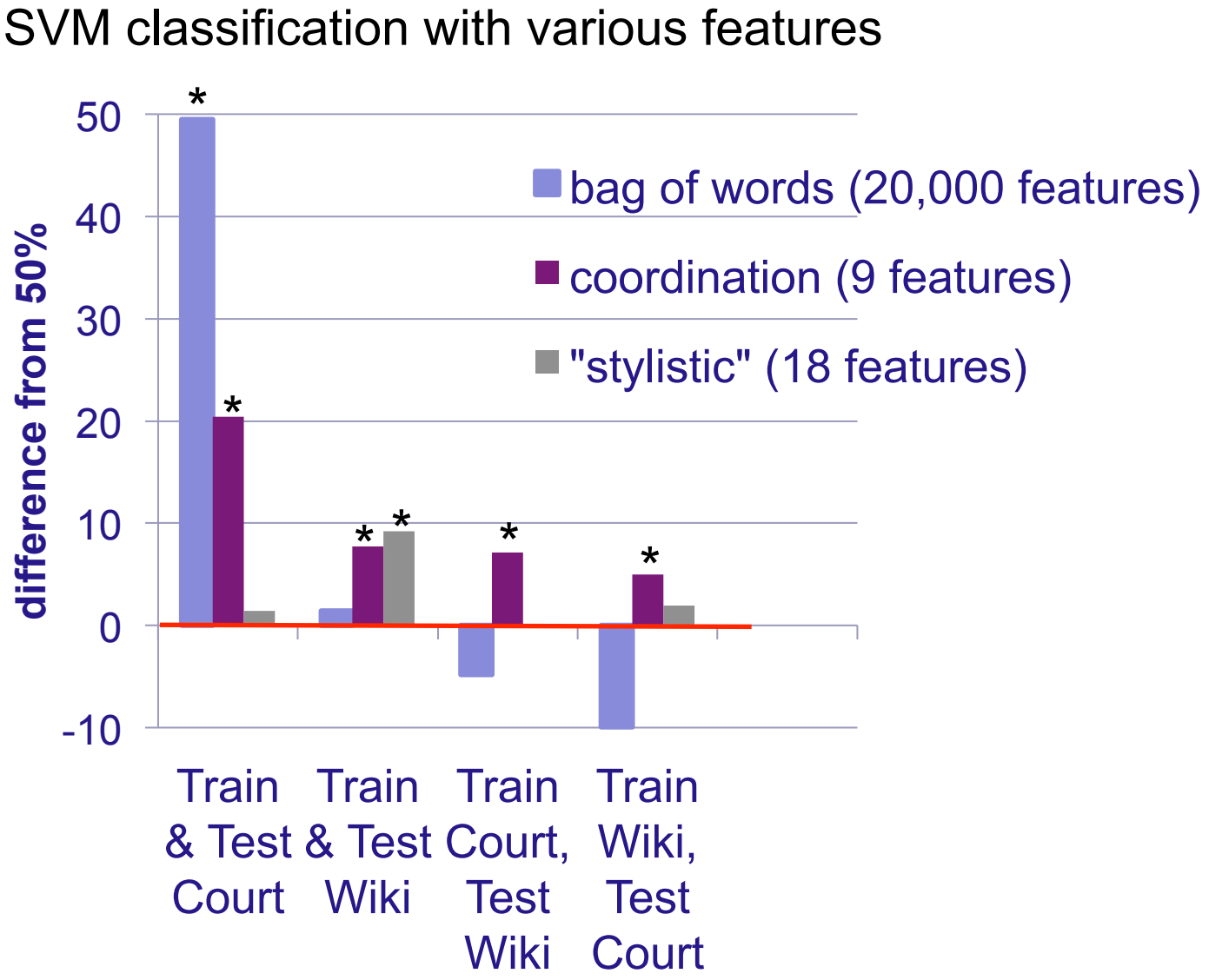


"needed to change" J's mind

J "had your opinion"



Evidence of domain independence



No country for old members:

