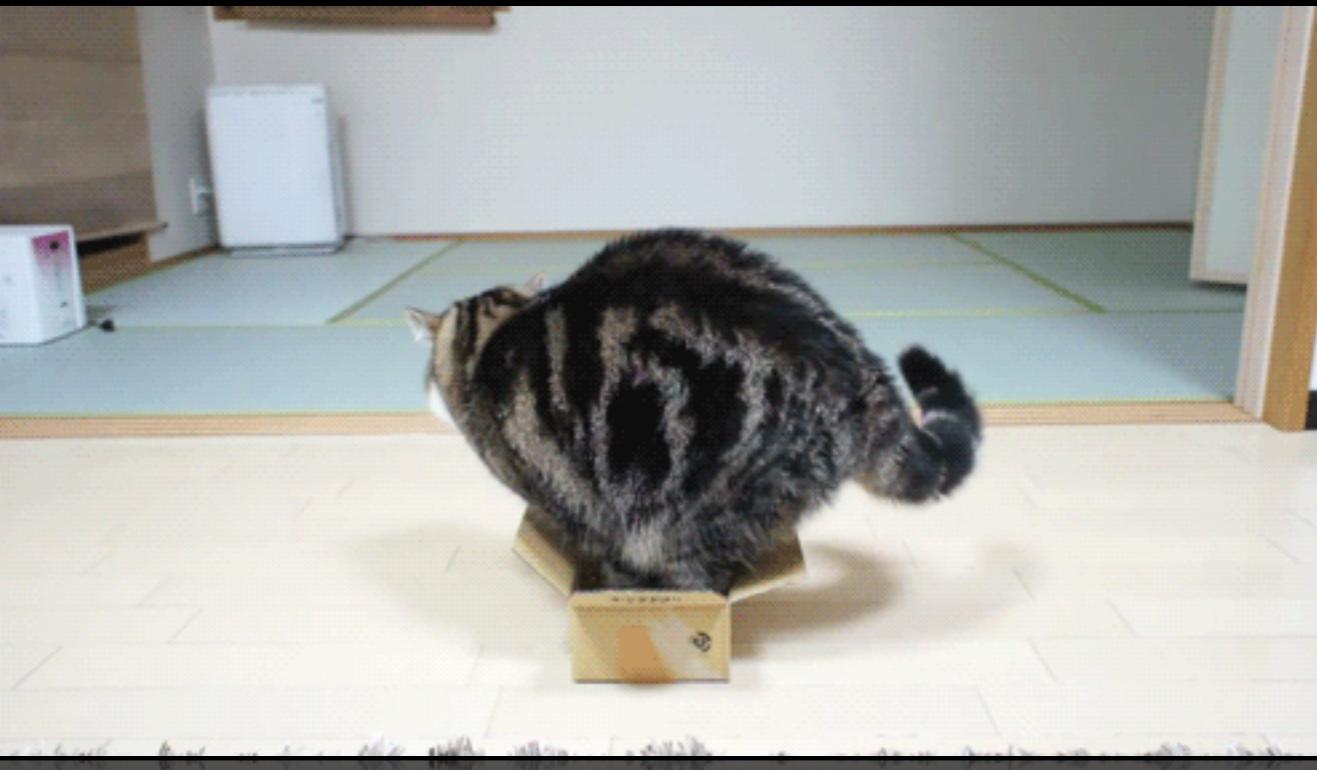
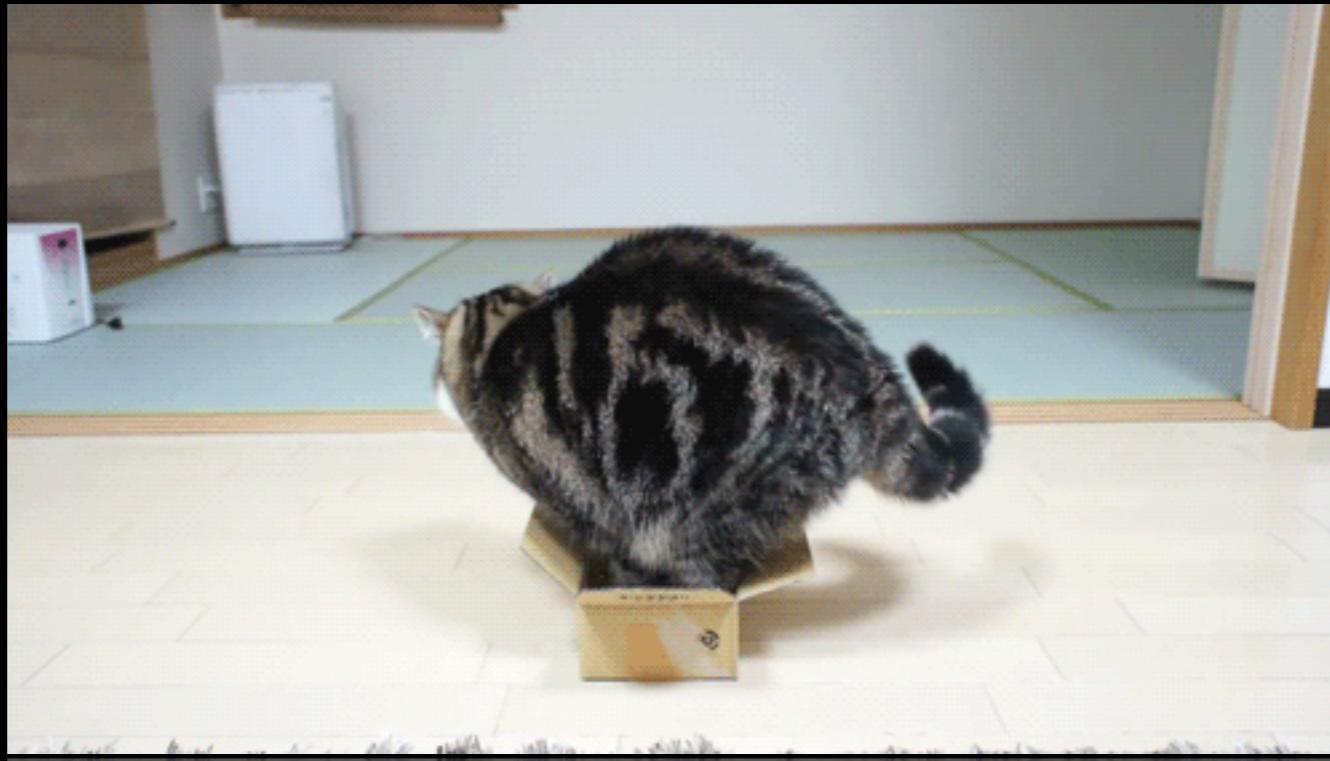


