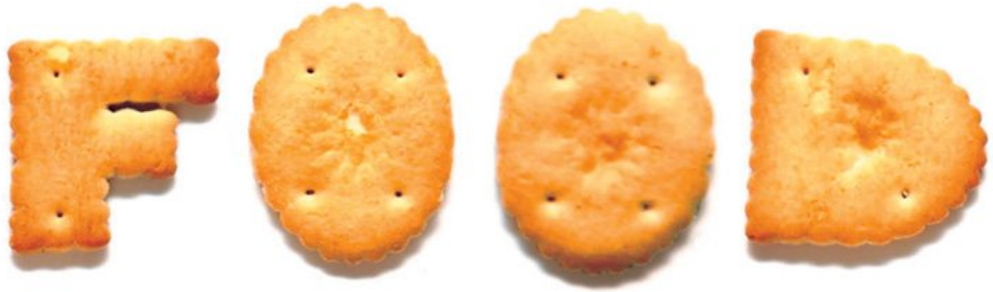
THE LANGUAGE OF FOOD



Dan Jurafsky
Linguistics and Computer Science
Stanford University

IPAM, May 23, 2016

America's national foods

Hamburger

ketchup

Frankfurter

French fries

Europe

But what about ketchup?

Fish preservation 2000 years ago

- Mon-Khmer, Tai-Kadai, Hmong-Mien speakers in Southeast China/ Southeast Asia

Preserving fish to last through dry season

- Fish, rice, salt, lactic acid fermentation

200 BCE: China expands

Han Dynasty: Emperor Wu invades tribal Guangdong and Fujian.

- Assimilating locals and their fermented seafoods
- Pushing the rest south

Innovations in Japan

700 CE: fermented fish rice ➔ Japan
called *sushi* (technically *narezushi*)

18th century: Use vinegar instead of lactic fermentation (and eat the rice)

19th century: eat the fish fresh

Meanwhile…
Southern Chinese sail/emigrate to SE Asia

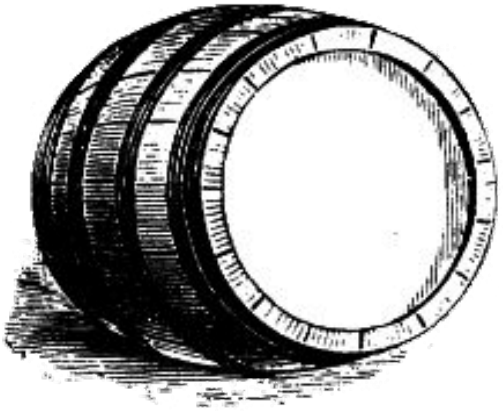
Propagating fish sauces and fish products.
Also red rice wine and
wine lees pastes 红糟

The fish/soy fermentation isogloss!

Ishige (1993)

The Age of European Exploration

1600: British and Dutch sail to Asia for spices, textiles, porcelain



The sailors drink

beer and wine

But both go sour in the tropical heat

(no hops yet)

They arrive in Indonesia to find ethnic Chinese making:

Arrack

The ancestor of rum

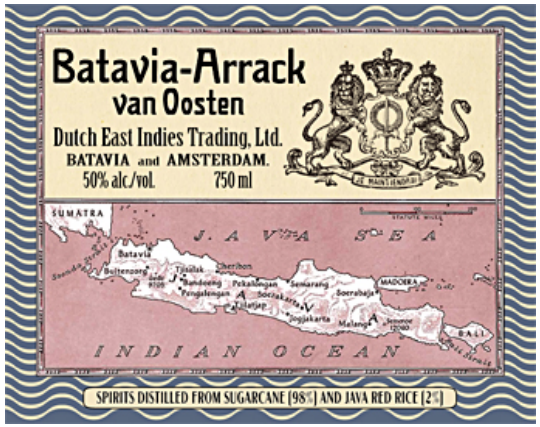
Distilled palm wine & **red rice**

(from Arabic word for ‘sweat’)

1609: British start buying arrack

1704: The “common drink” of Europeans in Asia

Sailors add limes (for scurvy) to make “punch”, first cocktail



While buying arrack, the British picked up barrels of:

Fish sauce

Vietnamese *nuoc mam* or Thai *nam pla*

What was this fish sauce called in the Zhangzhou dialect of Southern Min?

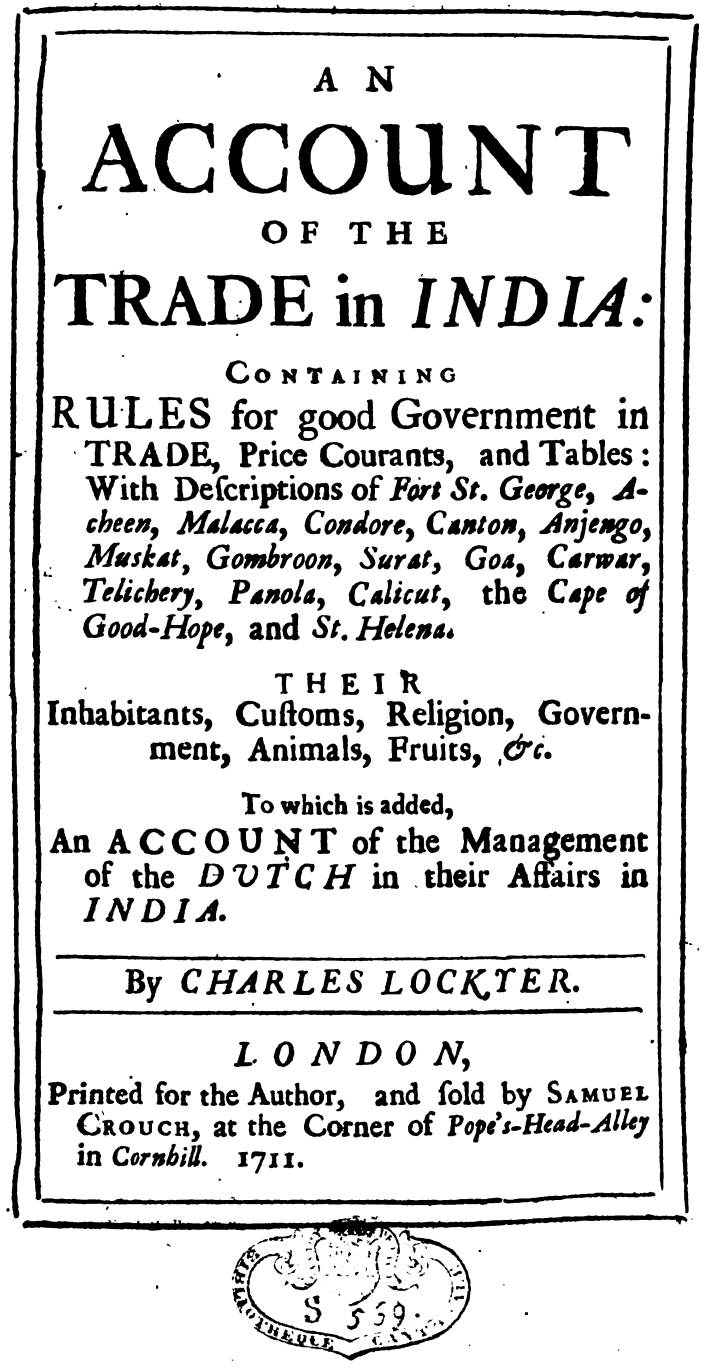
“Ketchup”

ke =鮭 salted fish **chiap** = 汁 “sauce”

The British bring it home.

Charles Lockyer's 1703 trip to Asia

- British trader in Asia
- Ketchup (fish sauce) now an important commodity



A N

ACCOUNT

OF THE

TRADE in *INDIA:*

CONTAINING

RULES for good Government in TRADE, Price Courants, and Tables: With Deſcriptions of *Fort St. George, Acheen, Malacca, Condore, Canton, Anjengo, Muskat, Gombroon, Surat, Goa, Carwar, Telichery, Panola, Calicut,* the *Cape of Good-Hope,* and *St. Helena.*

THEIR

Inhabitants, Cuſtoms, Religion, Government, Animals, Fruits, *&c.*

To which is added,

An ACCOUNT of the Management of the *DUTCH* in their Affairs in *INDIA.*

By *CHARLES LOCKYER.*

LONDON,

Printed for the Author, and ſold by SAMUEL CROUCH, at the Corner of *Pope's-Head-Alley* in *Cornhill.* 1711.

Soy comes in Tubs from *Jappan*, and the best *Ketchup* from *Tonqueen*; yet good of both sorts, are made and sold very cheap in *China*.

I know not a more profitable Commodity.

Fish sauce transforms

What to do when you have an expensive imported luxury?

Create fakes!

Expensive imported ketchup

To Make KATCH-UP that will keep good Twenty Years.

Take a Gallon of strong stale Beer, one Pound of Anchovies wash'd and clean'd from the Guts, half an Ounce of Mace, half an Ounce of Cloves, a quarter of an Ounce of Pepper, three large Races of Ginger, one Pound of Eschallots, and one Quart of flap Mushrooms …boil … strain …… bottle and stop it very close…This is thought to exceed what is brought from *India…* *1742*

Innovations: Jane Austen's family recipe for walnut ketchup, 1800

Take green **walnuts** …**vinegar** with a handful of **salt**. … boil ….**cloves**, **mace**, sliced **ginger**, sliced **nutmeg**, Jamaica **peppercorns**, little **horse radish** with a few **shallots**. … bottle it up …

Innovations: tomatoes! 1817

Tomata Catsup

Gather a gallon of fine, red, and full ripe tomatas; mash them with one pound of salt; …add **a quarter of a pound of anchovies**, two ounces of shallots, and an ounce of ground black pepper; boil … strain …..mace… allspice and ginger…. nutmeg, …. coriander … will keep for seven years

Sugar!

1850: anchovies disappear

1870: especially in the US, lots of sugar added

Hidden in the name of our national sauce: A history of innovation!

- Tai tribal fermented fish and rice
- Japanese sushi
- Vietnamese fish sauce
- Anchovy, mushroom, walnut ketchups
- Modern sweet tomato ketchup

Recipes are just a technology

The ketchup theory of innovation

Innovation happens at interstices, as we borrow and extend the ideas of our neighbors

Other stories of early borrowed innovation reflected in food words

How ice cream came from military technology!

- How Chinese gunpowder and Syrian chemists led to the Italian invention of ice cream and the word "*sherbet*")

How about innovations in science?

Most historical accounts of scientific change:

Internal revolution from one paradigm to another

But what about external influences?