User lifecycle & linguistic change in online communities

C. Danescu-Niculescu-Mizil, R. West, D. Jurafsky, J. Leskovec, & C. Potts

Best paper award, WWW 2013

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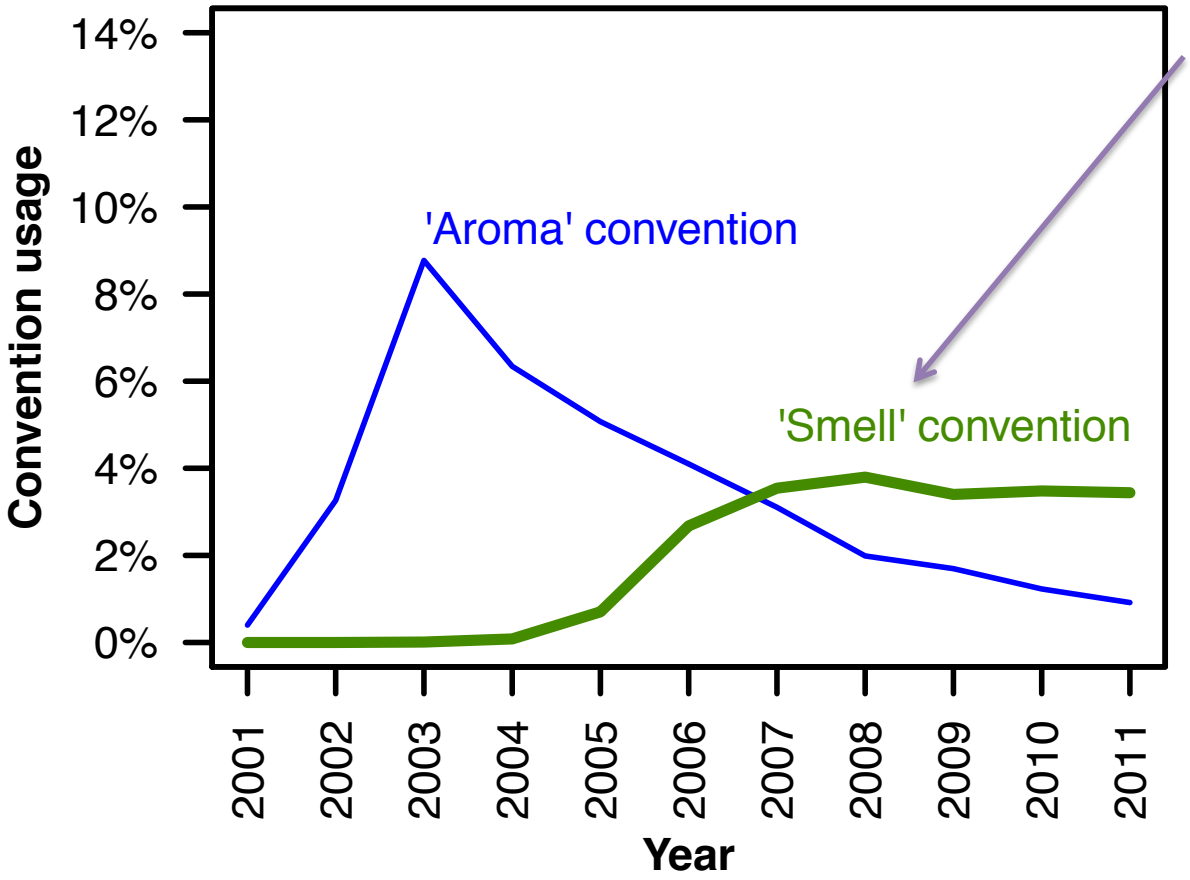
Group linguistic innovation