# Subjectivity Predicts Adjective Ordering Preferences

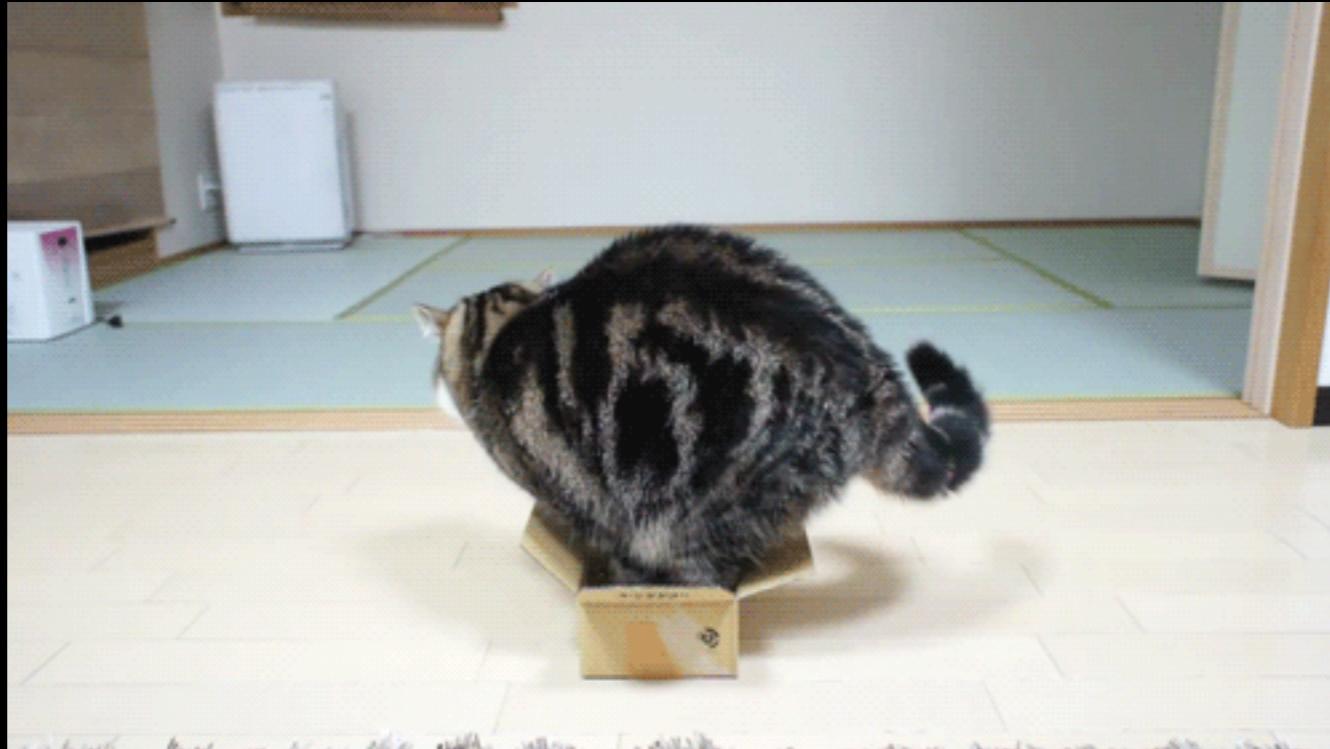
Greg Scontras  
Judith Degen  
Noah Goodman



the little brown cardboard box



the little brown cardboard box



*the cardboard brown little box*

little brown cardboard box

English

little brown cardboard box

English  
German  
Hungarian  
Polish  
Turkish  
Hindi  
Telugu  
Mandarin  
Dutch  
⋮