Is there a similar role for borrowing from the neighbors?

From recipes to ideas: Using computational linguistics to study the flow of ideas in science

Ashton Anderson

Dan McFarland

David Hall

Will Hamilton

Raine Hoover

David Jurgens

Minkyoung Kim

Jure Leskovec

Chris Manning

Vinod Prabhakaran

The history of one field: computational linguistics

ACL Anthology Corpus

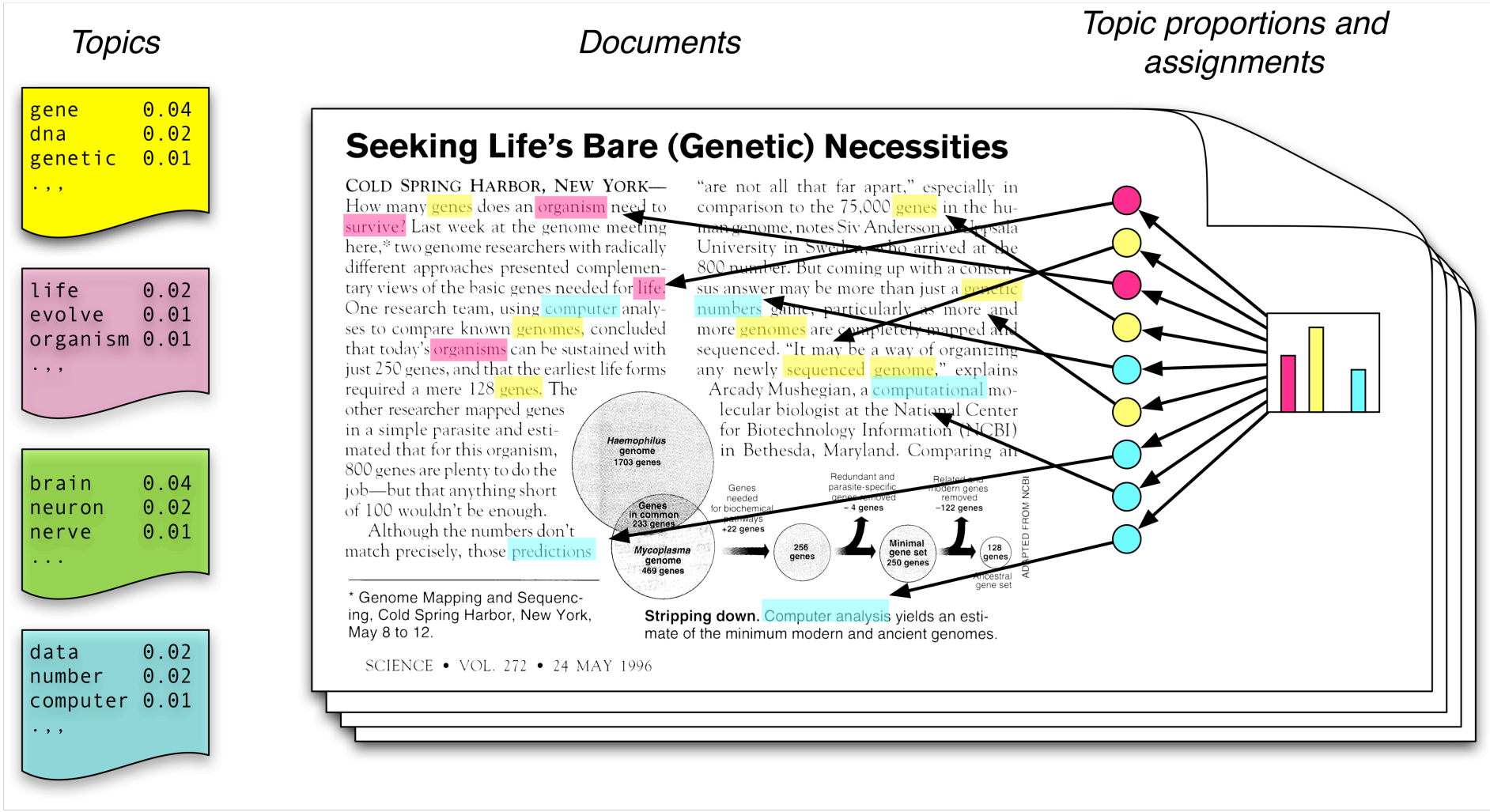
20,000 papers

15,000 authors

100,000 citations

Most papers in Computational Linguistics

Topic models for measuring language



Blei 2011

Topic models and other text processing for history of science

T.L. Griffiths and M. Steyvers. 2004. Finding scientific topics. PNAS 101 (S1):5228.

Paul, M and R. Girju. 2009. Topic Modeling of Research Fields: An Interdisciplinary Perspective. Proceedings of RANLP.

S. Gerrish and D.M. Blei. 2010. A language-based approach to measuring scholarly impact. ICML

C. Au Yeung and A. Jatowt. 2011. Studying how the past is remembered: towards computational history through large scale text mining. ACM CIKM 1231–1240.

Guo, H., S. B. Weingart, & K. Börner (2011). Mixed-Indicators Model for Identifying Emerging Research Areas. *Scientometrics*, 89:421–435.

(1) Induce 73 topics from distribution over words:

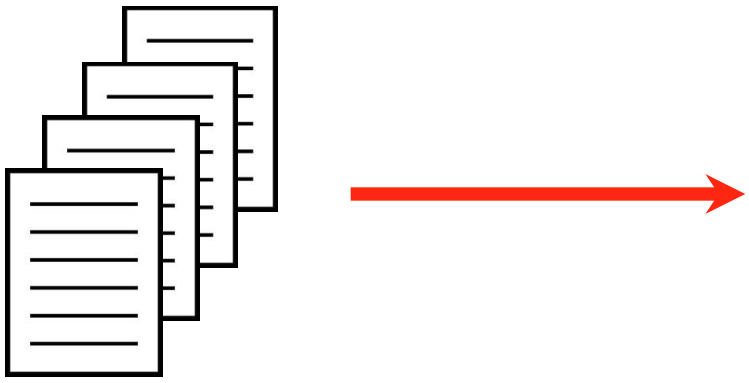
Anaphora resolution: pronoun, anaphora, antecedent, pronouns, coreference, anaphoric…

Parsing: grammar parse chart context-free edge production CFG symbol terminal left items nonterminal…

Probability: probability distribution estimate entropy statistical likelihood parameters smoothing modeling stochastic prior Bayesian..

70 more...

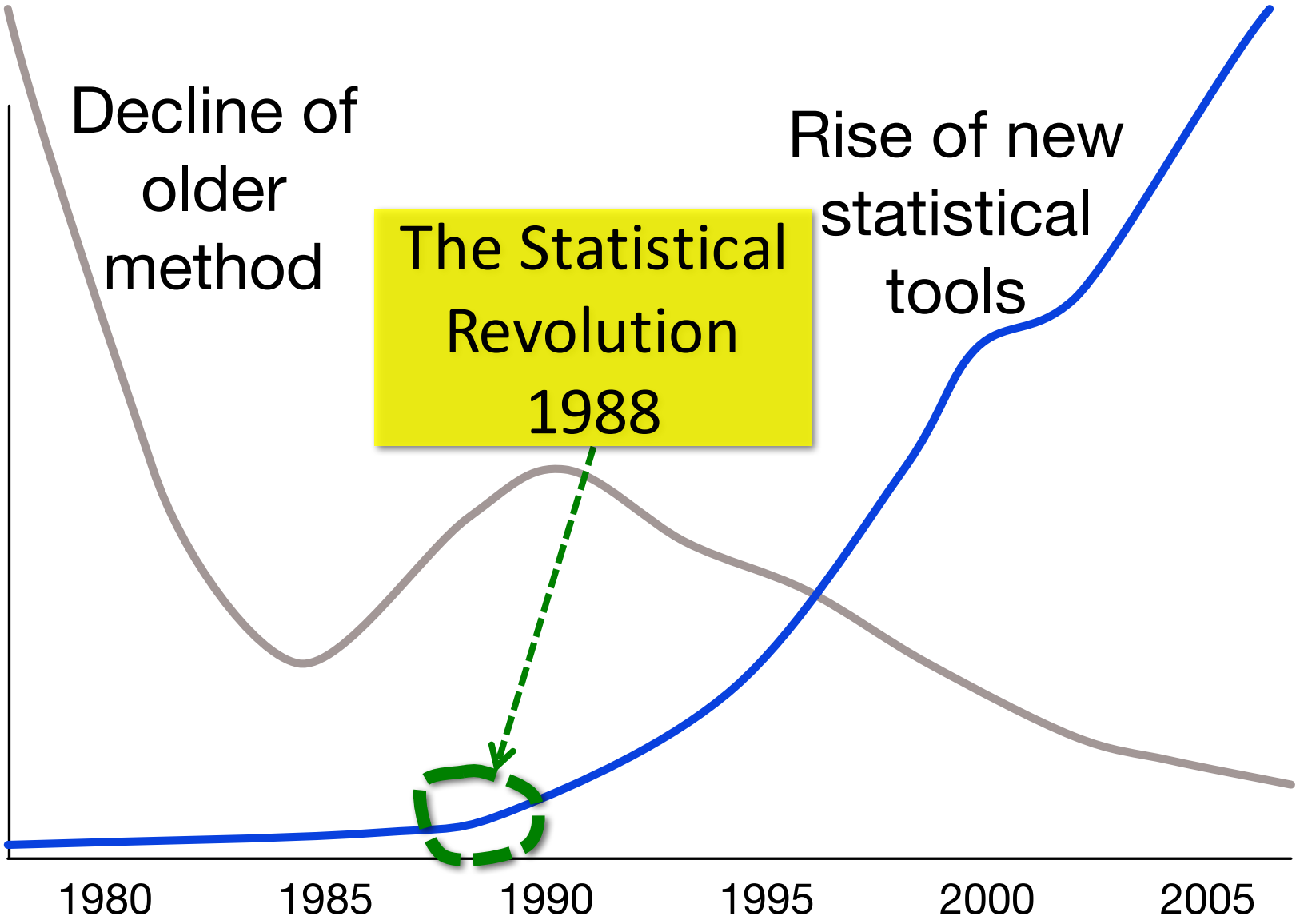
(2) Each CL paper has a distribution over topics:



ACL anthology

	Anaphora Topic	Parsing Topic	MT Topic	Tagging Topic	. . .
	0.12	0.08	0.02	0.01	
	0.03	0.22	0.16	0.00	
	0.01	0.38	0.04	0.01	
⋮					

Topic zeitgeist: $p(\text{topic}=z \mid \text{year}) \propto \sum_{d_i} p(z \mid d_i)$



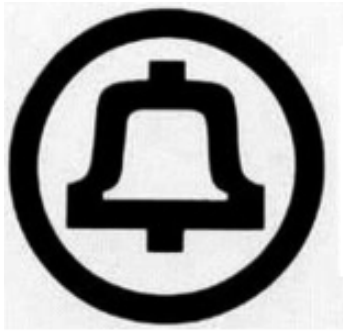
What happened in 1988?

