

# **Affect First!?**

## **Evaluating the Affect-First Hypothesis through Valence**

Morgan Moyer<sup>†</sup>, Anouch Bourmayan<sup>†</sup>, Isidora Stojanovic<sup>‡\*</sup>, Brent Strickland<sup>‡</sup>

<sup>†</sup>Sorbonne, <sup>‡</sup>Institute Jean Nicod, ENS-PSL / CNRS, <sup>\*</sup>Pompeu Fabra

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Valence asymmetries special session

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Blankenship, Ben (2020), <https://photocontest.smithsonianmag.com/photocontest/detail/parrot-snake-strike/>







# Affect-First Hypothesis

Wundt 1907; Zajonc 1980, 2000; Murphy & Zajonc 1993; LeDoux 1996; Stapel, Koomen & Ruys 2002

You don't process the **conceptual information** *that this object is a snake (cucumber)* before you have an **affective response** (=fear) to the object flying at your face (sitting behind you).

“Preferences need no inferences”

The affective response motivates you to adaptive behavior

## What about words?

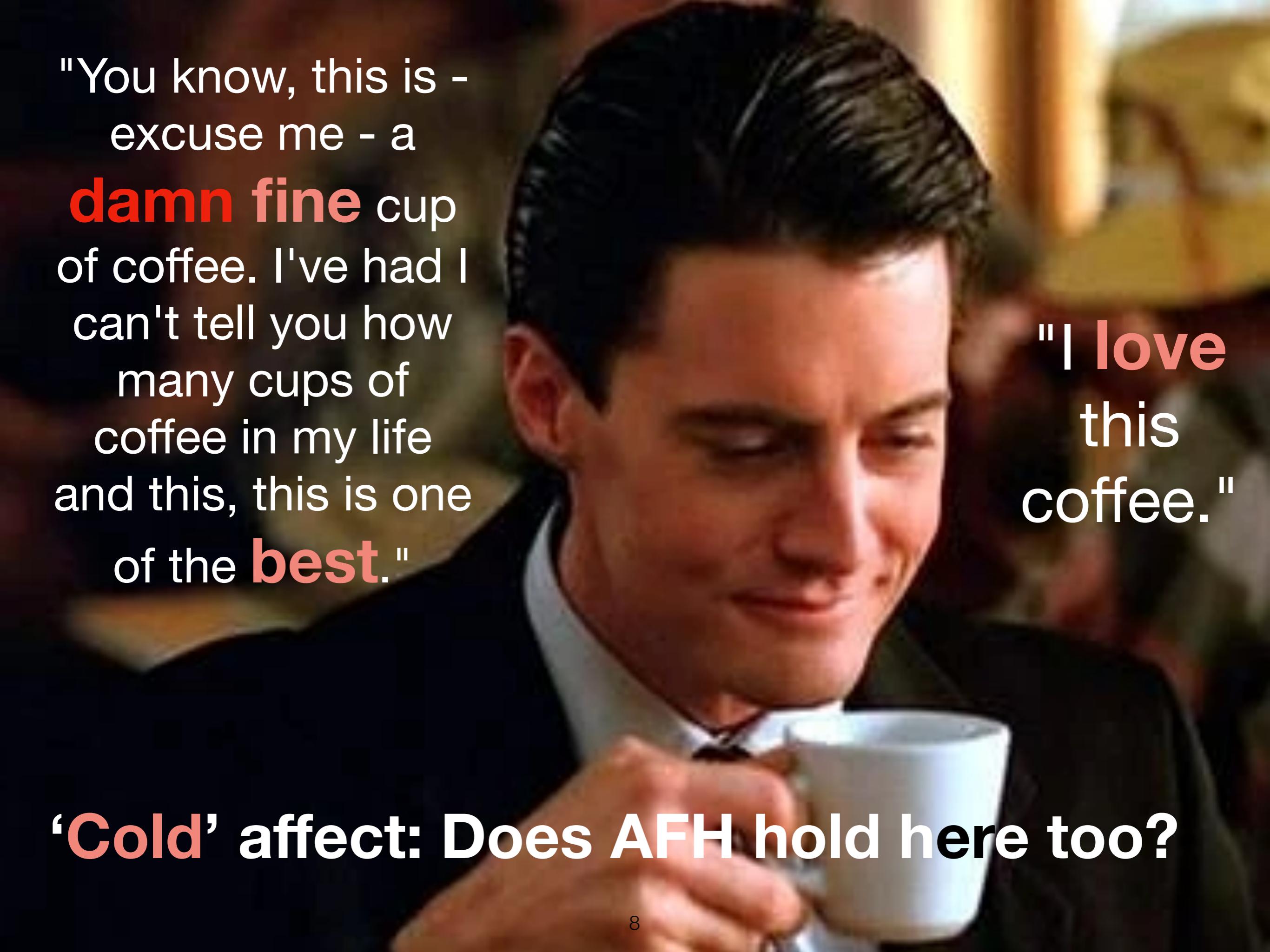


"You **bumb DITCH!**"



"Eat me."