pre-nominal

little brown cardboard **box**

English

German

Hungarian

Polish

Turkish

Hindi

Telugu

Mandarin

Dutch

⋮

post-nominal

**box** cardboard brown little

Indonesian

Basque

Selepet

Mokilese

Farsi

⋮

pre-nominal

little brown cardboard **box**

English

German

Hungarian

Polish

Turkish

Hindi

Telugu

Mandarin

Dutch

⋮

post-nominal

**box** cardboard brown little

Indonesian

Basque

Selepet

Mokilese

Farsi

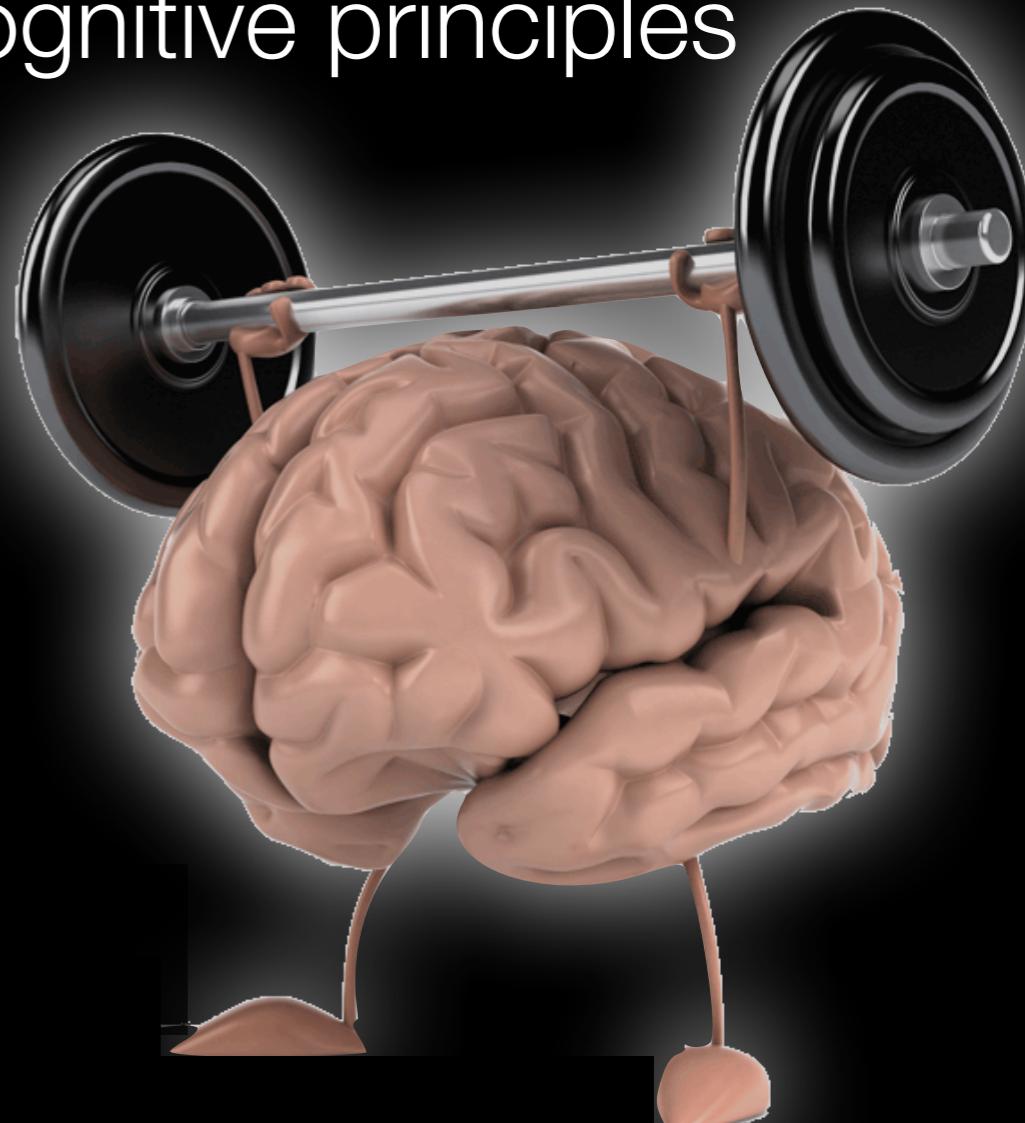
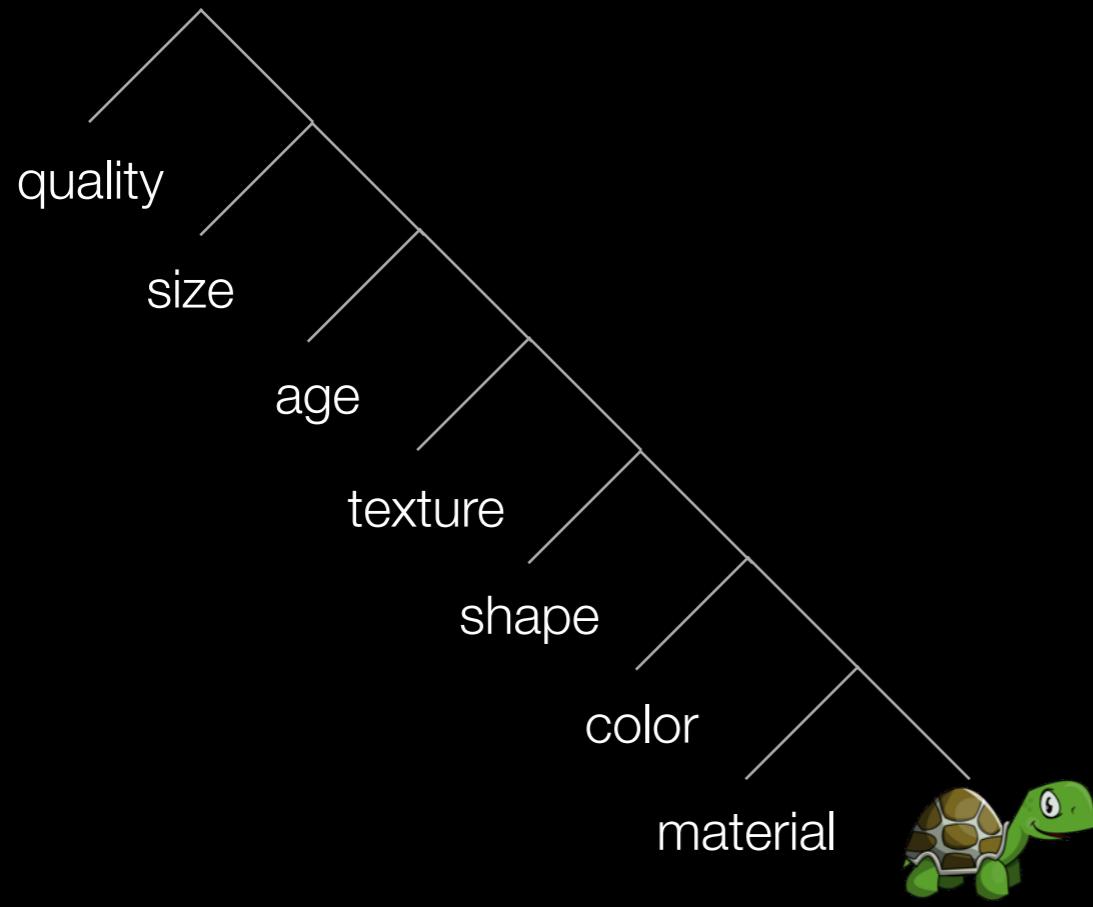
⋮

WHY?

# WHY?

hard-coded  
syntax-specific  
universal grammar

emergent  
from general  
cognitive principles



emergent  
from general  
cognitive principles

little brown cardboard box



emergent  
from general  
cognitive principles

little brown cardboard box



“less context-dependent meaning”

“closer to the noun in meaning”

“more specialized meaning”

“describing more inherent properties”

little brown cardboard box



subjectivity  
decreases



little brown cardboard box



subjectivity  
decreases



little brown cardboard box



subjectivity  
decreases

little brown cardboard box



subjectivity  
decreases

step 1: measure the ordering preferences

step 2: validate preference measure

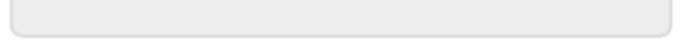
step 3: measure adjective subjectivity

step 4: validate subjectivity measure

# step 1: measure the ordering preferences

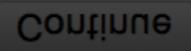
Progress: 

Which description of the chair sounds more natural?

"the small red chair"  "the red small chair"

Adjust the slider to indicate your preference.





26 adjectives from 7 semantic classes

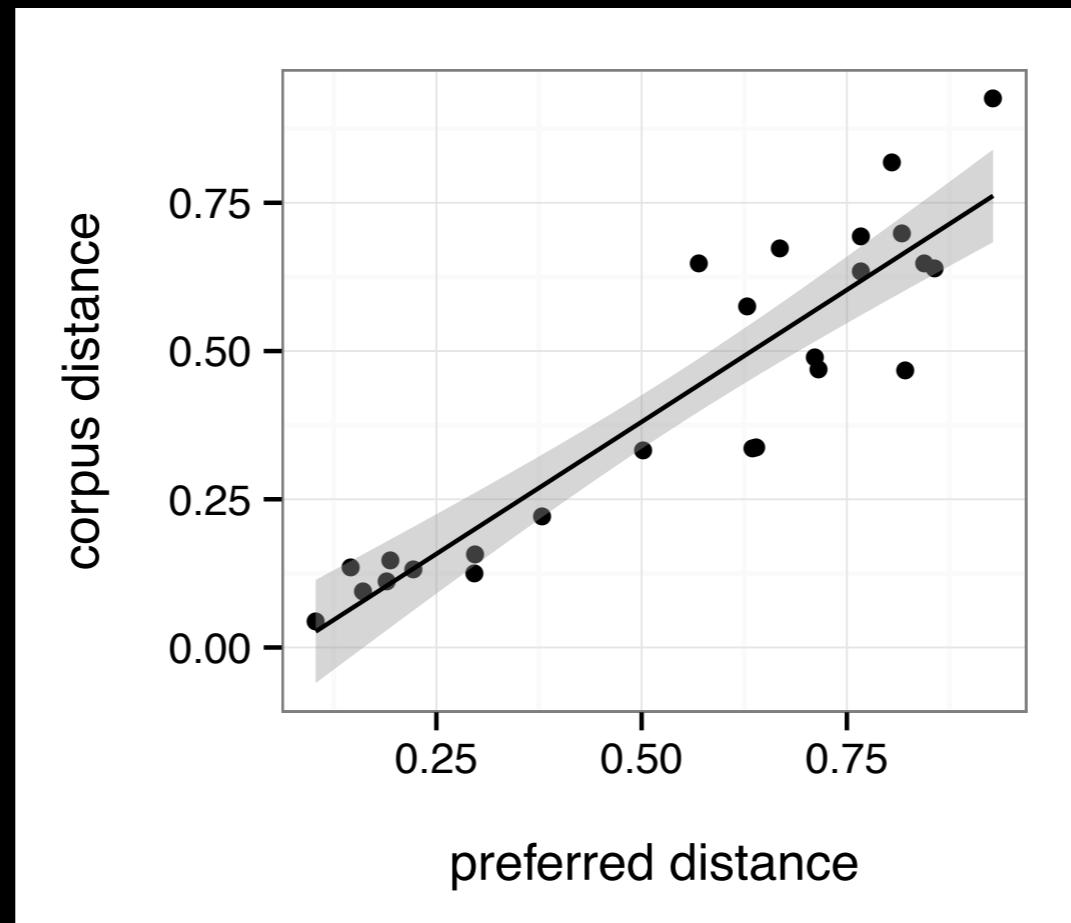
step 2: validate the preference measure with corpora

