



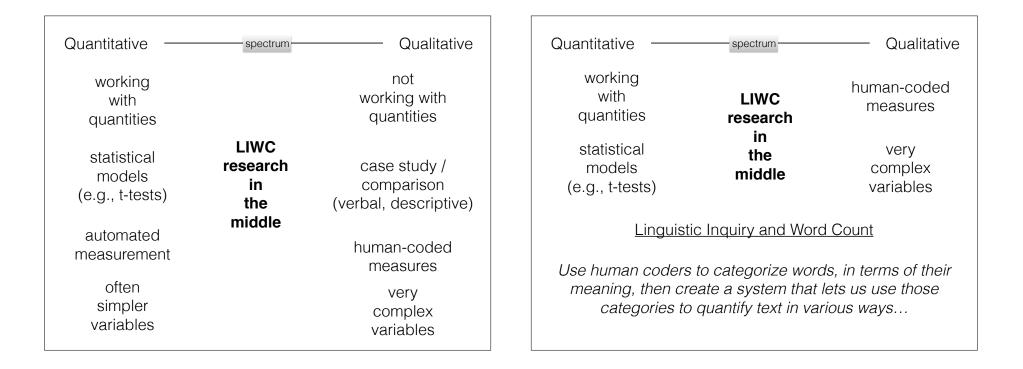
Today: LIWC

- Last time: LSA, a model of meaning
 - Purely quantitative
- Linguistic Inquiry and Word Count (LIWC)
 - A measure of meaning that **mixes qualitative and quantitative**
- Motivation: You are "linguistically leaky" subtle patterns of word usage may reveal your intentions, emotions, desires, etc.

Types of Research

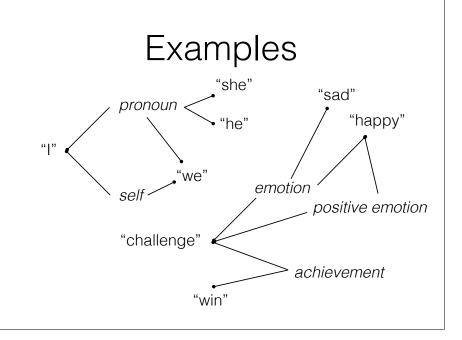
• Qualitative vs. ... quantitative





Examples

- What the word "I" means can be described in terms of the categories in which this word can be placed. E.g.: *pronoun, self*
- How about the word "challenge": *emotion*, *positive emotion*, *achievement*
- Each word can be in many categories; each category has many words.
- LIWC now has almost 5,000 words!



LIWC Is, in Part, a Dictionary

1	
	pronoun, self
we	pronoun, self
she p	ronoun, self, female
challenge emotion, p	ositive emotion, achievement
win	achievement, etc.
happy emo	otion, positive emotion
see	senses, vision, etc.

Qualitative Methods

- LIWC used qualitative coding by human participants in order to get these dictionaries...
- Human judges (about 5) worked together to help (i) pick the words, (ii) pick the categories, and (ii) **categorize the words**.
- Judges achieved inter-rater reliability:
 - The process of comparing judge categorizations to determine how closely judges agreed. Where they do not have a majority vote, they either removed a word or negotiated to come to agreement. Ultimately, LIWC's scores are based on over 90% agreement by judges.

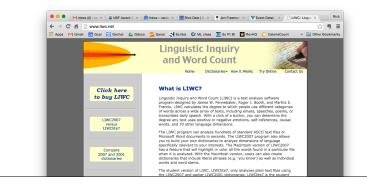


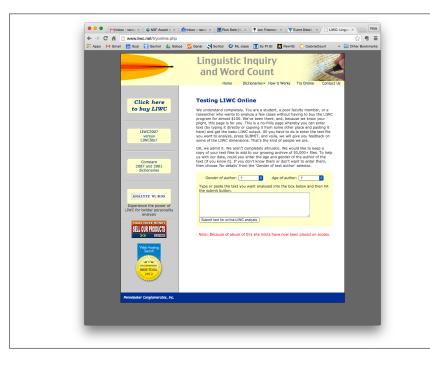
Cognitive Questions...

- After LIWC has **hand-coded** these categories, we can now use them to **quantify** text.
- Questions we might ask:
 - How much do people refer to themselves?
 - How sad are people? How negative?
 - How much do they talk about their job?
 - How often do they make social references?

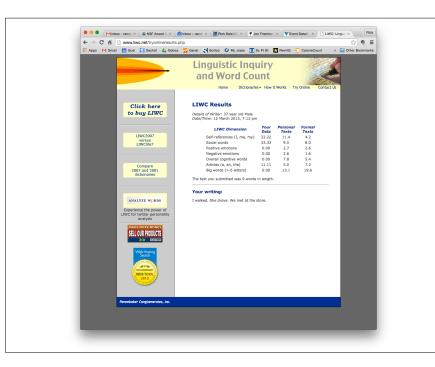
LIWC Is Quite Transparent

"I walked. She drove. We met at the store." 9 words. 3 pronouns (33%) 2 self words (22%)