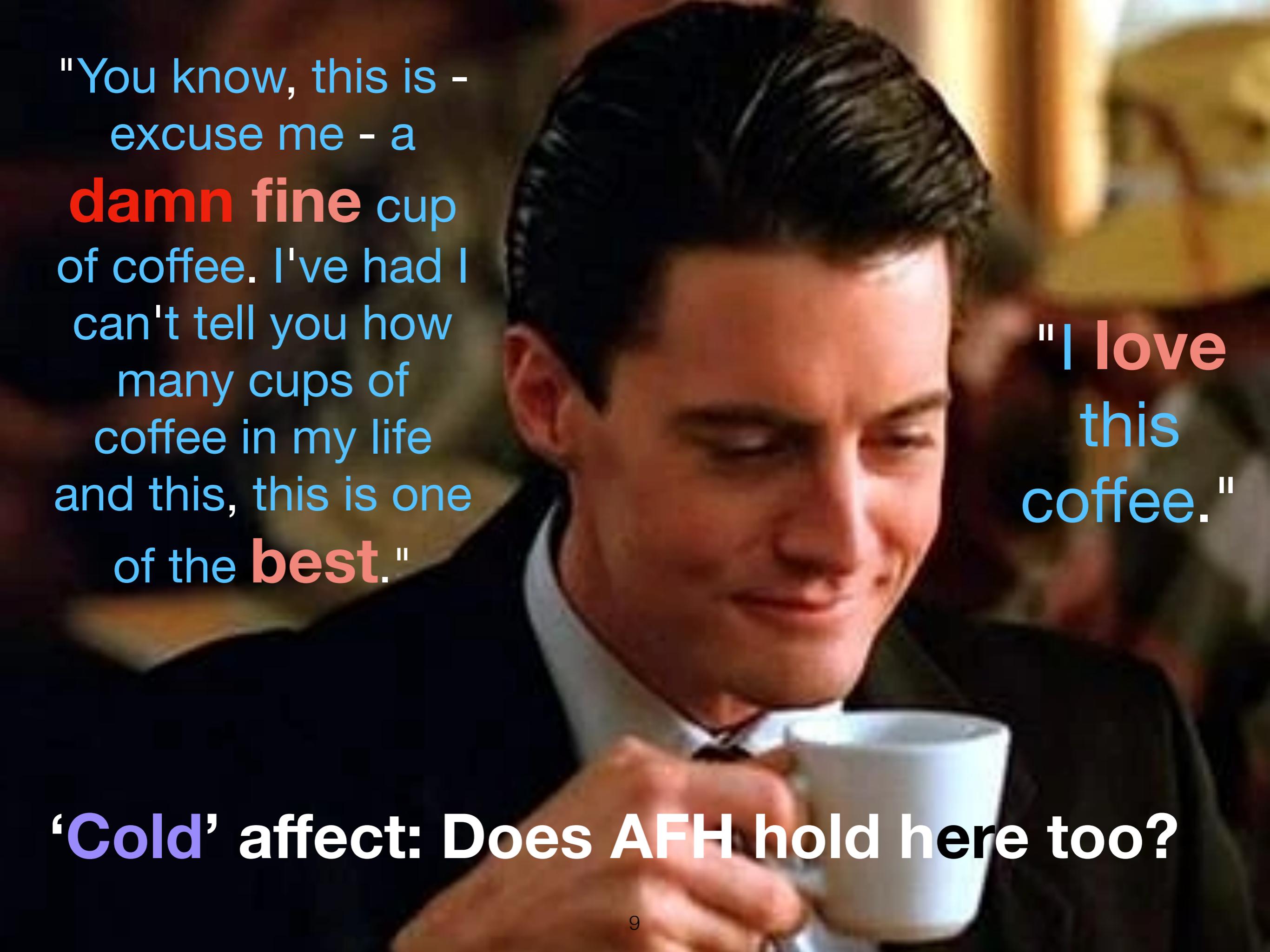
**Expressives, slurs, snakes, cucumbers... AFH ✓  
'Hot' affect: increased physiological arousal**



"You know, this is -  
excuse me - a  
**damn fine** cup  
of coffee. I've had I  
can't tell you how  
many cups of  
coffee in my life  
and this, this is one  
of the **best.**"

"I **love**  
this  
coffee."

**'Cold' affect: Does AFH hold here too?**



"You know, this is -  
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**'Cold' affect: Does AFH hold here too?**

# Roadmap

- I. Introduction
- II. Background ~ AFH & affective meaning
- III. Experiments 1-5: Speeded Categorization
  - A. Exp 1: Concrete vs. Abstract (V, N, A)
  - B. Exp 2a: Physical vs. Psychological (V)
  - C. Exp 2b: Physical vs. Social (A)
  - D. Exp 3: Animacy (N)
  - E. Exp 4: Syntax (N vs. V)
- IV. Experiment 6: Similarity judgements (V)
- V. Discussion

# What is ‘affect’?

‘Hot’ vs. ‘cold’

(Zajonc 1980, 2000)

‘Low’ vs. ‘high’ pathways

(LeDoux, 1996; LeDoux, Romanski, & Xagoraris, 1989)

Affective vs. Semantic valence

(Itkes et al. 2017)

Emotion *laden* vs. emotion *label* words

(Pavlenko 2008; Zhang et al 2017; Betancourt et al. 2024)

# Affective Meaning and Semantic Theory



Frege, it was counter to the begriffsschrift, and thus standard Tarski-Lewis-Montague-Davidson-style semantic theory reified in Heim & Kratzer

But: “little puzzles” persist

- Strawson (1950) “on referring”
- Davidson (1986) “derangement of epitaphs”
- Perry (1979) “Essential indexical”, Lewis (1979) “attitudes de dicto and de se”
- Lewis (1996) “ellusive knowledge”
- Kaplan (1999) on “oops and ouch” & Kratzer’s discussion of it

Explosion of work on “expressives” Potts (2006), McCready, Gutzmann (2015), Cepollaro (2020), Jeshion (2021)...Now!

PPTs: Stojanovic (2007), Stojanovic (2012)

Affective meaning >>> semantics vs. pragmatics issues  
...but *what is meaning* ?!