calculate mean distance from noun

adjective-adjective-noun

38,418 cases from Switchboard and BNC

step 2: validate the preference measure with corpora



$r^2 = .83$ ; 95% CI [.63, .90]

ordering preferences track corpus measure

## step 3: measure adjective subjectivity

Progress: 

Consider the following situation:

Greg and Logan see the same carrot.

Greg says: "**That carrot is big.**"

Logan responds: "**You're wrong. That carrot is not big.**"

Can both Greg and Logan be right?

No, somebody must be wrong.

Yes, it's a matter of opinion.

[Continue](#)

more “faultless disagreement” → more subjective

No, somebody must be wrong.

Yes, it's a matter of opinion.

## step 4: validate subjectivity measure

Progress: 

Consider the following description:

**brown cheese**

How subjective is the description "brown cheese"?

completely objective

completely subjective

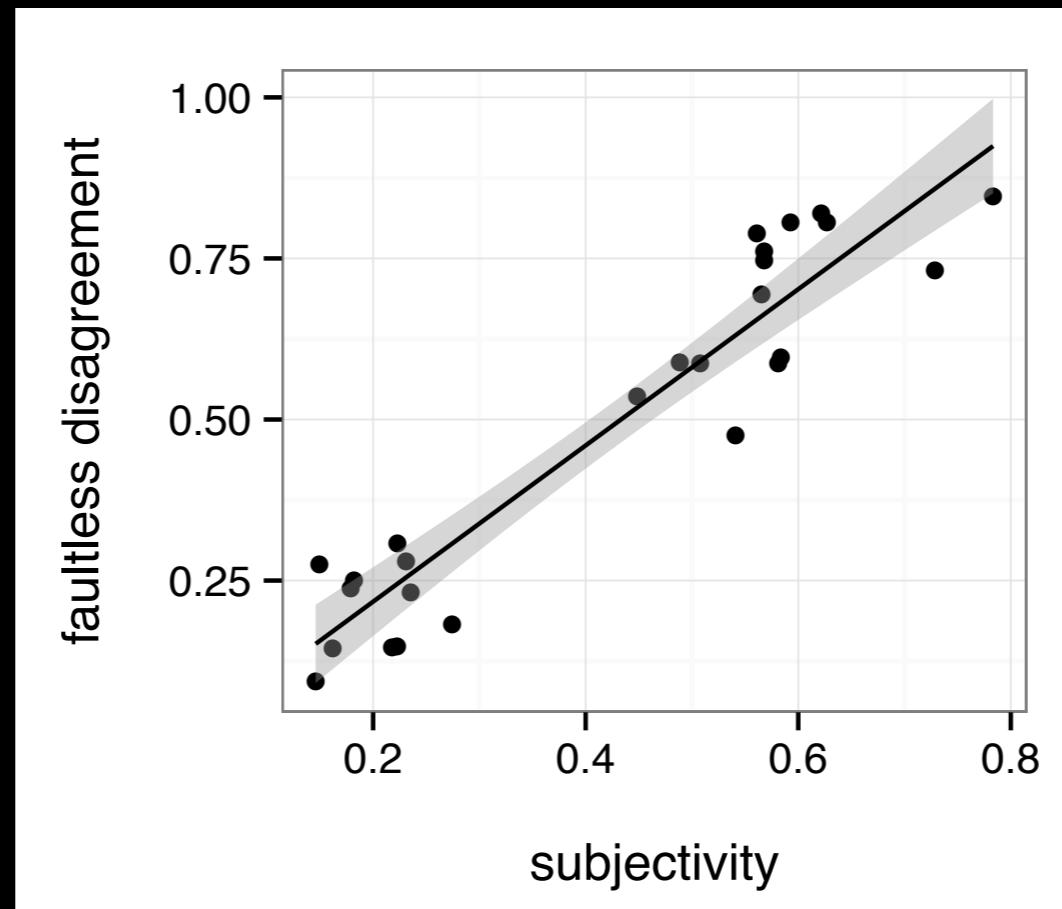
[Continue](#)

[Continue](#)

completely objective

completely subjective

## step 4: validate subjectivity measure



$r^2 = .89$ ; 95% CI [.82, .93]