We read all the papers with new statistics

The Origins of Statistical Modeling

T

Speech Researchers with Electrical Engineering background!



Kenneth Church, et al.

IBM

Peter Brown, Bob Mercer, Frederick Jelinek,

…

Implication

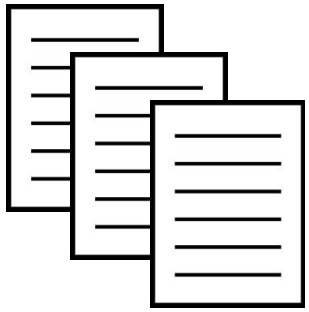
Speech researchers brought these ideas to computational linguistics.

- Computational linguists borrowed these new models
- And started adapting them to new problems

The **ketchup model** of innovation:

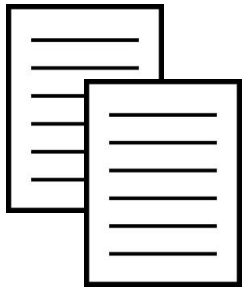
- We borrowed technology from the neighbors
- Interdisciplinarity plays a key role

Topic X



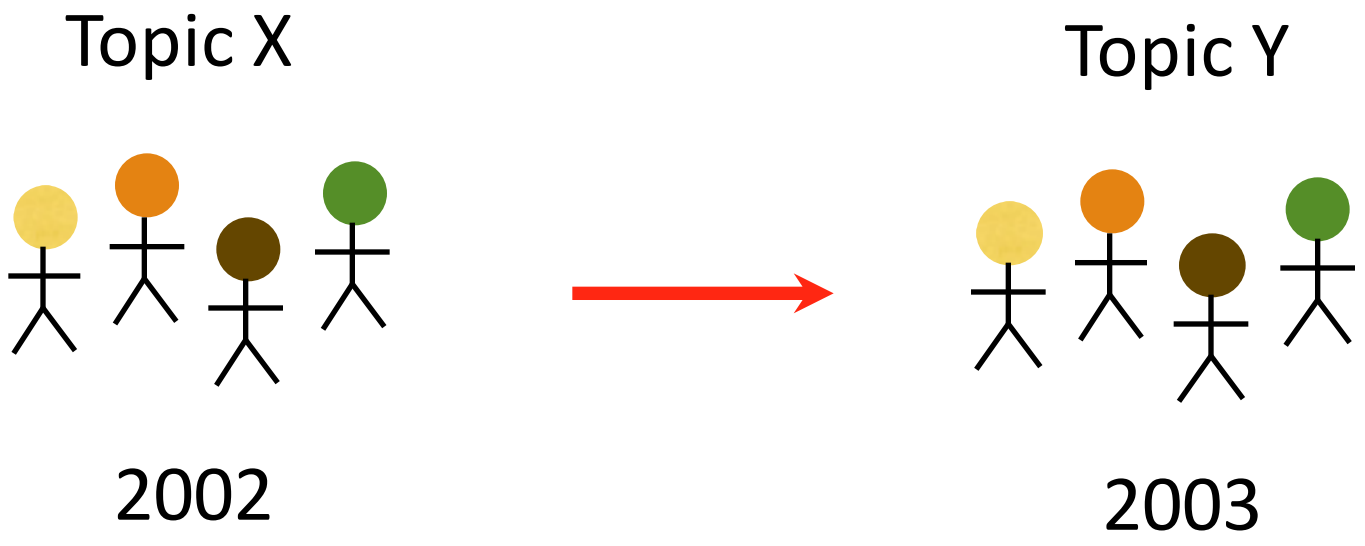
2002

Topic Y



2003

But wait: With topic models alone, no hard evidence of a connection between rise and fall of topics X and Y



But wait: with topic models alone, no hard evidence of a connection between rise and fall of topics X and Y

By tracking the movements of people over time, we can better understand the causal story

Studying movement of people across topics

First cluster topics on how people move in and out of them

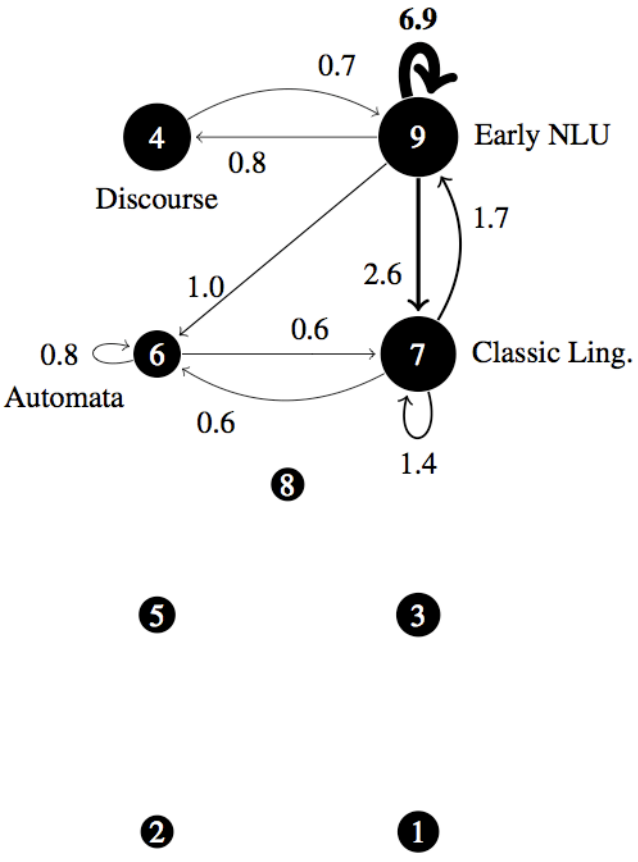
Then study the flow of people between these 9 clusters:

1980-1988 Early Natural Language Understanding
Discourse
Parsing
Finite Automata

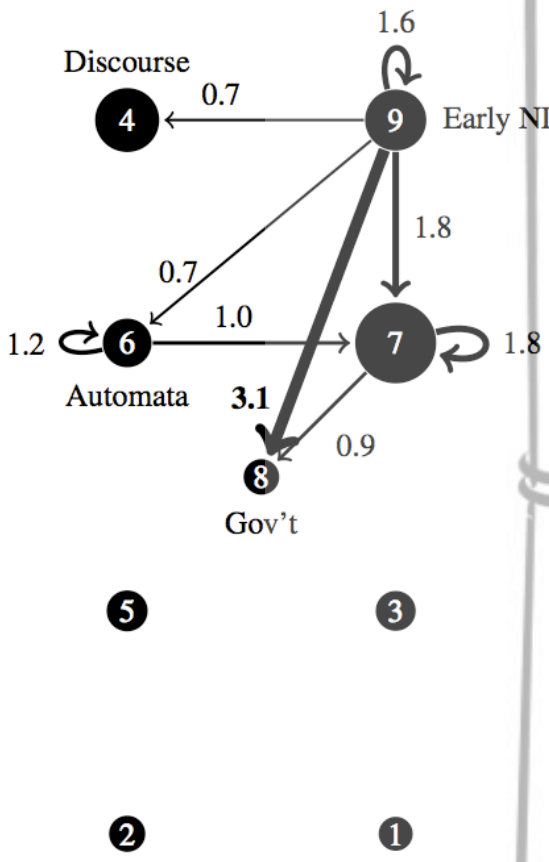
1989-1994 Government Sponsored "Bakeoff" Period
Grantees required to attend these workshops

1995-2008 Early Probability Models
Supervised Learning of Linguistic Classes
Probabilistic Methods
Big Data Computational Linguistics

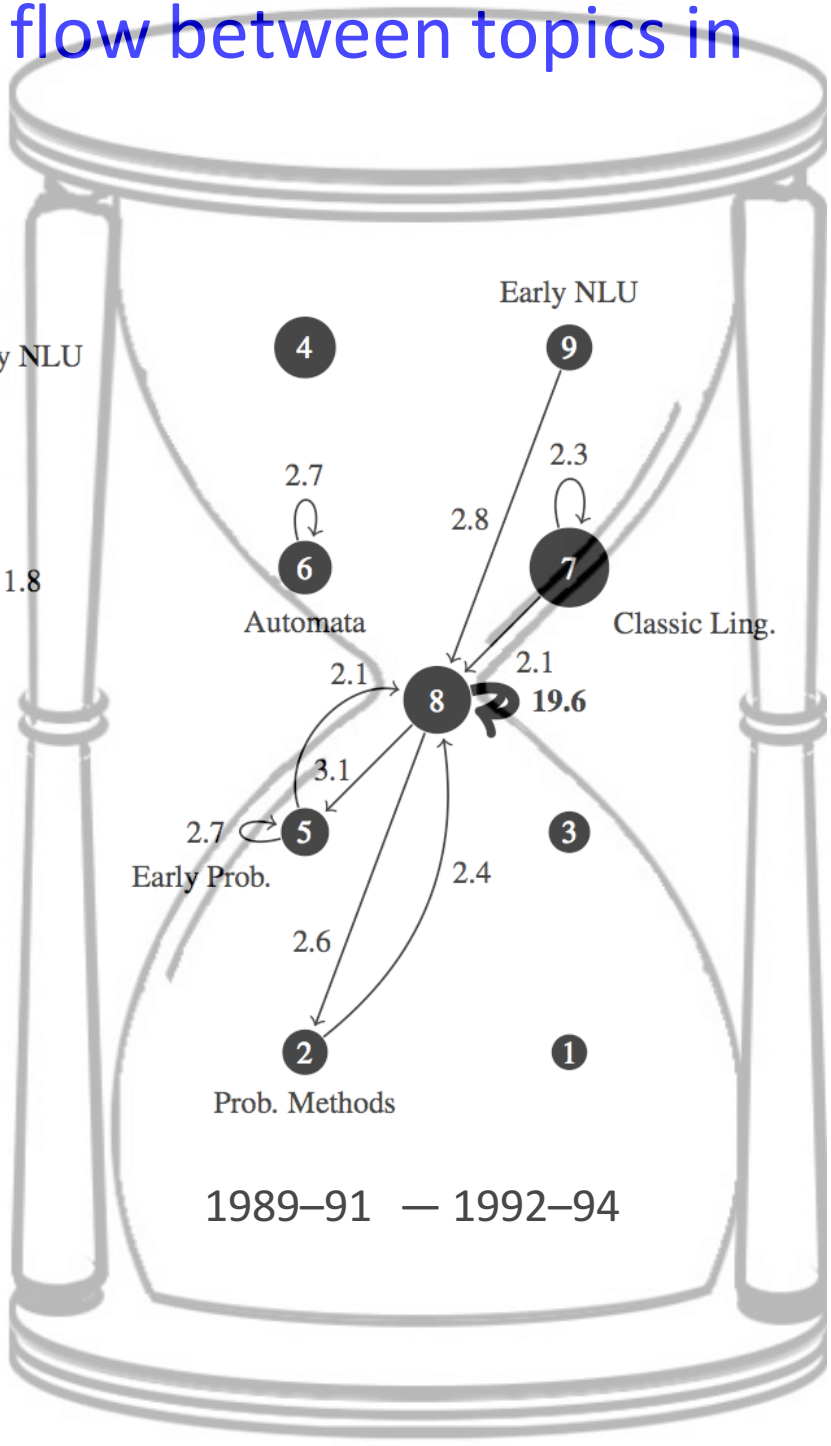
Flow between clusters is the average flow between topics in those clusters