# Affect and the Lexicon: Psychological norms of word meaning

Some psychologists argue affect  
is a part of all concepts (Osgood et al  
1957; Lambon Ralph et al 2017; Yap & Show 2017)

# Affect and the Lexicon: Psychological norms of word meaning

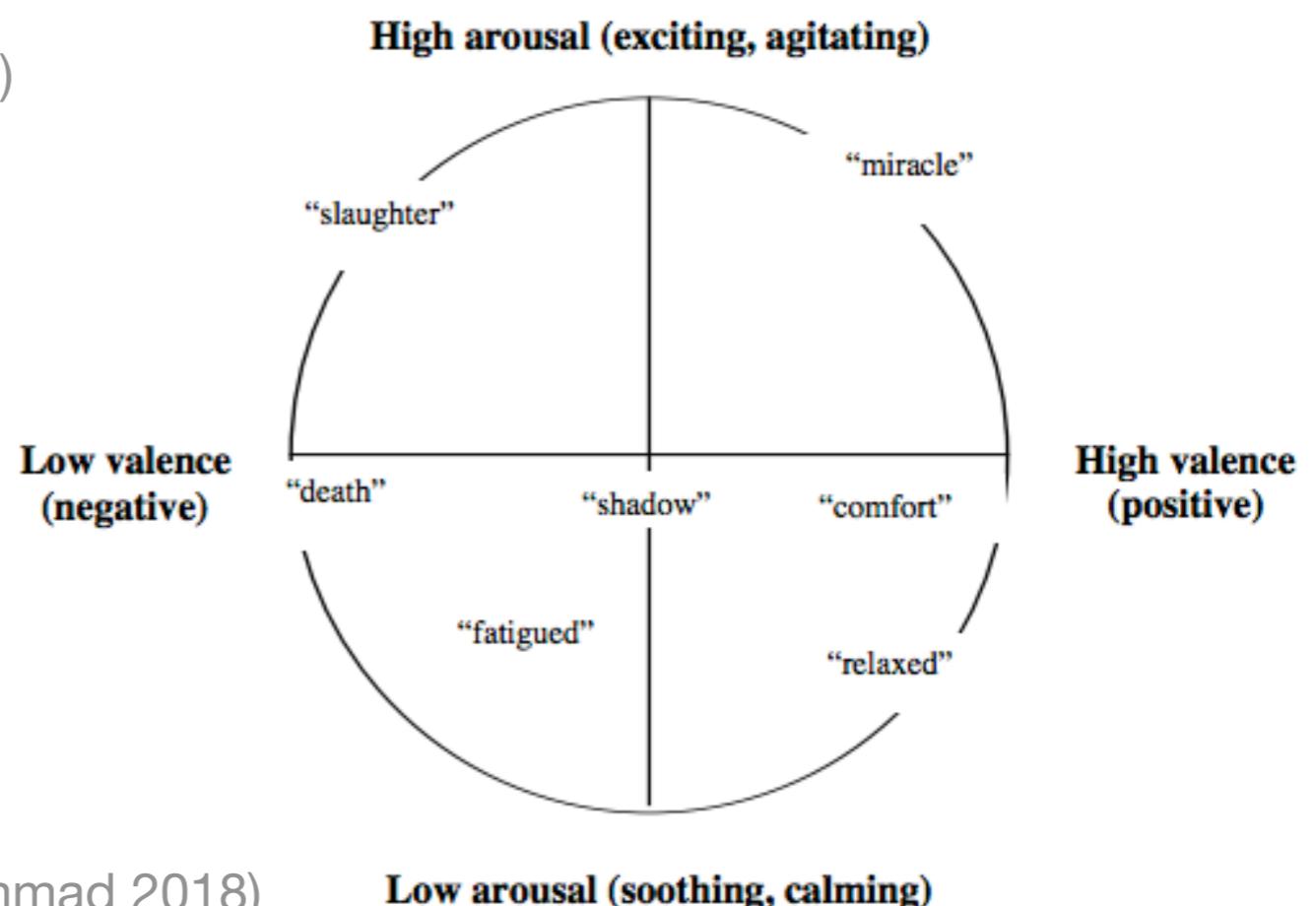
Some psychologists argue affect is a part of all concepts (Osgood et al 1957; Lambon Ralph et al 2017; Yap & Show 2017)

**evaluation, potency, activity**  
(Osgood et al. 1957)

...  
**pleasure, arousal, dominance**  
(Mehrabian et Russell 1974)

...  
**valence, arousal, dominance**  
(Bradley & Lang 1999; Warriner et al. 2013; Mohammad 2018)

**Figure 1.** Affective experiences may be best described in two dimensions: Valence refers to how positive or negative an event is, and arousal reflects whether an event is exciting/agitating or calming/soothing. Words have been placed at locations within this space, indicating their approximate valence and arousal ratings (ratings from Bradley & Lang, 1999 [#11]).