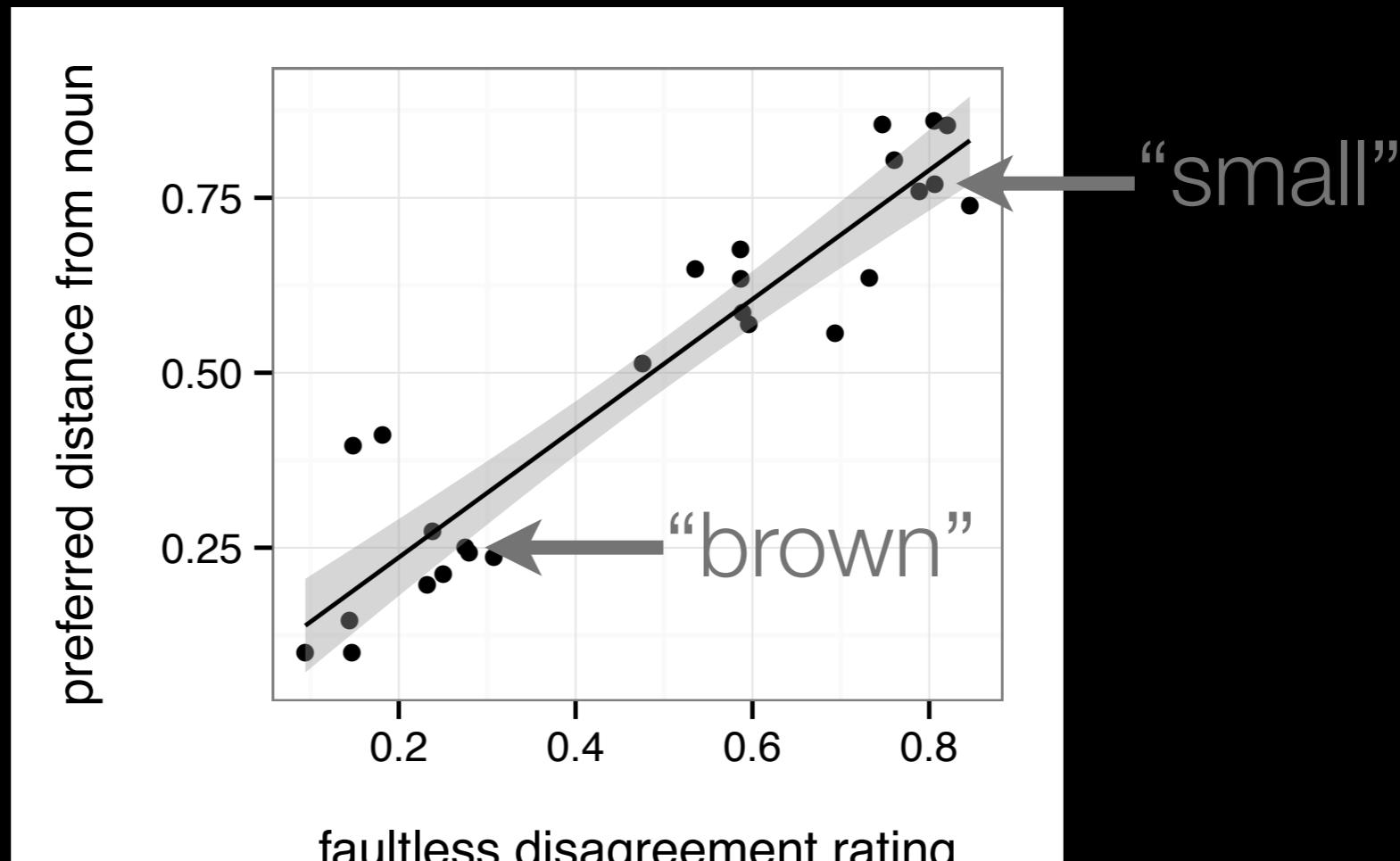
faultless disagreement tracks “subjectivity”

little brown cardboard box



subjectivity  
decreases

# predicting adjective order with subjectivity



preferred distance increases with subjectivity

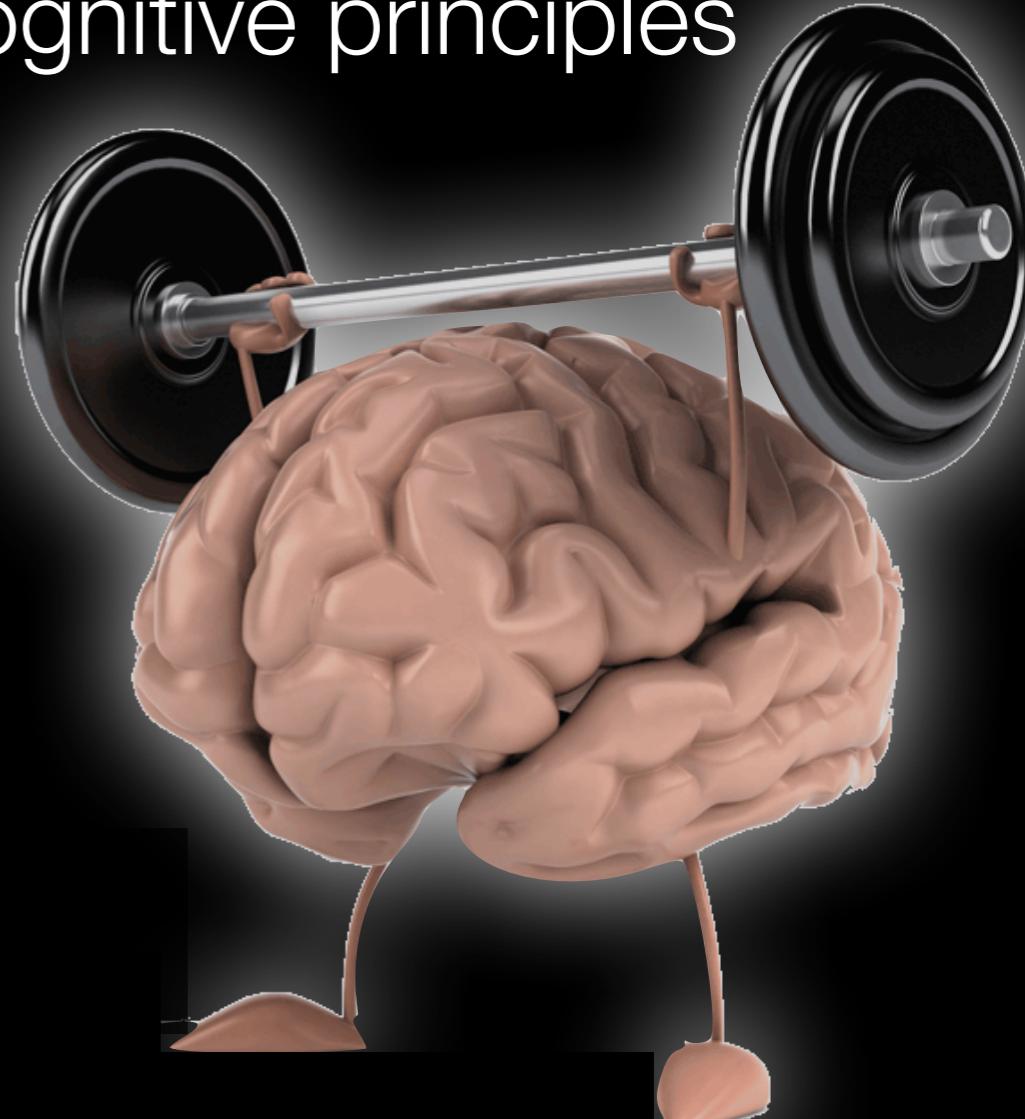
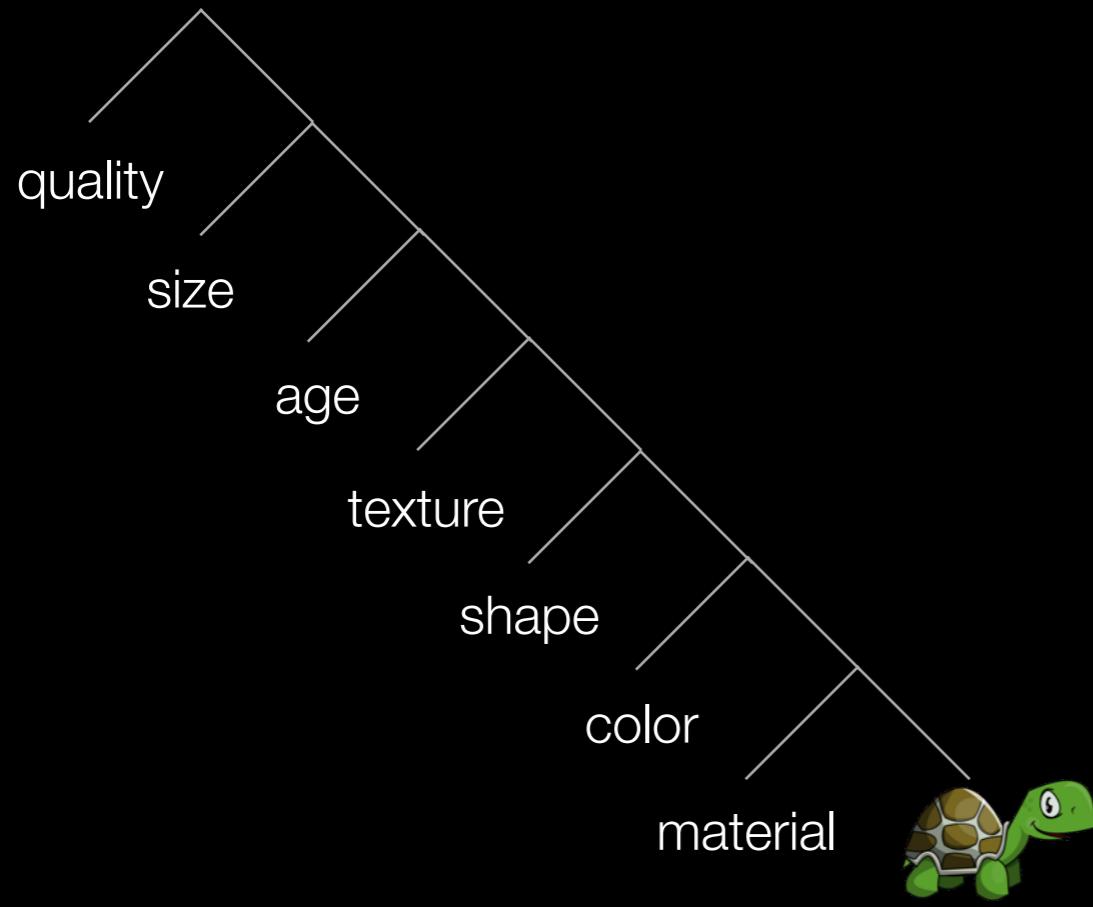
$$r^2 = .88; \text{ 95\% CI } [.77, .95]$$