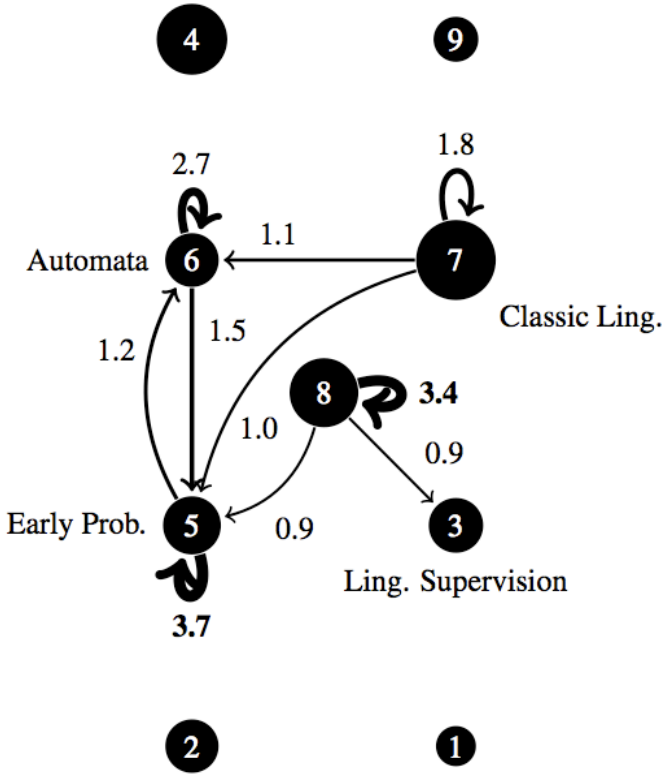
1980–83 — 1984–88



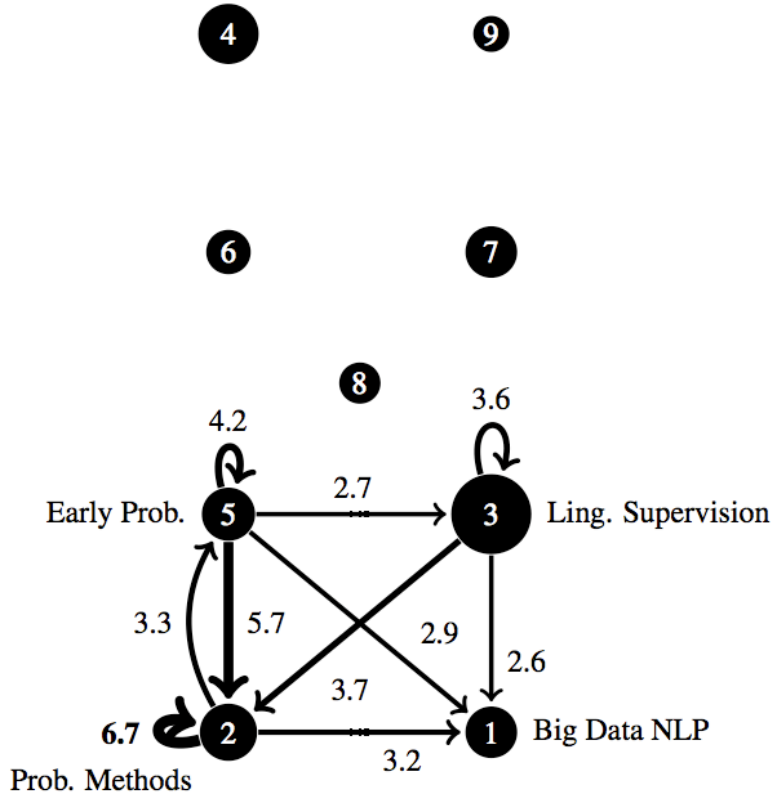
1986–88 — 1989–91



1989–91 — 1992–94



1992–94 — 1995–98



2002–04 — 2005–07

Topic 8: the funnel of the hourglass

US DARPA funding agency “bakeoffs”

Researchers from many fields

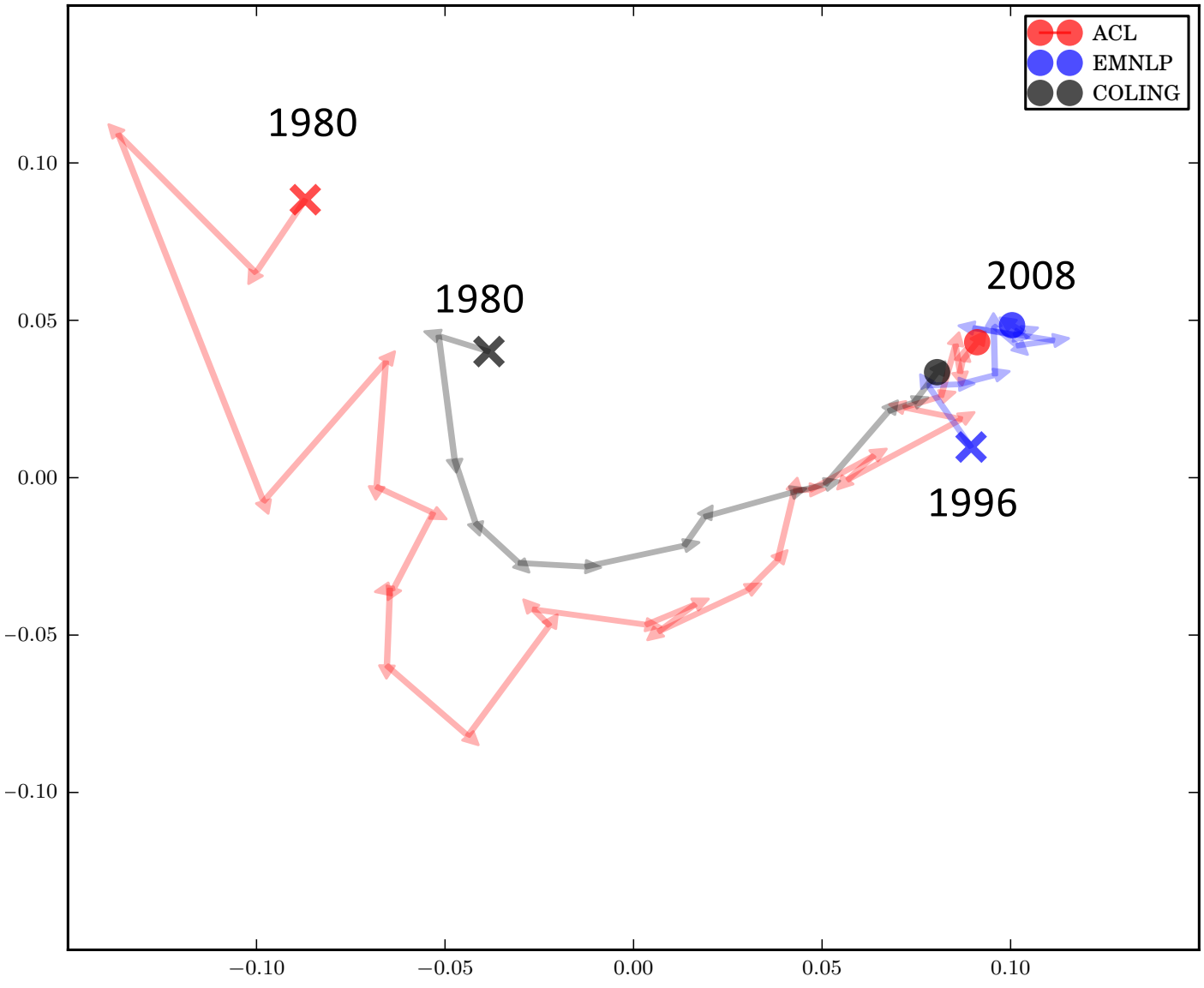
- work on common tasks
- shared evaluations
- show up at to annual workshop and present results
- interdisciplinary participation