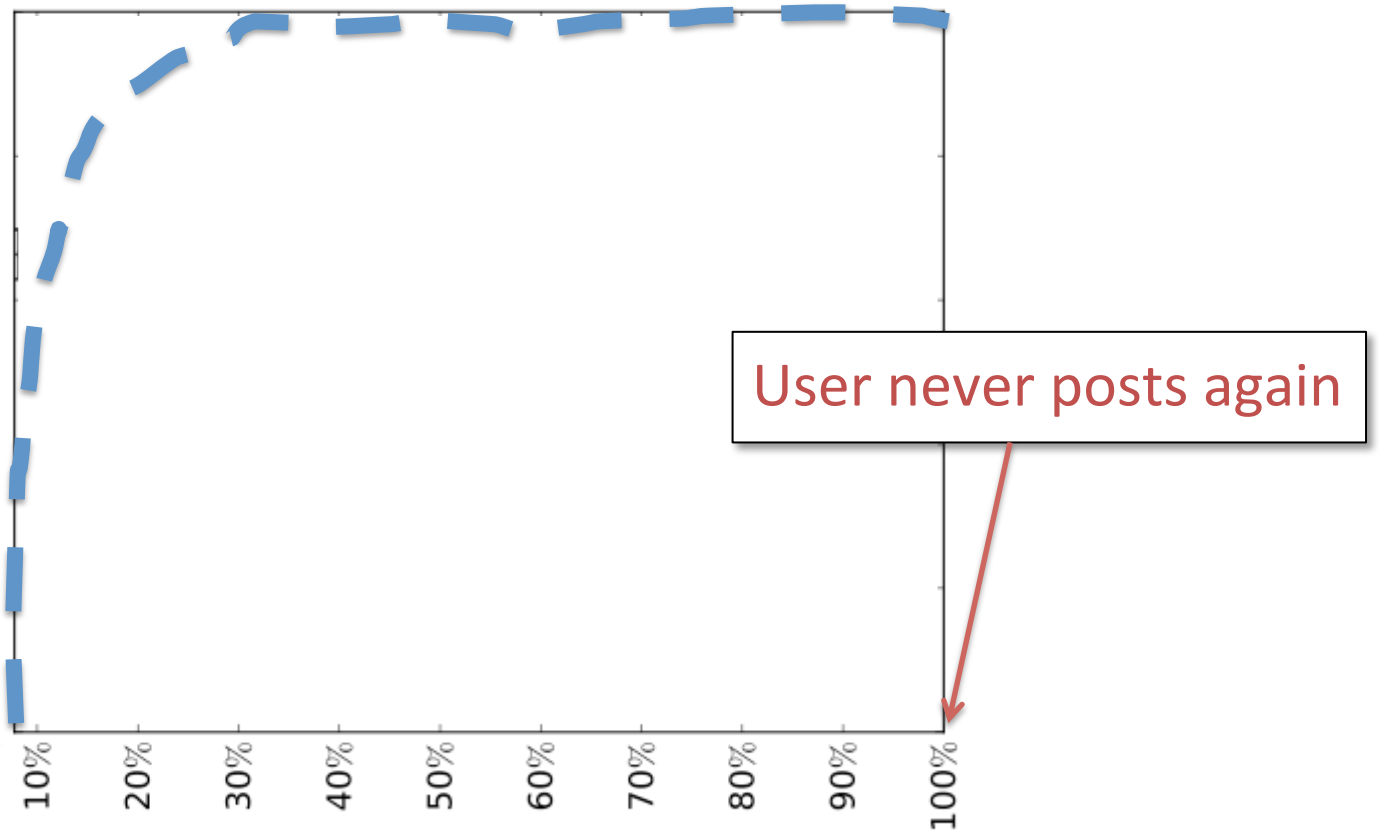
Ten-year+ online group devoted to rating beers, ~30K users



Language innovation: Never previously used, then used by at least 10 users for multiple producers and products for 6 months.