subjectivity predicts  
adjective ordering preferences

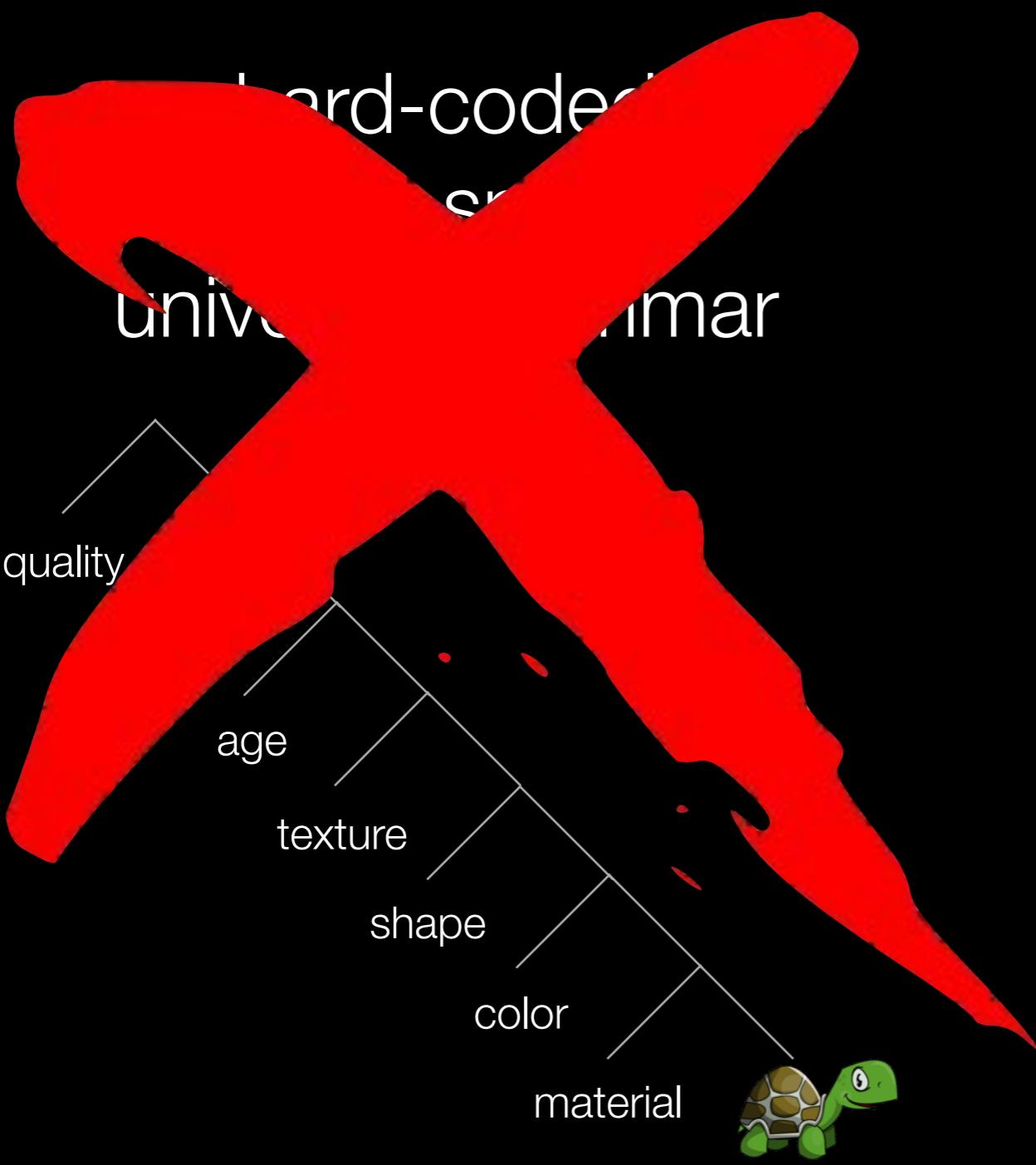
# WHY?