# Affect and the Lexicon: Psychological norms of word meaning

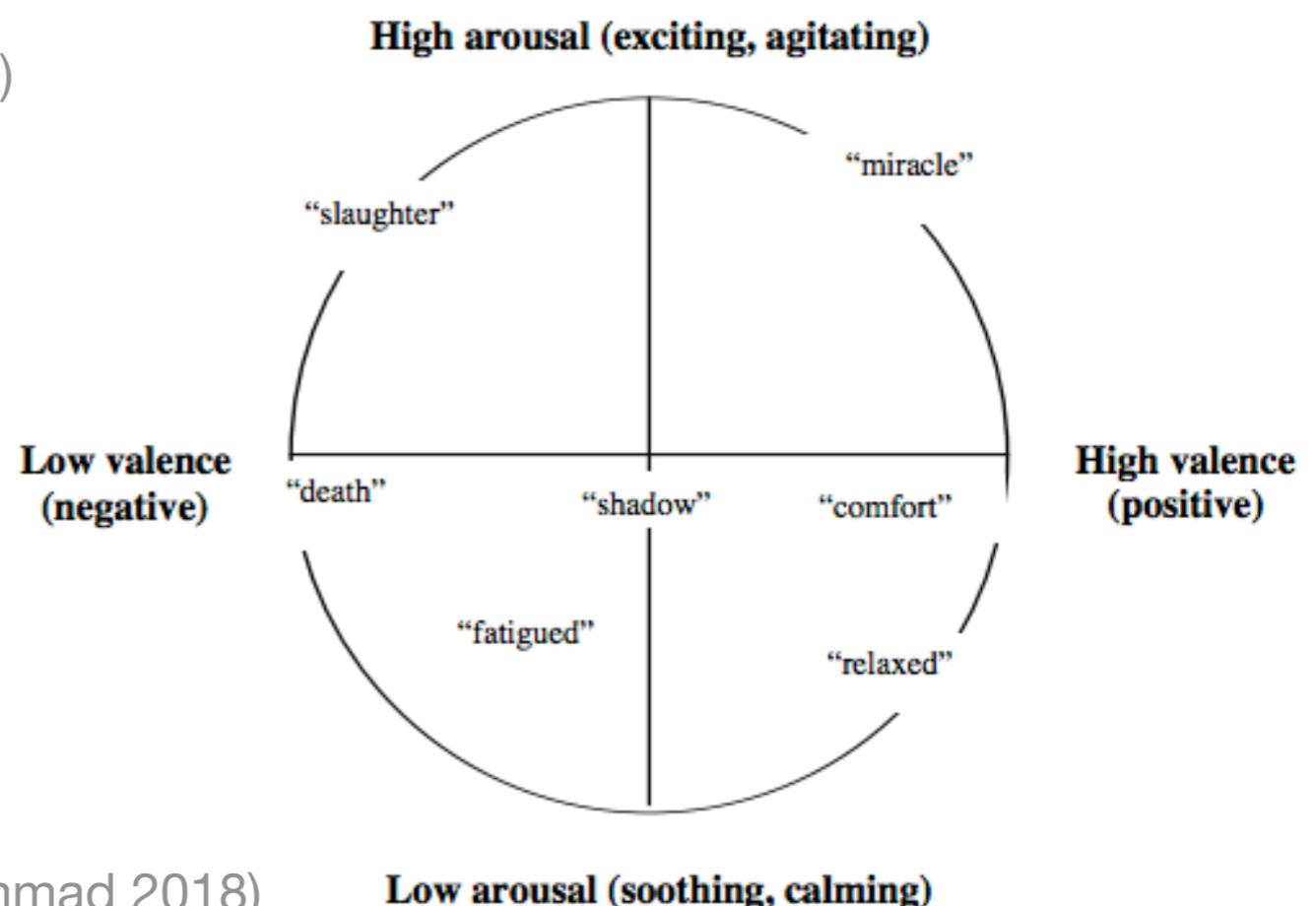
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**valence: the positive or negative value**

# Affect and the Lexicon: Classes of lexical items

Are all words ‘valenced’ in some way?

Are all ‘valancings’ the same ?

Some words are good candidates for lexical affect:  
evaluative terms, ppts, emotion-label words (love, hate,  
etc.)

Some PPTs are truly neutral (but can be evaluative  
contextually), others are valanced (=truly evaluative)

Stojanovic & Kaiser (2022)

# Evidence for AFH

Mere Exposure Effect (Zajonc 1968) and Affective priming (Fazzio 2001)

Participants respond faster + early ERP responses to Emo than neutral words (Costa et al 2009; Vigliocco et al 2011; Scott et al 2012)

Valence congruity facilitates semantic evaluation in aphasic patients with semantic dementia, argued to underly meaning (Souter et al. 2023)

# Against..

Object recognition (visual scene or facial) required for affect effects (Lazarus 1984; Rolls 1999; Storbeck, Robinson & McCourt 2006; Storbeck & Clore 2007; Calvo & Nummenmaa 2007; Batty, Cave, & Pauli, 2005; Fox et al., 2000; Horstmann & Bauland, 2006; Nummenmaa, Hyönä & Calvo 2010)