Hypothesis: a user starts out of sync, then synchronizes

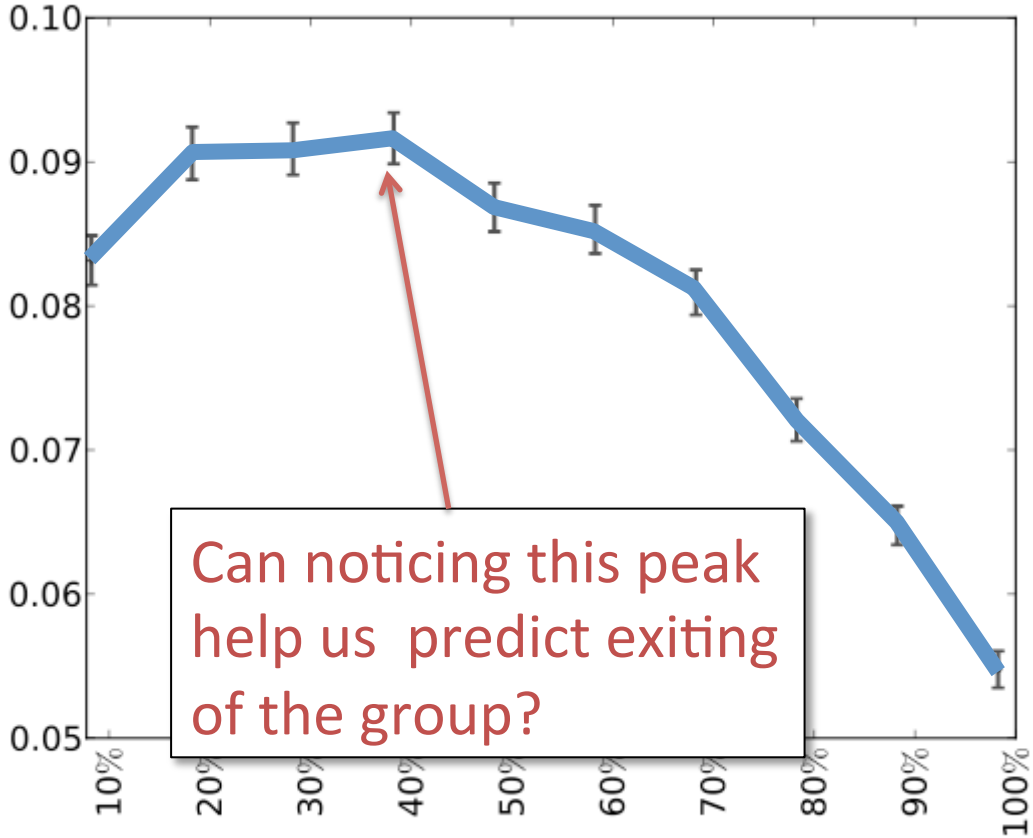
Average probability of adopting group innovations