Successful innovations were replicated

The field converges: 3 conferences move toward the new empirical

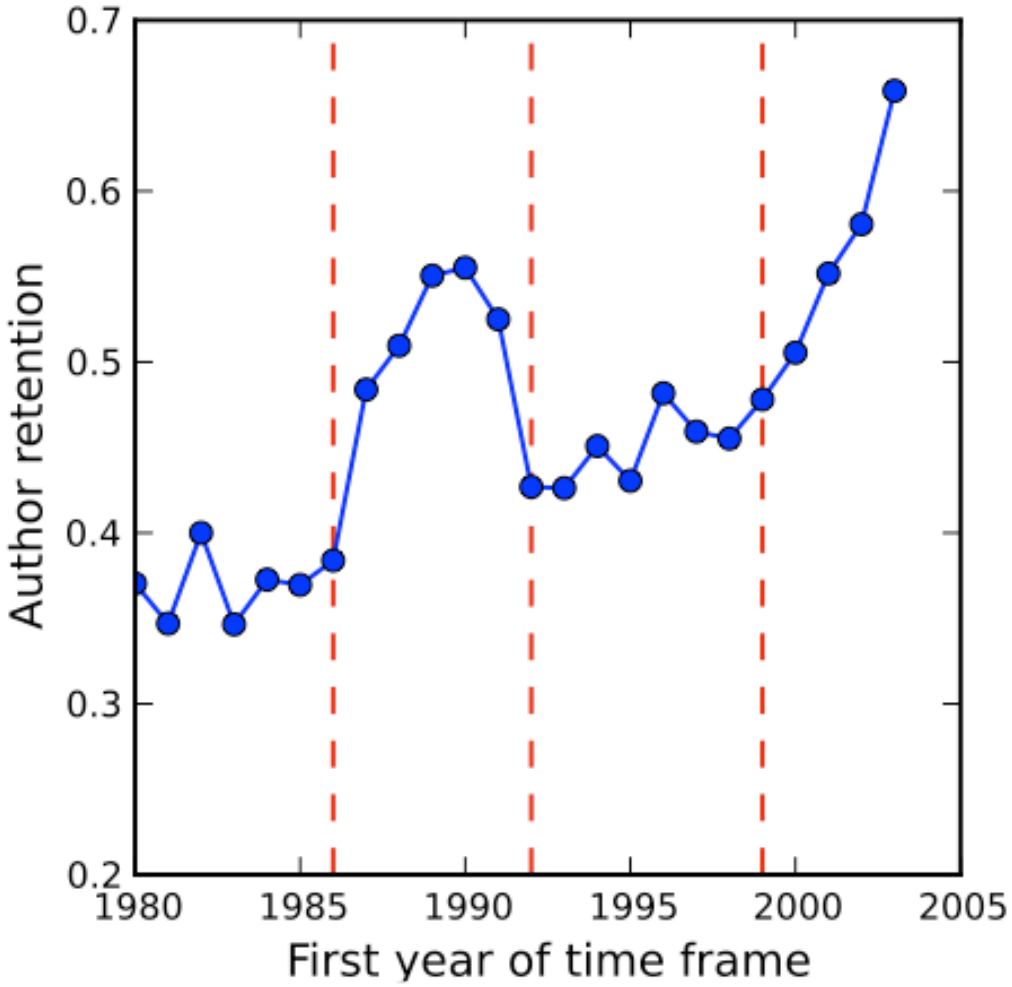
Papers at the main 3 conferences over time, showing their language projected onto 2 dimensions.

Blue is the new statistical conference



The field converges: continued authorship

Overlap between authors in neighboring time windows



Pollination

Of the prolific authors who first published in the database in 1989, 50% were from speech recognition.

Most left (returned to EE).

Government-sponsored period led to a large influx of speech recognition researchers

The people returned, but these new ideas stayed.

A new model of spread of innovation

- **“Pollination” rather than “Colonization”**

Summary

Use language to locate a field-redefining innovation

- Trace the flow of people to find causal patterns

We found:

- Innovations came from neighboring field whose researchers pollenated new field
- Midwifed by government funding for collaboration/group work on shared problems

In that spirit, let's apply computational linguistics to food!

The Linguistics of the Everyday

Words on potato chip packages reveal identity in American food

Expensive chips

Cheap chips

Sample from the corpus:

Bourdieu's *Distinction*

Survey: French taste in the 1960s correlated with class

- Working class had "popular" tastes
  - the *Blue Danube waltz*
  - heavy starchy meals (cassoulet)
- High status class had "refined" tastes
  - *Well-Tempered Clavier* or Breughel
  - new ethnic or health foods (curry, brown rice)

Bourdieu's proposal:

- Not about absolute quality
- About distinguishing upper class from lower class

Bourdieu's *Distinction*

In matters of taste, more than anywhere else, all determination is **negation**; and tastes are perhaps first and foremost distastes, disgust provoked by horror or visceral intolerance ("sick-making") of the tastes of others.

Bourdieu, *Distinction*

Let's measure linguistic *distinction*

Comparison

- *"more", "less"*
- *"least", "best", "finest"*
- *"unique"*

Negation

- *"not", "no", "never", "didn't"*

Distinction in expensive chips

5x more frequent in expensive chips

*Because of our **unique** baking process…*

in a class of their own

*…deliciously **different**…*

***best** in America…*

*crunchy bite you won't find in **any other** chip*

***less** fat than other leading brands…*

Every additional negative word adds 4 cents to the price per ounce

Say “no”


nothing fake or phony.
no fake colors, no fake flavors,
no fluorescent orange fingertips,
no wiping your greasy chip hand
on your jeans. no, really.

Expensive Chips: Health

Chips are a health food!

But expensive bags mention health 6 times more than cheap!

Cheap Chips: Traditional authenticity

in the shadow of the **Cascade Mountains**

made in the **great Pacific Northwest**

classic American snacks

using an **old family recipe**

time-tested standard

85-year-old recipe

a **time-honored tradition**

since 1921

the chips that **built our company**

Bill and Sally Utz believed

Expensive chips: Natural authenticity

all **natural**

great taste...**naturally**

still made with all **natural** oil

absolutely **nothing artificial**

only **real food** ingredients

Yukon Gold potatoes

only the **finest** potatoes

hand-rake every batch

Language and class/expense

- Expensive
  - Health
  - “Natural” Authenticity
  - Negation
- Cheap
  - Traditional Authenticity

How do menus reflect socio-economic differences?



What linguistic differences are reflected in cheap versus expensive menus?

Menus as reflections of attitudes toward socio-economic class

Online menus from 6562 restaurants

- 650,000 menu items
- 5,000,000 words
  - allmenus.com, yelp.com

Lots of adjectives in $$ menus

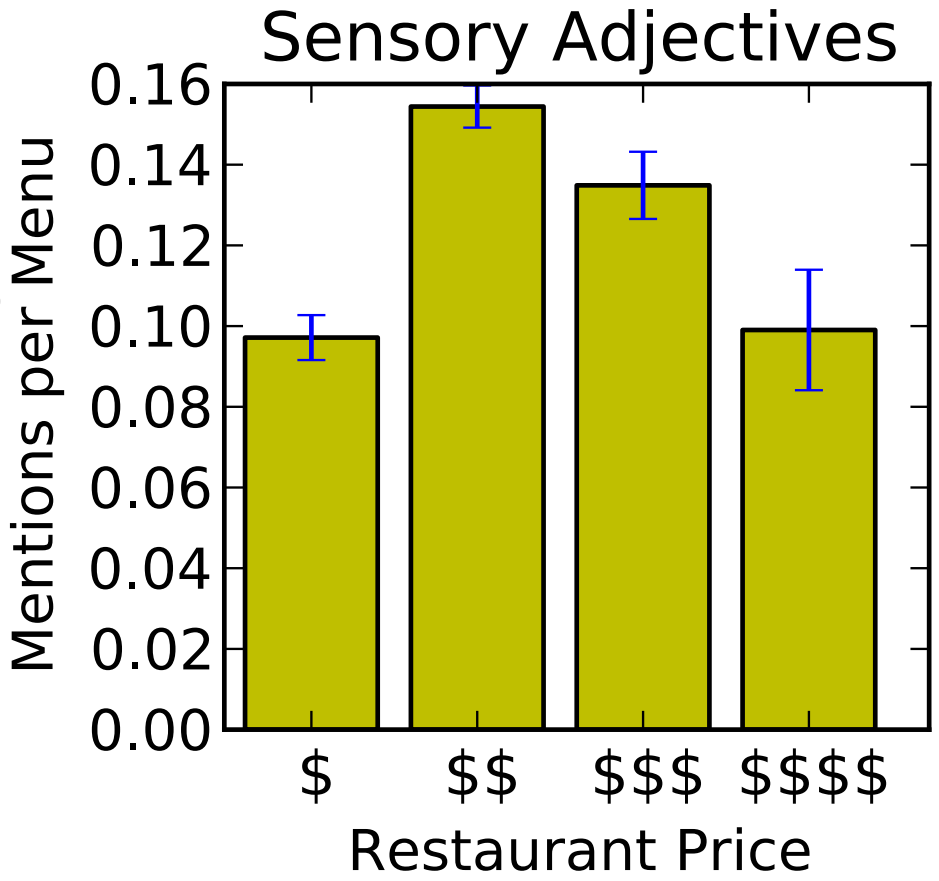
zesty, rich, golden brown, crispy, creamy

Crispy white-meat tenders served with a **creamy** Creole sauce

rich, **creamy** spinach artichoke dip

Creamy, homemade fettuccine alfredo

zesty chili pepper cream sauce



Lots of vague filler words in $ menus

Delicious, freshly, flavorful

The **delicious** taste

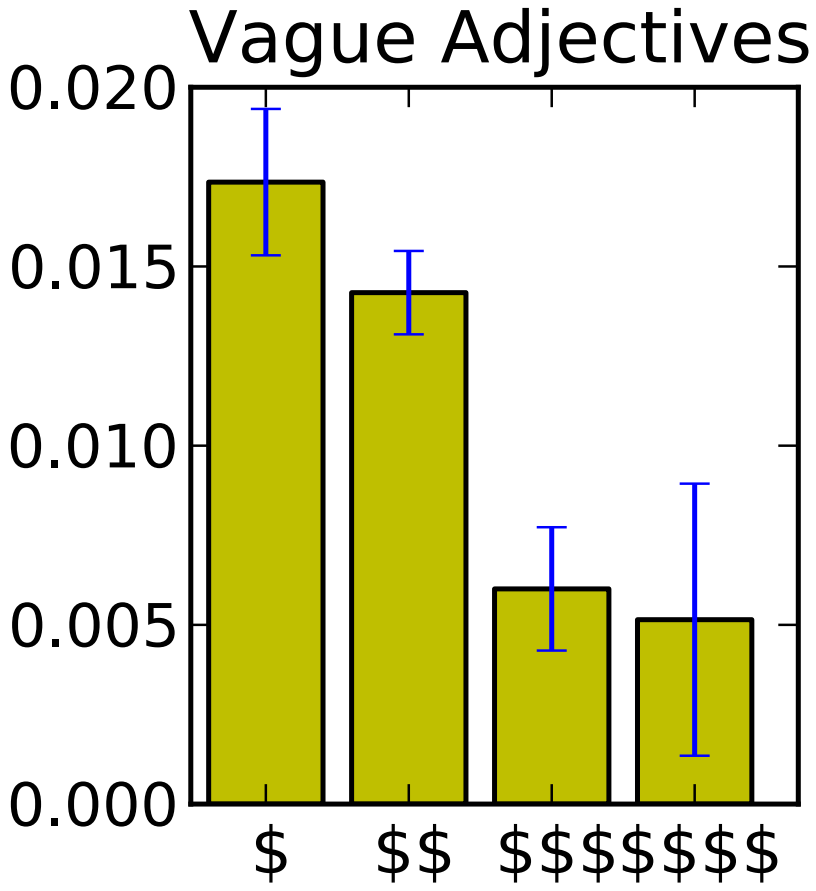
delicious outdoor grill flavor

flavorful entrées

flavorful ancho-chile

two **freshly** made sides

freshly steamed broccoli



Why Expensive Menus are short

Why say food is "*fresh*"?