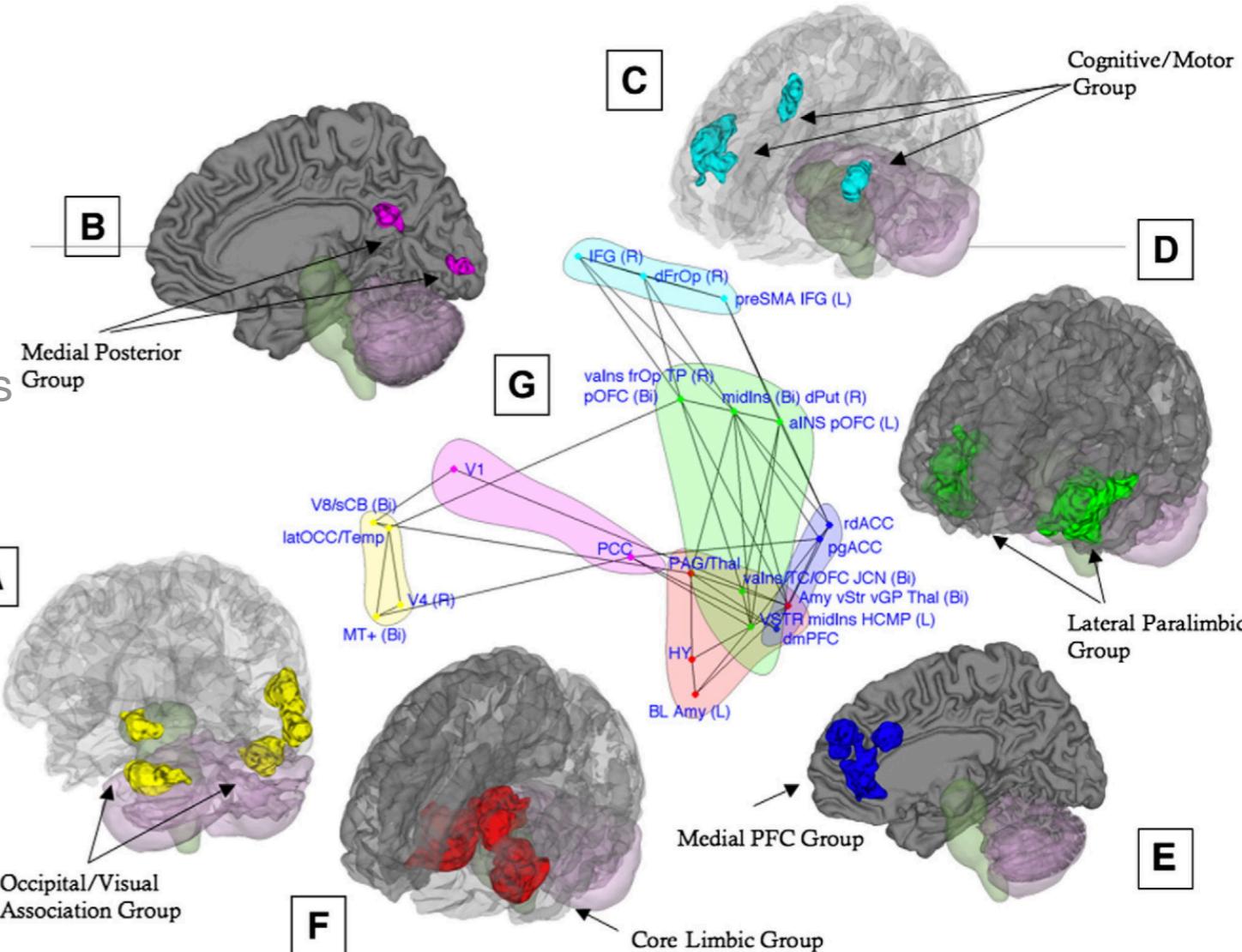
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**BUT**  
AFH assumes independence of affect and cognition. Is it correct?

(Souter et al ; Korber 2008) Korber et al found 6 circuits of coactivation

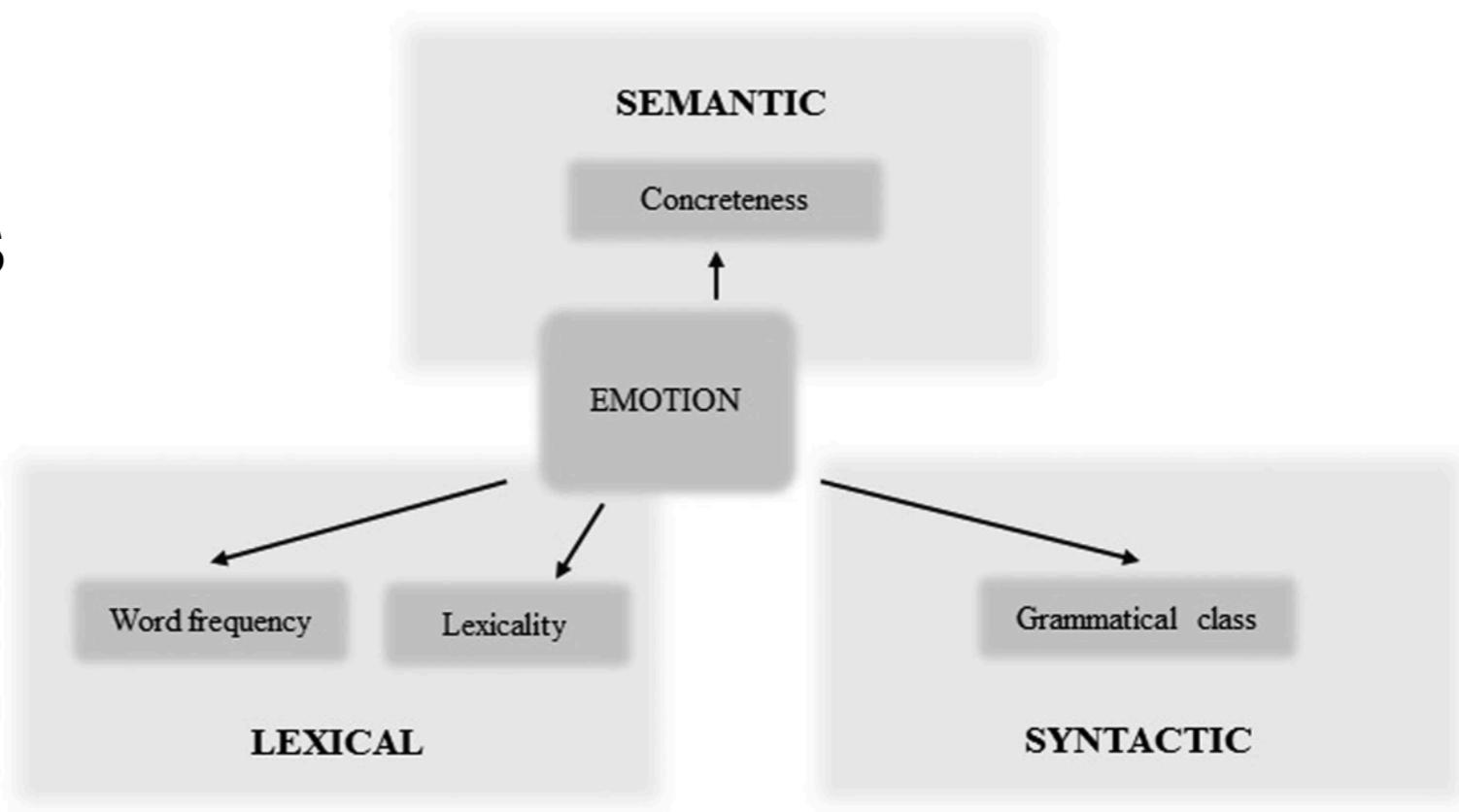
Affect vs. conceptual content: it's complicated (Winter 2022; Hinojosa et al 2019; Hinojosa et al 2023)