hard-coded  
syntax-specific  
universal grammar

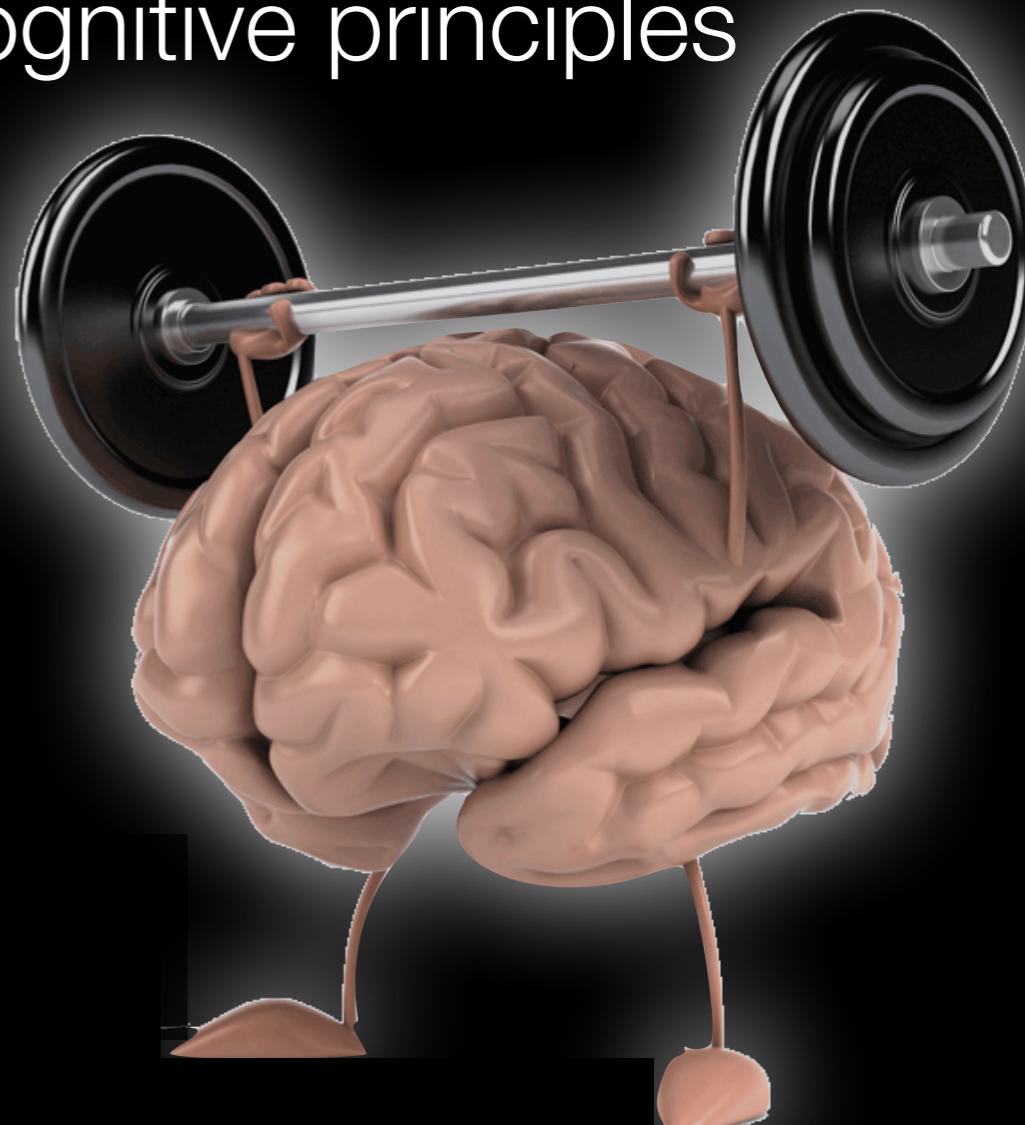
emergent  
from general  
cognitive principles



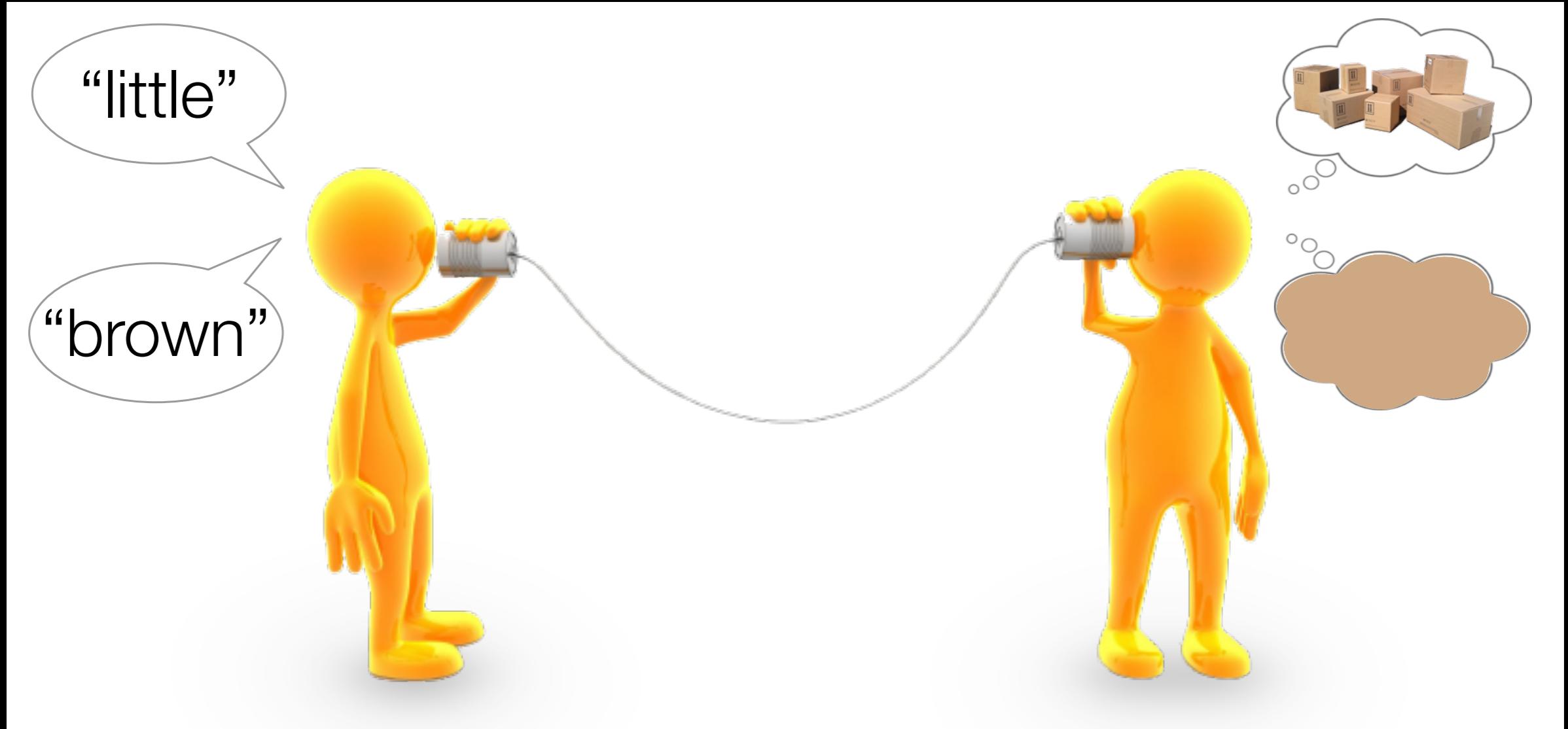
# WHY?