- Grice's Maxims of Quantity and Relevance:
  - The hearer needs to know it's fresh
  - I am trying to communicate the freshness of my food

Why would you need to know?

- Because you don't already know if it's fresh
- i.e. you aren't sure if it's fresh

Expensive restaurants want you to be sure

- I say nothing so you *assume* food is fresh

Why Middle Priced Menus are long

Feltovich, Nick, Rick Harbaugh, and Ted To (2002). Too cool for school? Signalling and countersignalling. RAND Journal of Economics Vol. 33, No. 4, Winter 2002 pp. 630–649H.

Grice, Paul (1975). "Logic and conversation". In Cole, P.; Morgan, J. Syntax and semantics. 3: Speech acts. New York: Academic Press. pp. 41–58.

Game theoretic model

- Assume 3 class: high, mid, low,
- And assume other noisy cues to quality (location, expensive, décor)
- Mid signals to show isn't low
- High countersignals (doesn't signal) to show isn't mid

Grice in action: *real* on menus

$

- chocolate chip pancakes served with **real whipped cream**
- home made meatloaf served with **real mashed potatoes**
  chicken cutlet: melted swiss cheese on a roll with lettuce, tomato, russian dressing and **real bacon bits**

$$

- california roll: **real crab** and avocado
- blueberry whole grain pancakes with **real maple syrup**

no $$$ or $$$$

Aside: semantics and the history of artificial food

From the New York Public Library's Buttolph collection:

1990s: real bacon (not Bacon Bits).

1970/80s: real whipped cream (not Cool Whip)

real sour cream (not Imo).

1960s: real butter (not margarine).

1930/40s: genuine calves liver.

1900: real German beer and real turtle (not ale or mock turtle)

What do fancy restaurants do instead?

Use rare words

- *tonnarelli, bastilla, persillade*

Use long words:

- *decaffeinated, accompaniments, complements, exquisitely*

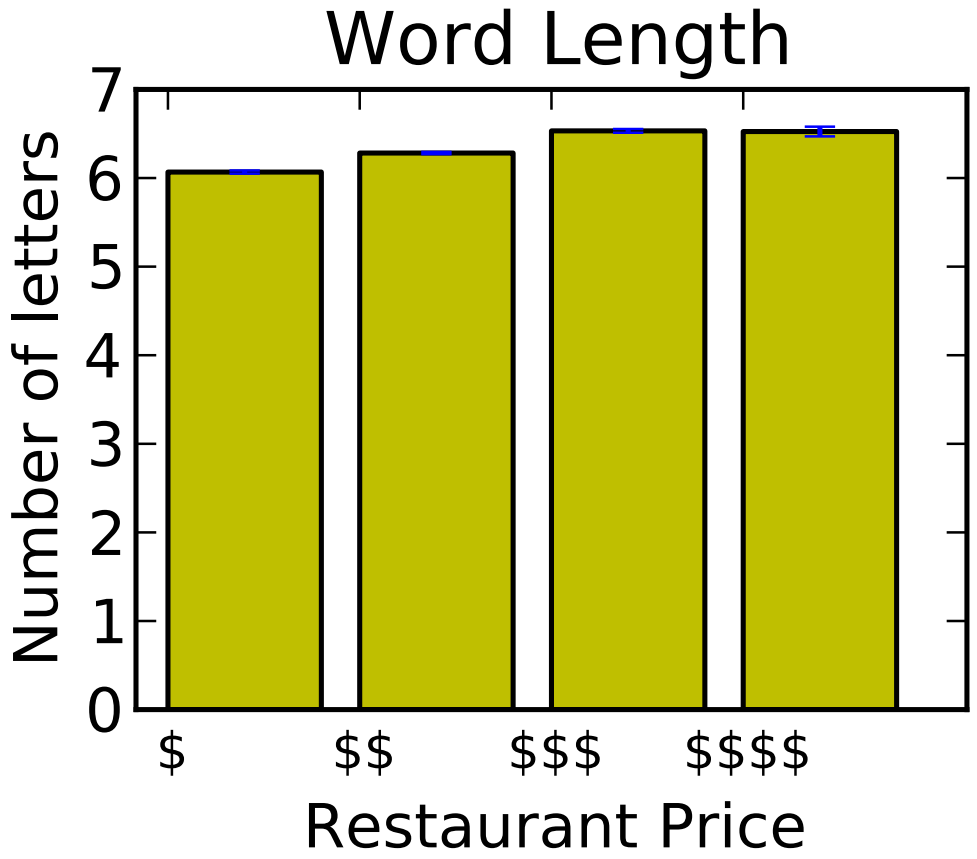
cheap restaurants:

- *decaf* not *decaffeinated*, *sides* not *accompaniments*.

Silverstein, Michael. 2003. "Indexical Order and the Dialectics of Sociolinguistic Life." Language and Communication 23: 193–229.

What do fancy restaurants do?

Each additional average letter = 18 cents



Expensive restaurant menu:

Robin Lakoff (2006). Identity a la carte: you are what you eat. In De Fina, Schiffrin, and Bamberg (eds), *Discourse and Identity*. Cambridge.

caviar

(cru) golden eye snapper
amberjack
herring

abalone

trout roe

sea urchin

cardoon

brassicas

toffee

wood pigeon

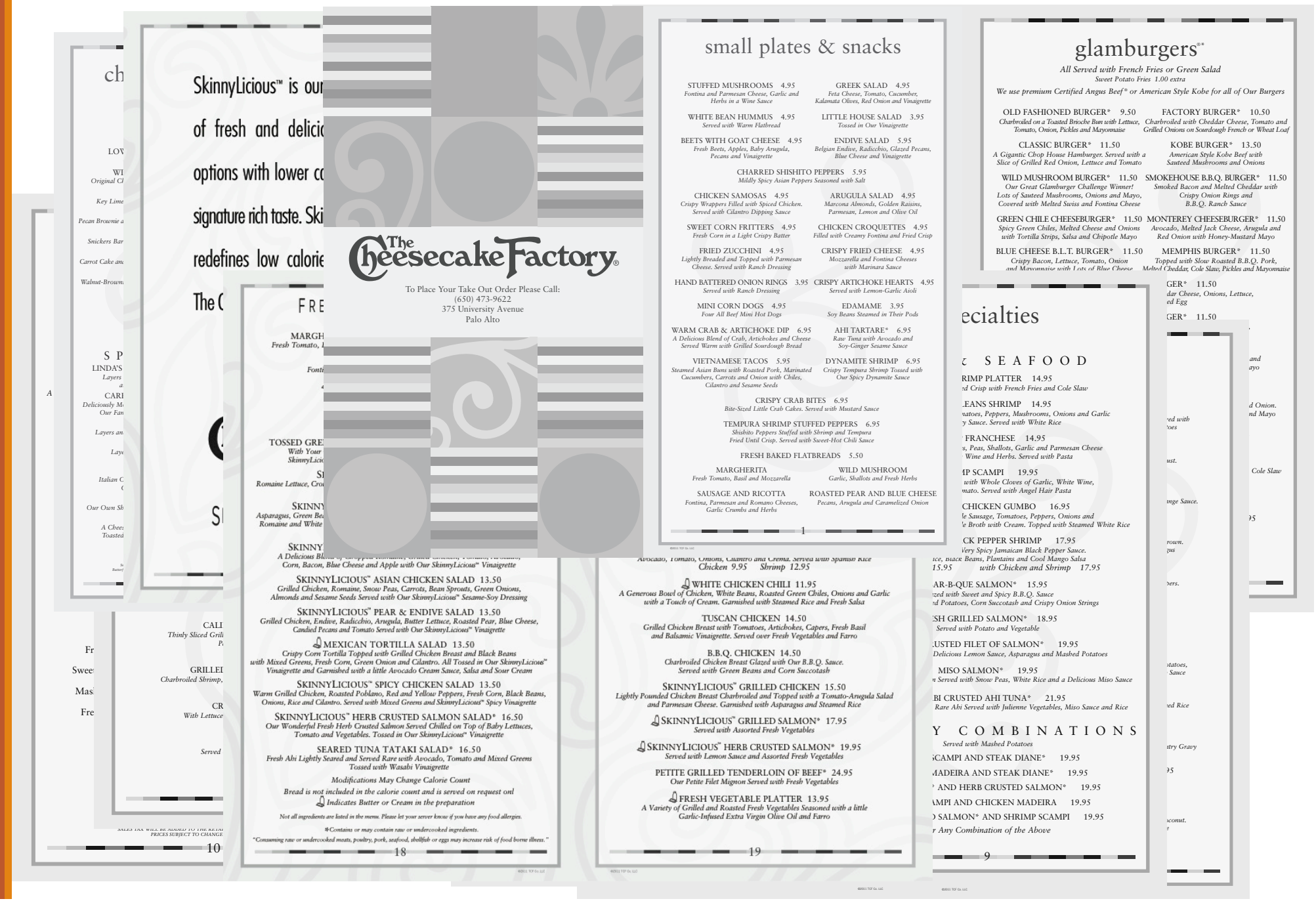
winter citrus

black walnut

ice cream

tea

Cheap restaurant menu



Linguistics and economics

Expensive menus are linguistically **modest**

- Modest advertising is a way of displaying luxury status

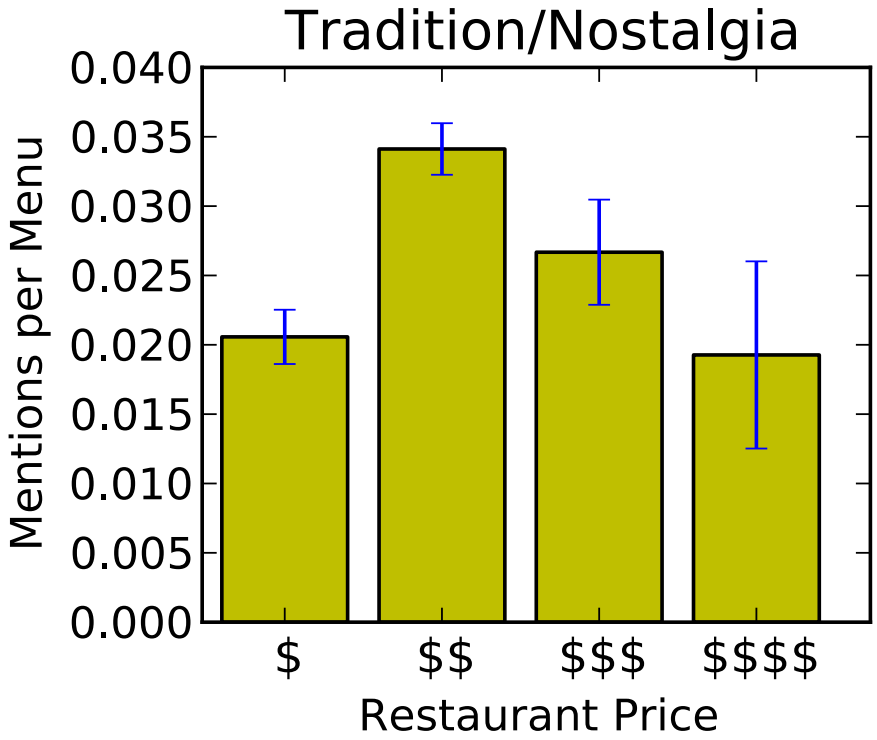
Traditional authenticity in $$ restaurants:

fresh **homemade** guacamole and chip

old fashioned beef stew

annie's famous pot roast homemade **just like mom's**

grandma minnie's fried chicken salad



Expensive restaurants use natural authenticity

HERB ROASTED ELYSIAN FIELDS FARMS LAMB

Eggplant Porridge, Cherry Peppers,

Greenmarket Cucumbers and Pine Nut Jus

GRASS FED ANGUS BEEF CARPACCIO

Pan Roasted King Trumpet Mushrooms

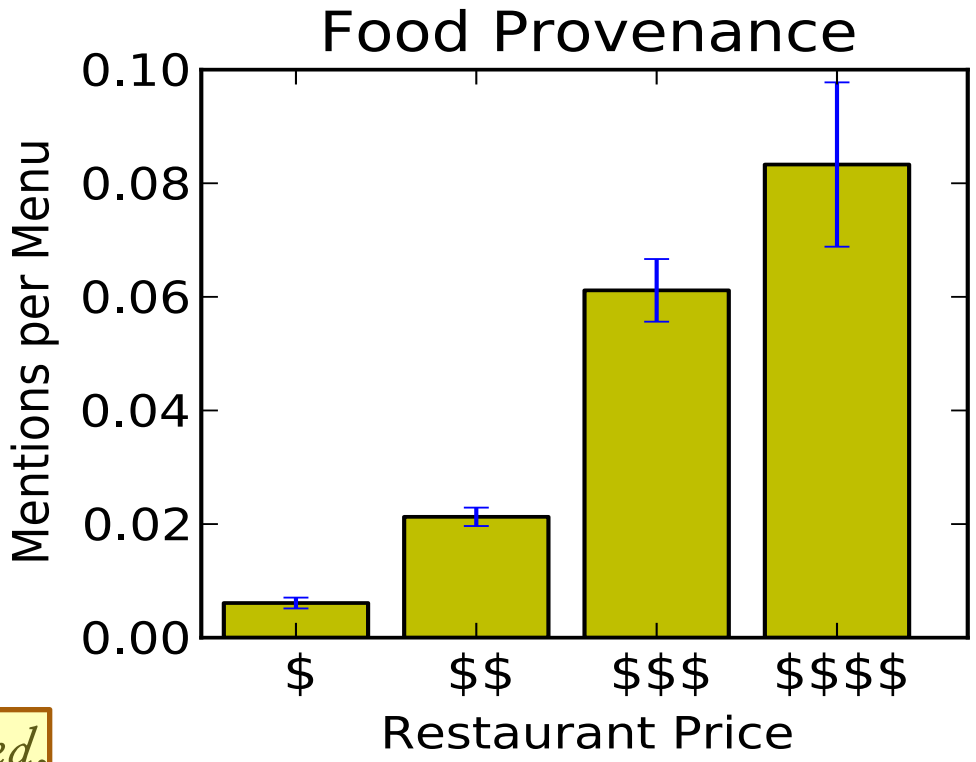
Dirty Girl Farm Romano Bean Tempura

Persillade, Extra Virgin Olive Oil

BISON BURGER

8 oz. blue star farms, grass fed & pasture raised,

melted gorgonzola, grilled vegetables



More on social aspects of word meaning:
The Tiki Lounge effect

exotic, oriental, spices, spicy

exotic five spices

exotic blend of indian spices

island **spices** you crave: An **exotic**, delicious sauce.

oriental vinaigrette

Thai curry herbs and **spices**

kick of southwestern **spice**

spicy Santa Fe sauce

spicy garlic & lime grilled shrimp

Dishes with these words cost 3 cents more per word

Framing in restaurant reviews



Dan Jurafsky, Victor Chahuneau, Bryan R. Routledge, and Noah A. Smith. 2014. Narrative framing of consumer sentiment in online restaurant reviews. First Monday 19:4

900,000 online reviews

The bartender... absolutely horrible... we waited 10 min before we even got her attention... and then we had to wait 45 - FORTY FIVE! - minutes for our entrees... stalk the waitress to get the cheque... she didn't make eye contact or even break her stride to wait for a response

Log odds ratio

Log likelihood ratio: does "horrible" occur more % in corpus A or B?

$$\log P_A(\text{“}horrible\text{”}) - \log P_B(\text{“}horrible\text{”})$$

$$= log\left(\frac{countA(\text{“}horrible\text{”})}{\sum_{word\ in\ A} count(word)}\right) - log\left(\frac{countB(\text{“}horrible\text{”})}{\sum_{word\ in\ B} count(word)}\right)$$

Log odds ratio: does "horrible" have higher odds in A or B?

$$log\left(\frac{\frac{countA(\text{“}horrible\text{”})}{NA}}{1-\frac{countA(\text{“}horrible\text{”})}{NA}}\right) - log\left(\frac{\frac{countB(\text{“}horrible\text{”})}{NB}}{1-\frac{countB(\text{“}horrible\text{”})}{NB}}\right)$$

$$log\left(\frac{countA(\text{“}horrible\text{”})}{NA-countA(\text{“}horrible\text{”})}\right) - log\left(\frac{countB(\text{“}horrible\text{”})}{NB-countB(\text{“}horrible\text{”})}\right)$$

Log odds ratio with a prior

Log odds ratio:

$$log\left(\frac{f_A(\text{“}horrible\text{”})}{N_A - f_A(\text{“}horrible\text{”})}\right) - log\left(\frac{f_B(\text{“}horrible\text{”})}{N_B - f_B(\text{“}horrible\text{”})}\right)$$

With a prior:

$$log\left(\frac{f_A(\text{“}horrible\text{”}) + f_{prior}(\text{“}horrible\text{”})}{N_A + N_{prior} - (f_A(\text{“}horrible\text{”}) + f_{prior}(\text{“}horrible\text{”})}\right) - log\left(\frac{f_B(\text{“}horrible\text{”}) + f_{prior}(\text{“}horrible\text{”})}{N_B + N_{prior} - (f_B(\text{“}horrible\text{”}) + f_{prior}(\text{“}horrible\text{”})}\right)$$

Log odds ratio informative Dirichlet prior

Monroe, Colaresi and Quinn (2008)

Find words that are statistically overrepresented in a particular category of review compared to another

$$\hat{\delta}_w^{(i-j)} = log\left(\frac{y_w^i + \alpha_w}{n^i + \alpha_0 - (y_w^i + \alpha_w)}\right) - log\left(\frac{y_w^j + \alpha_w}{n^j + \alpha_0 - (y_w^j + \alpha_w)}\right)$$

(n^i is the size of corpus *i*, n^j is the size of corpus *j*, y_w^i is the count of word *w* in corpus i, y_w^j is the count of word *w* in corpus *j*, α_0 is the size of the background corpus, and α_w is the count of word *w* in the background corpus.)

$$\sigma^2\left(\hat{\delta}_w^{(i-j)}\right) \approx \frac{1}{y_w^i + \alpha_w} + \frac{1}{y_w^j + \alpha_w}$$

Final statistic for a word: z-score of its log-odds-ratio:

$$\frac{\hat{\delta}_w^{(i-j)}}{\sqrt{\sigma^2\left(\hat{\delta}_w^{(i-j)}\right)}}$$

Top 50 words associated with one-* reviews by Monroe, *et al.* (2008) method

Linguistic Class	Words in Class
Negative sentiment	worst, rude, terrible, horrible, bad, awful, disgusting, bland, tasteless, gross, mediocre, overpriced, worse, poor
Linguistic negation	no, not
1 pl pronouns	we, us, our
3rd pronouns	she, he, her, him
Past tense verbs	was, were, asked, told, said, did, charged, waited, left, took
Narrative sequencers	after, then
Common nouns	manager, waitress, waiter, customer, customers, attitude, waste, poisoning, money, bill, minutes
Irrealis modals	would, should
Complementizers	to, that

Language of bad reviews?

Negative sentiment language

horrible awful terrible bad disgusting

Past narratives about people (Biber's factor)

waited, didn't, was

he, she, his, her,

manager, customer, waitress, waiter

Frequent mentions of we and us

… **we** were ignored until **we** flagged down one waiter to go get **our** waitress …

Other narratives with this language

A genre using:

Past tense, we/us, negative, people narratives

Texts written by **people suffering trauma**

- Chat group discussions after Princess Diana's death
  - Stone, L.D. & Pennebaker, J.W. (2002). Trauma in real time: Talking and avoiding online conversations about the death of Princess Diana. Basic and Applied Social Psychology, 24, 172-182
- Blog posts after September 11, 2001
  - Cohn, M.A., Mehl, M.R., & Pennebaker, J.W. (2004). Linguistic markers of psychological change surrounding September 11, 2001. Psychological Science, 15, 687-693
- Student newspaper reports after a campus tragedy
  - Gortner, E.-M., & Pennebaker, J.W. (2003). The archival anatomy of a disaster: Media coverage and community-wide health effects of the Texas A&M Bonfire Tragedy. Journal of Social and Clinical Psychology, 22, 580-603

Why? Pennebaker's *social stage model of coping*

- people feel a need to tell stories expressing their negative emotion,
- "we/us/our" suggests we are seeking comfort in community
- Past tense used to distance ourselves from the traumatic event

Implications

1-star reviews are not descriptions of bad food.