**Fig. 7.**  
(A–F) The six functional groups revealed by our multivariate analysis are depicted in 3D rendering on the single-subject brain. Regions in each group are rendered in a unique color. (G) To visualize the relationships among the regions in each group, both regions and co-activation lines are displayed on a “flattened” map of the connectivity space along the first two dimensions determined by NMDS (see Methods). Colors correspond to those in panels A–F and identify each network. Points closer together on the graph tend to have stronger positive co-activation, and connected lines represent significant Tau-b ( $\tau$ ) association values between pairs of regions. The connectivity map has been “pruned” such that the relationships depicted are direct, meaning that they were not completely mediated by any other single intervening region. Direct relationships were assessed by mediation analyses considering each possible mediating region in turn, with 1000 bootstrap samples per analysis. See Table 1 for abbreviations.

# Interacting variables

- Word frequency
- Word length
- Native/non-native
- Gender differences
- Morphosyntax
- Concreteness
- Imageability
- Age of acquisition
- Familiarity
- Contextual availability
- Semantic relatedness



**Figure 2.** Relations between emotional features and different lexical, semantic and syntactic features at the word level.

Hinojosa, Moreno & Ferré (2019)

# Affect + context

**Task effects:** Emotion effects found in semantic judgement tasks (Hinojosa et al 2014, Kaltwasser et al 2013)  
concreteness effects when focus is on lexical decision tasks (Hinojosa et al 2019)

**Affect effects** when emo words either describe people or are in communicative contexts (Rohr & Abdel Rahman 2018; Rohr & Wentura 2022)

**Negative attitude of slurs** direct listener attention to speaker intentions (Rodrigues Ronderos & Domaneschi 2023)

# Is **affective** meaning processed faster than **conceptual** meaning?

What is the ‘right’ conceptual foil for affective meaning, and how does it relate to cognition?

Does AFH occur across the lexicon?

# Conceptual foils

Concrete vs. abstract

Physical vs. psychological

Physical vs. social

Animate vs. inanimate

Noun vs. verb

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# HATE

F

**positive**

J

negative

# HUG

F

abstract

J

concrete

# Speeded categorization

2x1 within-subjects, blocked design  
(counterbalanced)

Task (Valence, Conceptual)

Items randomized within block

DM: key board press F or J (counterbalanced)

# **Experiment 1a-c: concrete / abstract**

# Valence x Concreteness

Relationship Status: HS sweethearts but it's complicated

Emotion grounds abstract concepts:  
valence aids abstract word learning

(Ponari et al, 2018, Lund et al 2019; Kim et al 2020),

and activates similar brain areas

(Vigliocco et al 2014)

“The inverted U”: the more abstract,  
the more valenced (Kousta et al 2011)

- **Yes But!** Winter (2020): true for *most* langs (not Cantonese or Mandarin) BUT only when you use a *particular* concreteness rating measure and *particular* statistical analyses matter, otherwise the pattern reverses

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and activates similar brain areas

(Vigliocco et al 2014)

**But** Concrete words elicit valence contrasts earlier than abstract  
(Palazova et al 2003)

- Modulation by task demand (Kansuke & Kotz 2007), other features like frequency (Hinojosa et al 2019)

“The inverted U”: the more abstract,  
the more valenced (Kousta et al 2011)

- **Yes But!** Winter (2020): true for *most* langs (not Cantonese or Mandarin) BUT only when you use a *particular* concreteness rating measure and *particular* statistical analyses matter, otherwise the pattern reverses

**But ‘Concrete/Abstract’ too simple**

(Löhr 2021, Strike Levers et al 2021, Connell et al 2012; Pollock 2018; Juhasz et al 2013) ~

Lancaster sensorimotor norms with 11 dimensions! (Lynott et al, 2019)

# Exp 1 Stimuli

3 Exps!  
Nouns (n=40)  
Verbs (n=40)  
Adjs (n=40)

Using Corpus norms for Valence (Warriner et al 2013) and Concreteness (Brysbaert et al 2013)

- 9-pt scale from 1 (negative) to 9 (positive)
- 5-pt likert scale, abstract (1) to concrete (5)