post at i^{th} percent of all reviews posted

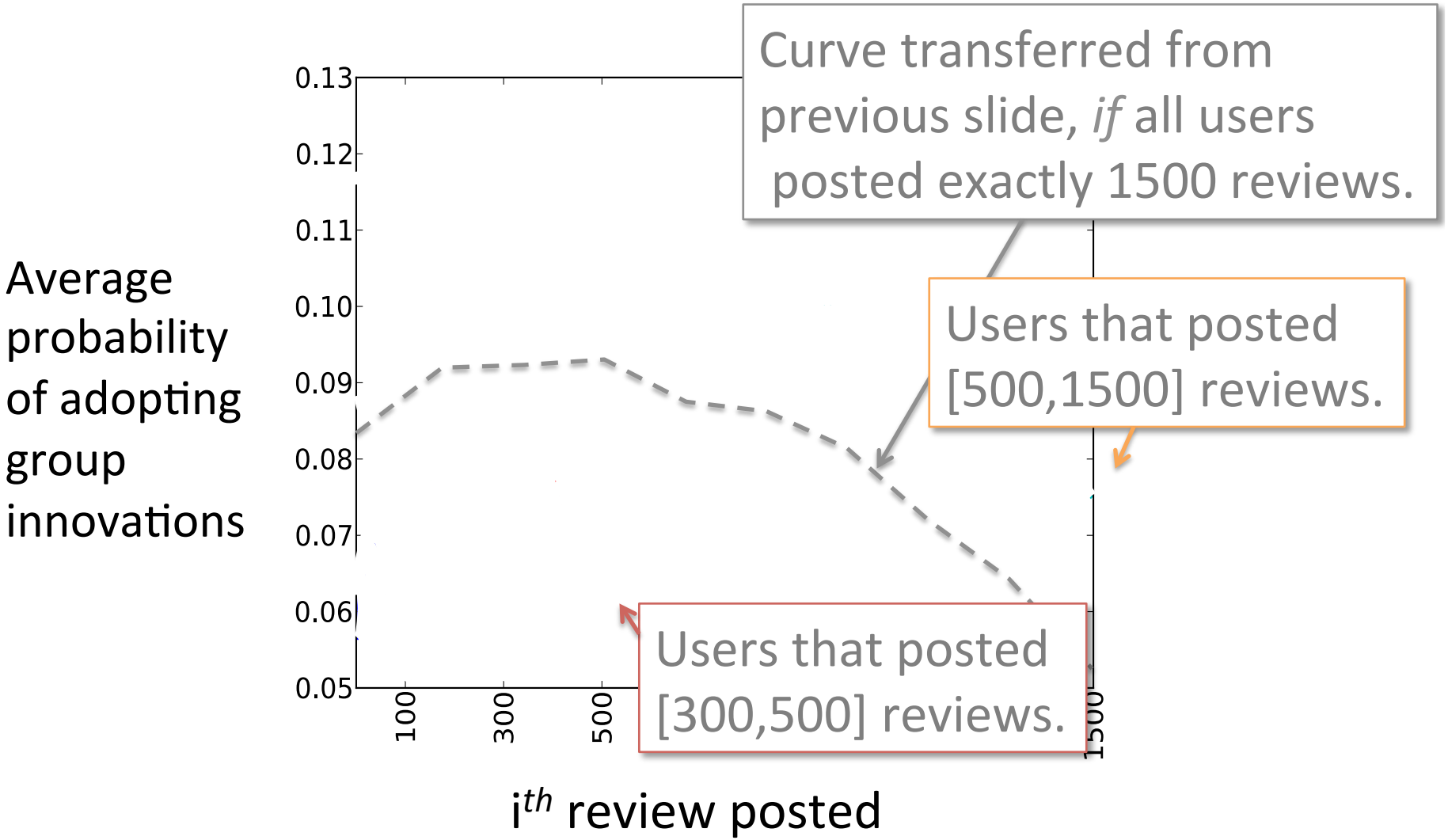
Actual lifecycle pattern

Average probability of adopting group innovations



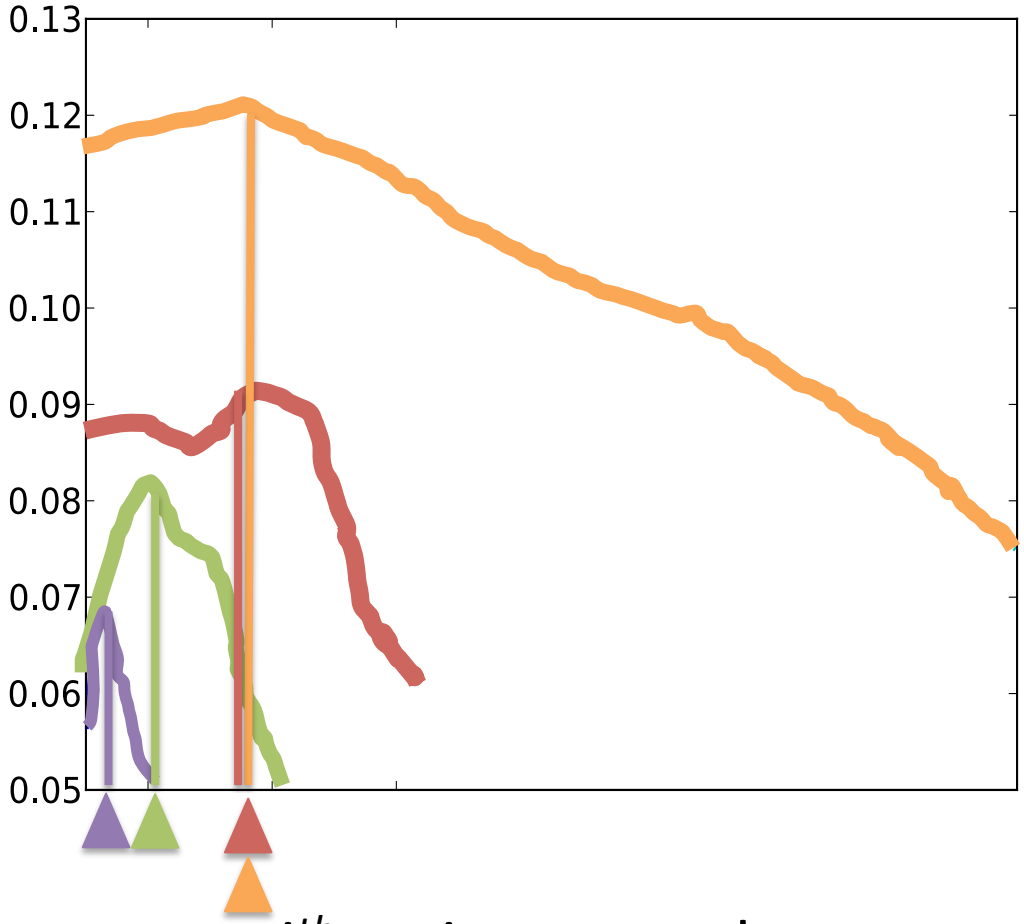
post at i^{th} percent of all reviews posted