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Click here	Testing LIWC Online
to buy LIWC	We understand completely. You are a student, a poor faculty member, or a researcher who wants to analyze a few cases without having to buy the LIWC
	program for almost \$100. We've been there, and, because we know your plight, this page is for you. This is a no-frills page whereby you can enter
LIWC2007	text (by typing it directly or copying it from some other place and pasting it here) and get the basic LIWC output. All you have to do is enter the text file
versus LIWCite7	you want to analyze, press SUBMIT, and volla, we will give you feedback on some of the LIWC dimensions. That's the kind of people we are.
Liwciter	OK, we admit it. We aren't completely altruistic. We would like to keep a
·	copy of your text files to add to our growing archive of 50,000+ files. To help us with our data, could you enter the age and gender of the author of the
Compare	text (if you know it). If you don't know them or don't want to enter them, then choose 'No details' from the 'Gender of text author' selector.
2007 and 2001 dictionaries	then choose wo details from the Gender or text author selector.
	Gender of author: Male O Age of author: 37 O
	Type or paste the text you want analysed into the box below and then hit the submit button.
ANALYZE WORDS	"I walked. She drove. We met at the store."
Experience the power of	
LIWC for twitter personality analysis	
MAKE HORE HONEY	Submit text for online LIWC analysis
SELL OUR PRODUCTS	
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Dear members of the UC Merced Faculty:	
As you know, Commencement is our most visib accomplishments of our students. As an educa you have played a vital role in the success of ou participation in the Commencement ceremony i	ator and mentor at UC Merced, ur students. Your personal
This year we will be hosting two school-based or Engineering and the School of Natural Sciences and the School of Social Sciences, Arts and Hun	ceremony on Saturday, May 16,
Your role in Commencement is invaluable and I students for this important milestone. If you ha graduating this year, it is especially important th As we did last year, my office will partially subs participating faculty who do not possess their o	ave a Ph.D. candidate who is hat you attend to hood her/him. idize the cost of rental regalia for
You will receive additional details regarding you from your respective Dean and the Commencer to celebrating this momentous occasion with you	nent Committee. I look forward
Sincerely,	
Tom	
Thomas W. Peterson Provost and Executive Vice Chancellor UNIVERSITY OF CALIFORNIA, MERCED 5200 North Lake Road, Merced, CA 95343 2004:288-4491 (Investerson@unerced.edu	



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Commencements is unablade and a mecourage you to join your students for the second provide the second provid	· · · · · · · · · · · · · · · · · · ·	two school-based ceremonies, with the School of Engineering and the School of Natural Sciences ceremony on Saturday, May 16, and the School of Social
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LIWC as "Forensic Linguistics"

- LIWC has been applied all over the place. The reading provides some very nice details...
- The idea is that subtle linguistic usage, especially such things as stylistics (pronouns, prepositions, etc.) might serve as a kind of "linguistic forensic" device, that could detect some psychological states.

Cognitive Question

THE SECRET LIFE OF PRONOUNS WHAT OUR WORDS SAY ABOUT U

- How much do people refer to themselves?
 - Turns out, liars tend to use language in a way to minimize first-person singular.
 - LIWC has been used to quantify text that contains lies. Fewer "I"s!
 - Also find that depressives use more first-person singular.

Cognitive Questions

- How sad are people? How negative?
 - Turns out, participants who are more **neurotic** tend to have correlated **negative word** usage.

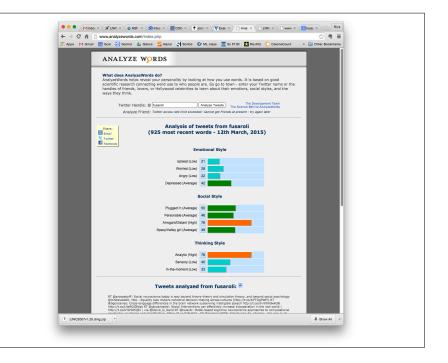
ranging between 0.10 and 0.16. Overall, neuroticism was positively correlated with use of negative emotion words and negatively with positive emotion words; extraversion correlated positively with positive emotion words and words indicative of social processes; agreeableness was positively related to positive emotion and negatively to negative emotion words. In addition, neuroticism was characterized by a more frequent use of first person singular, a finding that is consistent with the idea that excessive use of first person pronouns reflects a high degree of selfinvolvement (e.g., Davis & Brock 1975, Ickes et al. 1986, Scherwitz & Canick

Cognitive Questions

consistent changes in their linguistic styles. With increasing age, individuals used more positive emotion words, fewer negative emotion words, fewer first person singular self-references, more future tense, and fewer past tense verbs. Age was also positively correlated with an increase in cognitive complexity (e.g., causation words, insight words, long words). In addition to challenging some of the cultural stereotypes on aging, these results suggest that language use can serve as a subtle linguistic age marker.

LIWC could serve as a kind of linguistic diagnostic tool for different stages in life...

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Grades

· Final paper

- Our coverage of diverse material is partly designed to help expose you to many techniques.
- In the final paper, you will choose one method, and expand a lab into a paper project.
- Choose something that is related to career interests.
 - E.g., philosophy grad school build a thought experiment?
 - E.g., forensic psychology LIWC?
 - E.g., CogSci grad school RT experiment?
 - E.g., cog neuro interests Neurosynth exploration?

Sections

- Going to lab ensures you understand the task you can even check to make sure it is correct before you submit it to your TA.
 - You can ask *any questions* about the task, and make sure you understand the procedures.
 - Ask your TA about careers in cognitive sc
- Don't forget extra SONA credit.



Exam 2 / Next Week

- Date for next exam: March 31st, after spring break.
 - Review guide posted well before spring break.
- One more section before exam two: neural network models
 - From computer analysis in big data to computational modeling using neural network