High Frequency, and within +/-2sd of mean Word Length

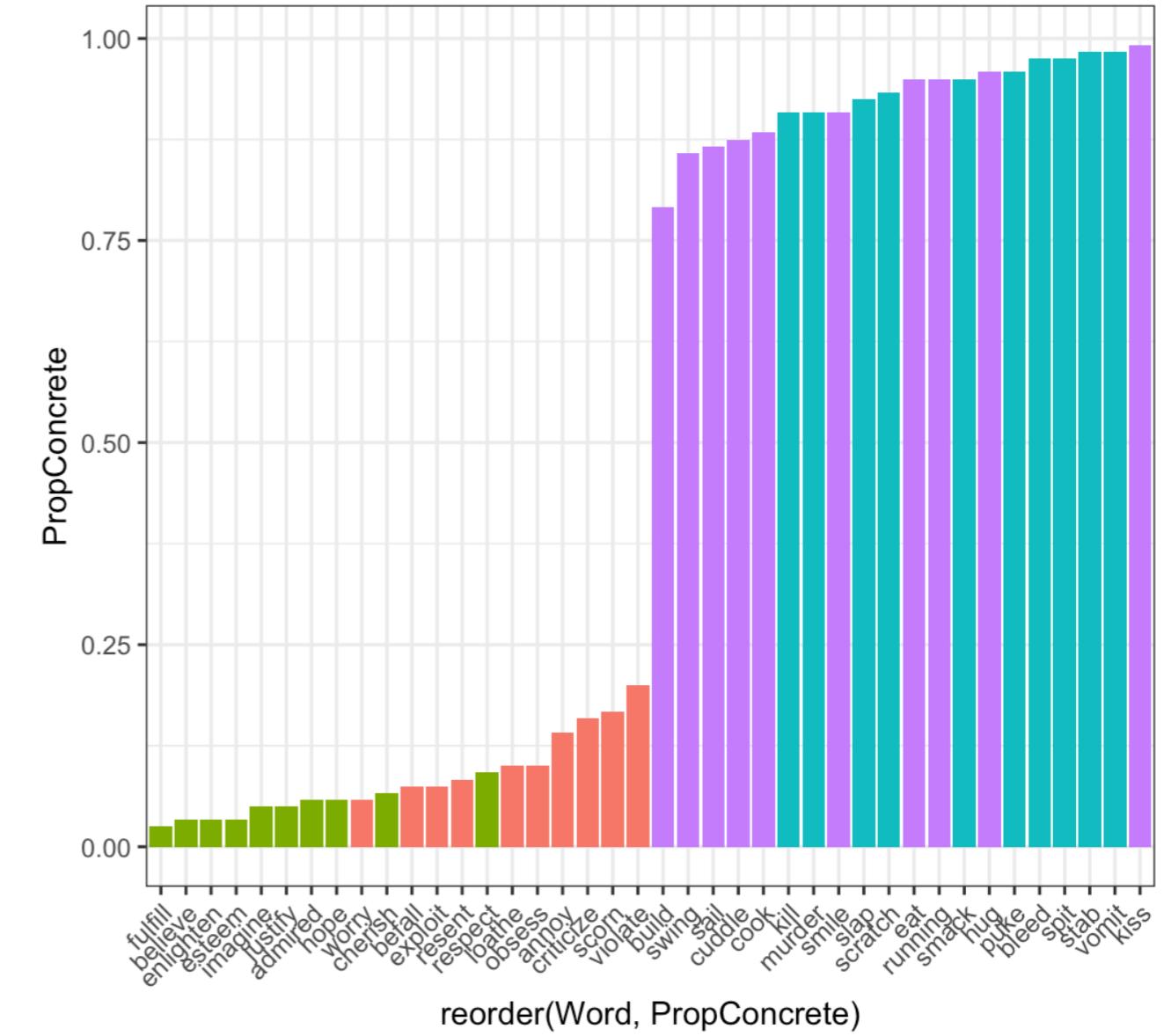
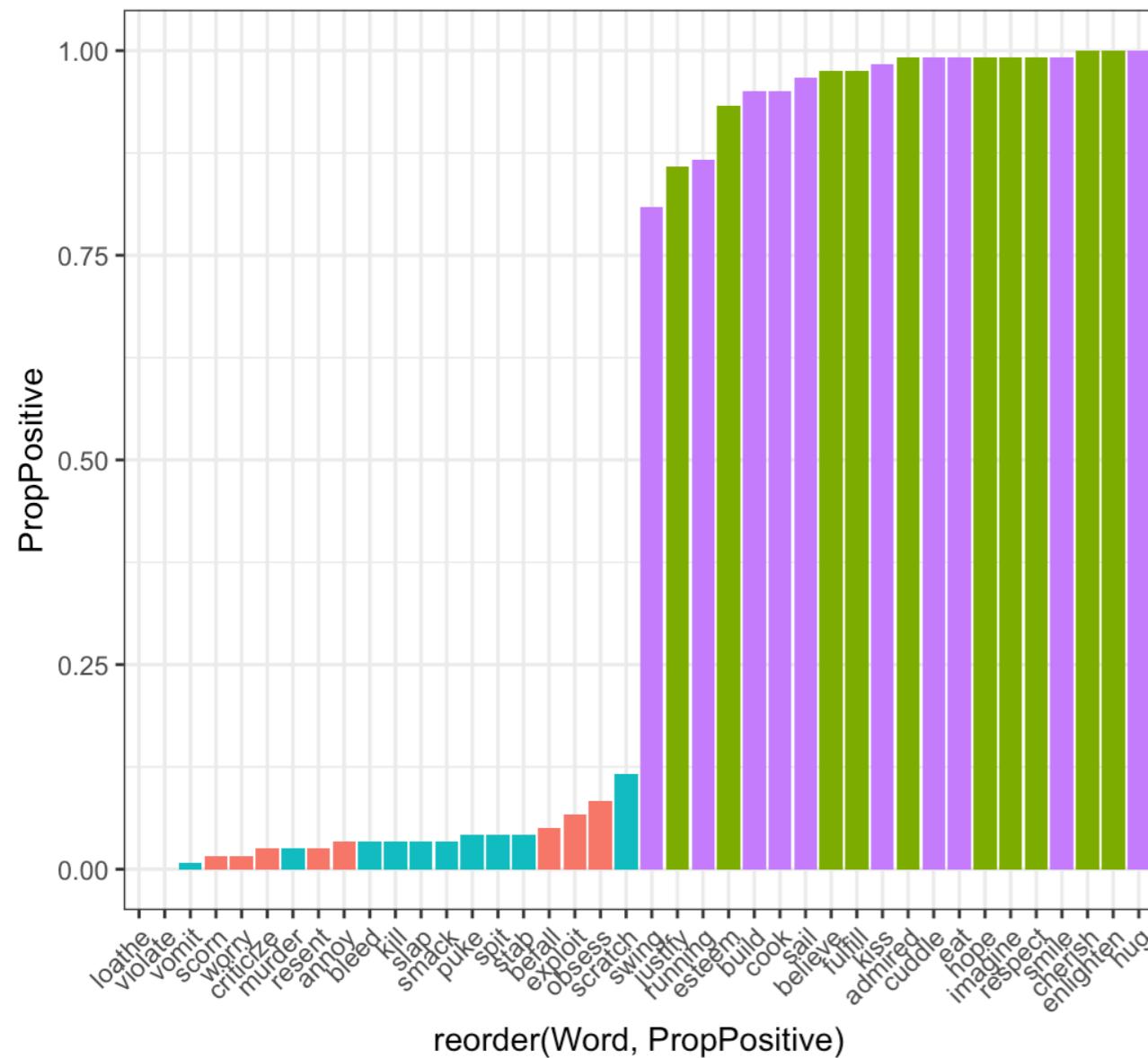
40 words, 10 from each combo of Conc+Val