Lifecycle pattern by absolute lifespan



Peak timing somewhat correlates with lifespan --- suggests intervention strategy

Average probability of adopting group innovations



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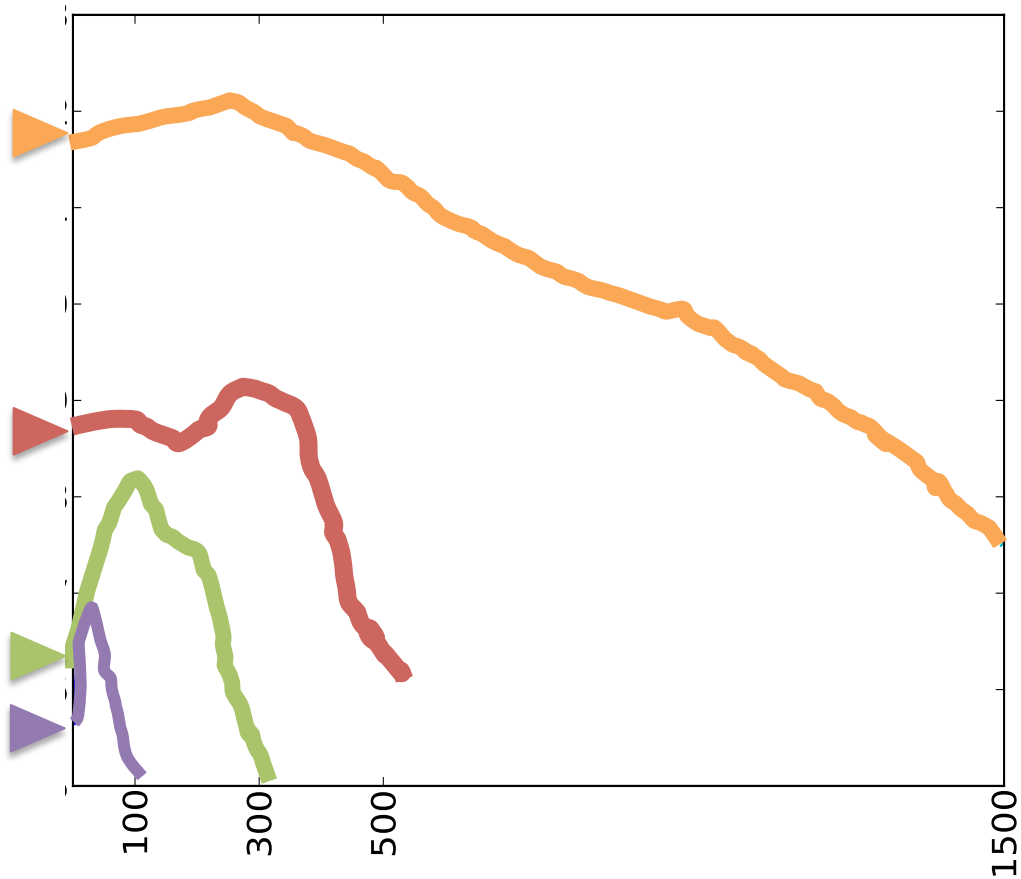
Initial receptivity correlates with lifespan

Average probability of adopting group innovations



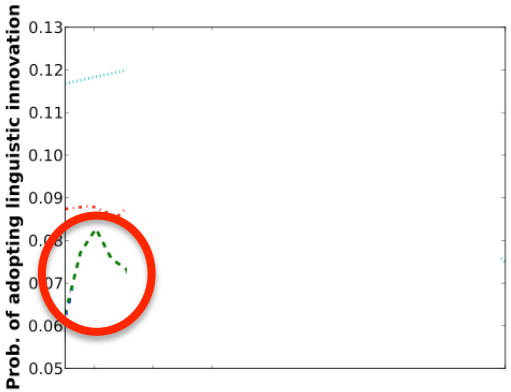
i^{th} review posted

Predicting imminent user exit

Task: Given the first 20 posts,
will the user abandon the community soon?