They are trauma narratives!

The lesson of bad reviews:

We are very sensitive to personal interaction

Positive Reviews?

addicted to wings

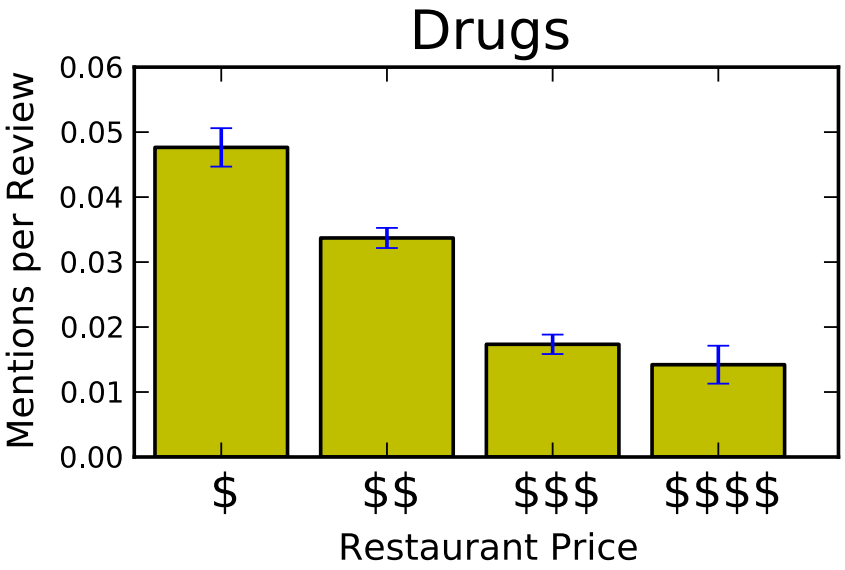
the fries are *like crack*

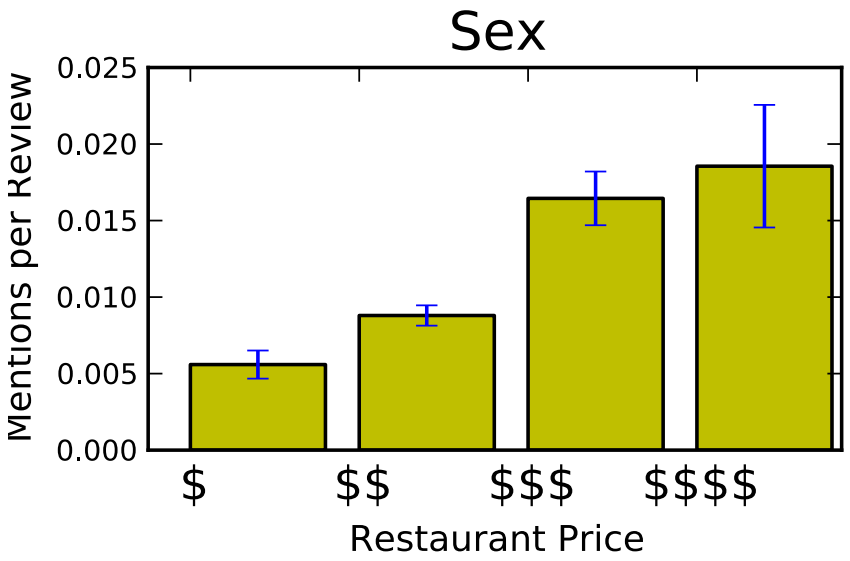
….*crave*… cupcakes

orgasmic pastry

seductively seared…

very naughty pork belly





Why the addiction narrative?

Table 4: Foods most likely to be described using drug metaphors.				
Meaty, fatty foods	**Starchy comfort food**	**Sweet food**	**Small ethnic dishes**	**Descriptors**
burgers	pizza	sweets	sushi	comfort
barbecue	mac and cheese	pancakes, breakfast	dim sum	fried, greasy
chicken wings	pasta/noodles	sugar	tacos, burritos	unhealthy
french fries	soups	chocolate	spam musubi	hearty, satisfying
	sandwiches	beignets	dumplings	junk
			falafel	authentic
			tapas	cheap

Craved foods aren't vegetables, or main courses like meatloaf or fish or even side dishes like mashed potatoes

They are **junk foods** or at least non-normative foods

- Assuage the guilt
- It's not my fault, I had no control, the cupcake made me eat it

Gender and the addiction metaphor?

Are women more likely to use the metaphor of drugs than men?

- women are more pressured to conform to healthy eating
- women more likely to mention food cravings
  - Rozin, *et al.* (1991): females are significantly more likely to express cravings for chocolate than males.
  - Zellner, *et al.* (1999), Weingarten and Elston (1990), Osman and Sobal (2006): female undergraduates more likely than males to report food cravings.
- How to test:
  - Figure out the gender of Yelp users from first names
    - Using Social Security Baby Name database
    - See if women use the drug metaphor more.

Are women more likely to use the metaphor of drugs than men?

- Women significantly more likely than men to talk about food as a drug (p=0.000832).
- But we don't know the cause:
  - women might be more likely than men to have these cravings
  - women might be more comfortable than men in admitting to these cravings
  - women might have identical desires but be more likely than men to use this particular linguistic metaphor
- By the way
  - Men were more likely to use the language of trauma

The linguistics of food requests

Tim Althoff, Cristian Danescu-Niculescu-Mizil, Dan Jurafsky. 2014. How to Ask for a Favor: A Case Study on the Success of Altruistic Requests. AAAI ICWSM 2014

Question: What language do people use when making successful requests?

Problem: it depends on the request

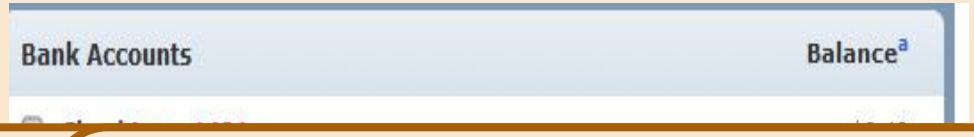
Solution: control for the request

21,000 requests for pizza on "Random Acts of Pizza" Reddit.

FA

Evidentiality: Urgent requests are met more frequently than non-urgent requests (Yinon and Dovrat 1987; Shotland and Stebbins 1983; Colaizzi, Williams, and Kayson 1984; Gore, Tobiasen, and Kayson 1997)

"My g … er losing her jo … eing pl… ha… cu… reinstat… perfo… and ANYT… I [...] woul… able to recipr…ocate."



Length: Long … effort and … (Lettice et a…

Reciprocity: Promises to return the favor (Wilke and Lanzetta 1970; Willer et al. 2013; Gray, Ward, and …

Status: People of high status (e.g. occupation or wealth) receive help more often.
(Solomon and Herman 1977; Goodman and Gareis 1993)

Who gets pizza?

Predictable from the language!

Most important factor: **Pro-social behavior**

- Generalized Reciprocity
  - Promising to Pay it Forward
- Saying thank you
- Having karma in community

Computing the Language of Food

The language of menus and ads

- economics of "modest" advertising
- Health, authenticity, and class

The language of reviews and requests

- social psychology of language
  - the linguistic signs of trauma
  - our complex attitudes toward food and body
  - the rewards of pro-social behavior/language

Some conclusions from the Language of Food

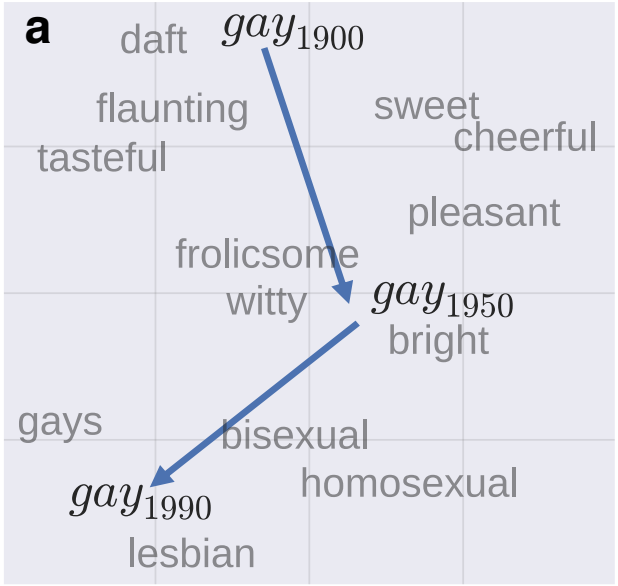
- Innovation happens at interstices, as we borrow and extend the ideas of our neighbors
- People suffer when you are mean to them, and are generous when you are kind
- You can tell a lot about psychology, economics, even evolution if you just look very carefully at the language of food

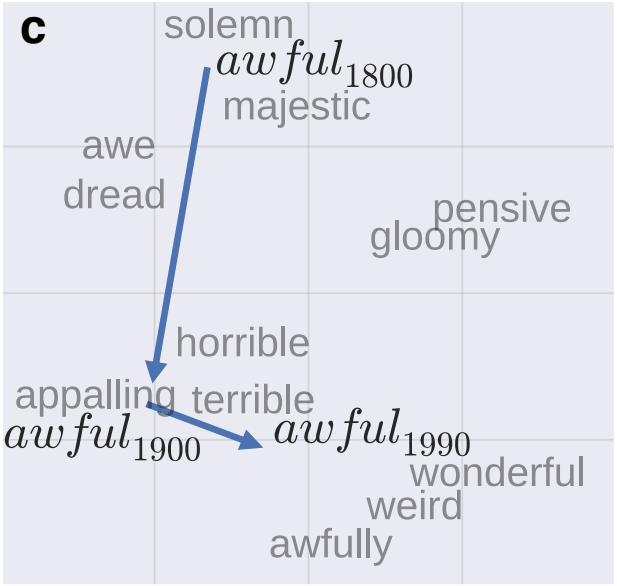
Other stuff going on in our lab

With Will Hamilton and Jure Leskovec

Computational historical linguistics

- Test linguistic theories of meaning change
- Using 200 years of online corpora





Other stuff going on in our lab

With **Jennifer Eberhardt**, Nick Camp, Camilla Griffiths, Rob Voigt, Vinod Prabhakaran, David Jurgens, Will Hamilton

Police language and race

- Use Oakland police department footage
- Can we extend Cristian's work on politeness to measure procedural justice
  - Respect, neutrality, etc. of police officers
  - Do police interactions with whites and blacks differ in aspects of procedural justice as measured from language?