emergent  
from general  
cognitive principles



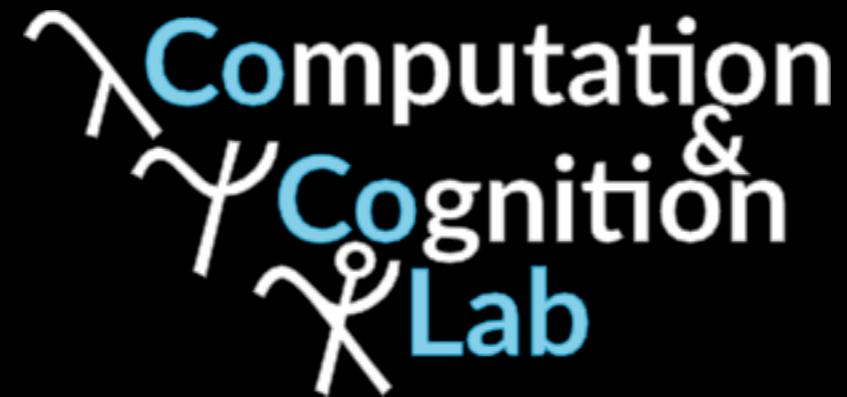
less subjective content is more useful



speakers consolidate less subjective  
content around the noun

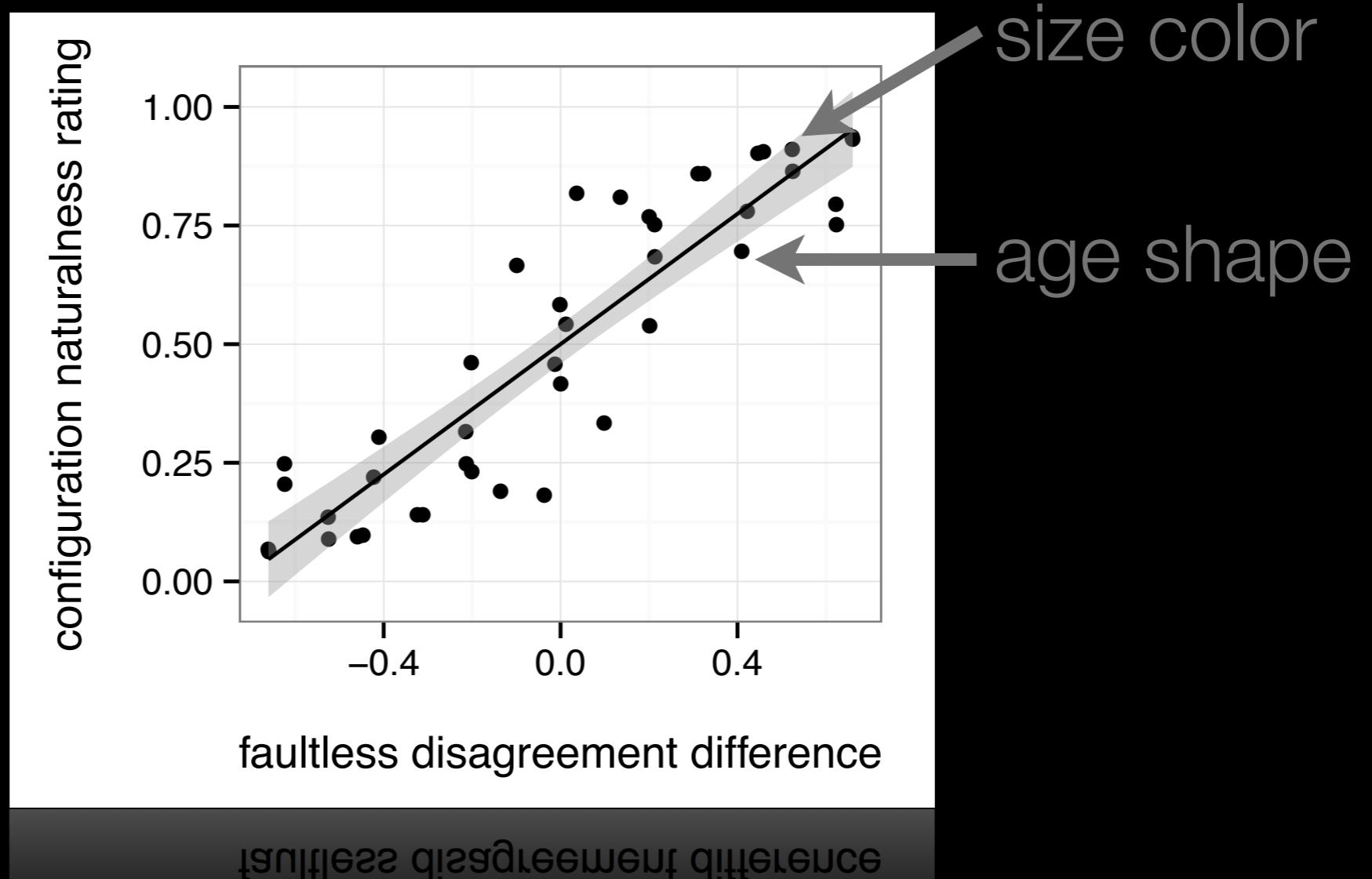
feedback welcome!

[scontras@stanford.edu](mailto:scontras@stanford.edu)





# predicting adjective order with subjectivity



naturalness increases with subjectivity difference

$$r^2 = .82; \text{ 95\% CI } [.71, .88]$$

# adjectives, nouns, and their semantic classes

adjective	class	adjective	class	noun	class
old	age	good	quality	apple	food
new	age	bad	quality	banana	food
rotten	age	round	shape	carrot	food
fresh	age	square	shape	cheese	food
red	color	big	size	tomato	food
yellow	color	small	size	chair	furniture
green	color	huge	size	couch	furniture
blue	color	tiny	size	fan	furniture
purple	color	short	size	TV	furniture
brown	color	long	size	desk	furniture
wooden	material	smooth	texture		
plastic	material	hard	texture		
metal	material	soft	texture		