Linguistic change features:

distance from the community
language stability
adoption of lexical innovations



Baselines:

post frequency ← previous work on churn prediction
[Dror et al. 2012, Yang et al. 2010]

post month ← accounts for community-wide changes

Predicting imminent exit (cont.)

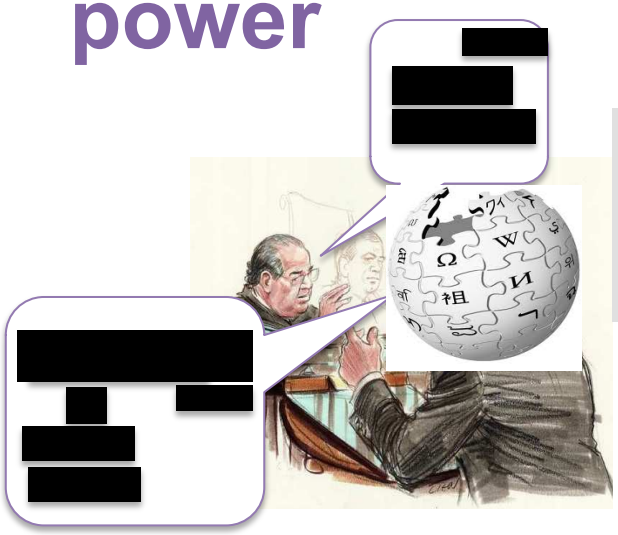
Results: Up to 12% absolute (40% relative) improvement

Features	F1
Baseline	30.5
+ Distance from community	**37.4**
+ Language stability	**38.0**
+ Adoption of lexical innovation	**40.9**
+ First person singular pronouns	41.2
+ Number of words	42.9

Summary

- Two projects incorporating degree of linguistic synchrony

power **lifespan in group**



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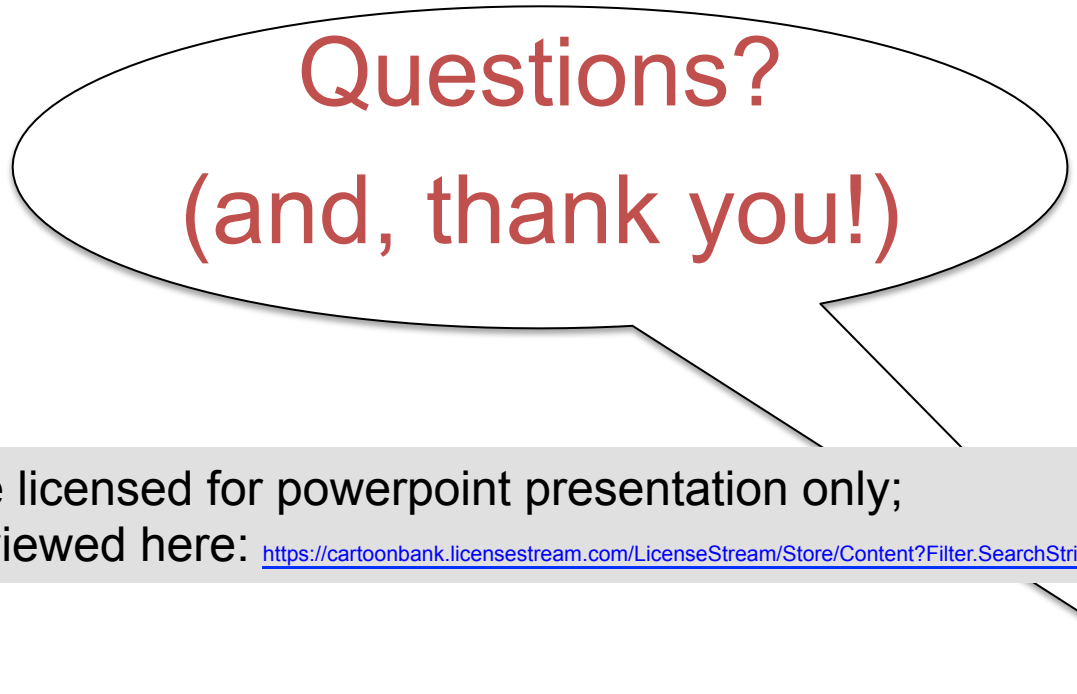
- Future: even more synchrony between language analysis and user modeling



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