- Maximizing mean rating for concrete/positive
- Minimizing mean rating for abstract/negative
- Minimizing rating SD

# Responses - Verbs

ConcValCombo

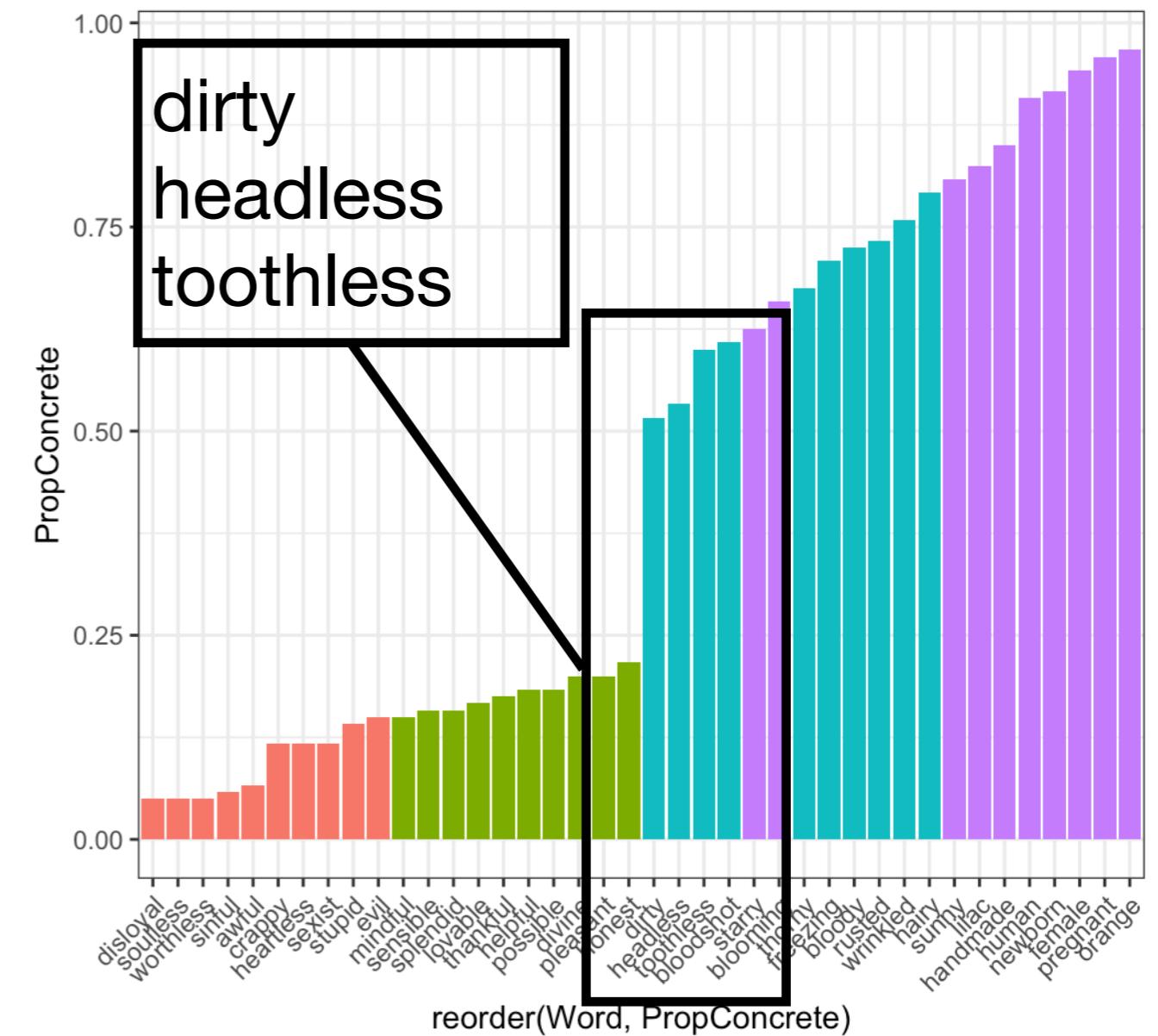
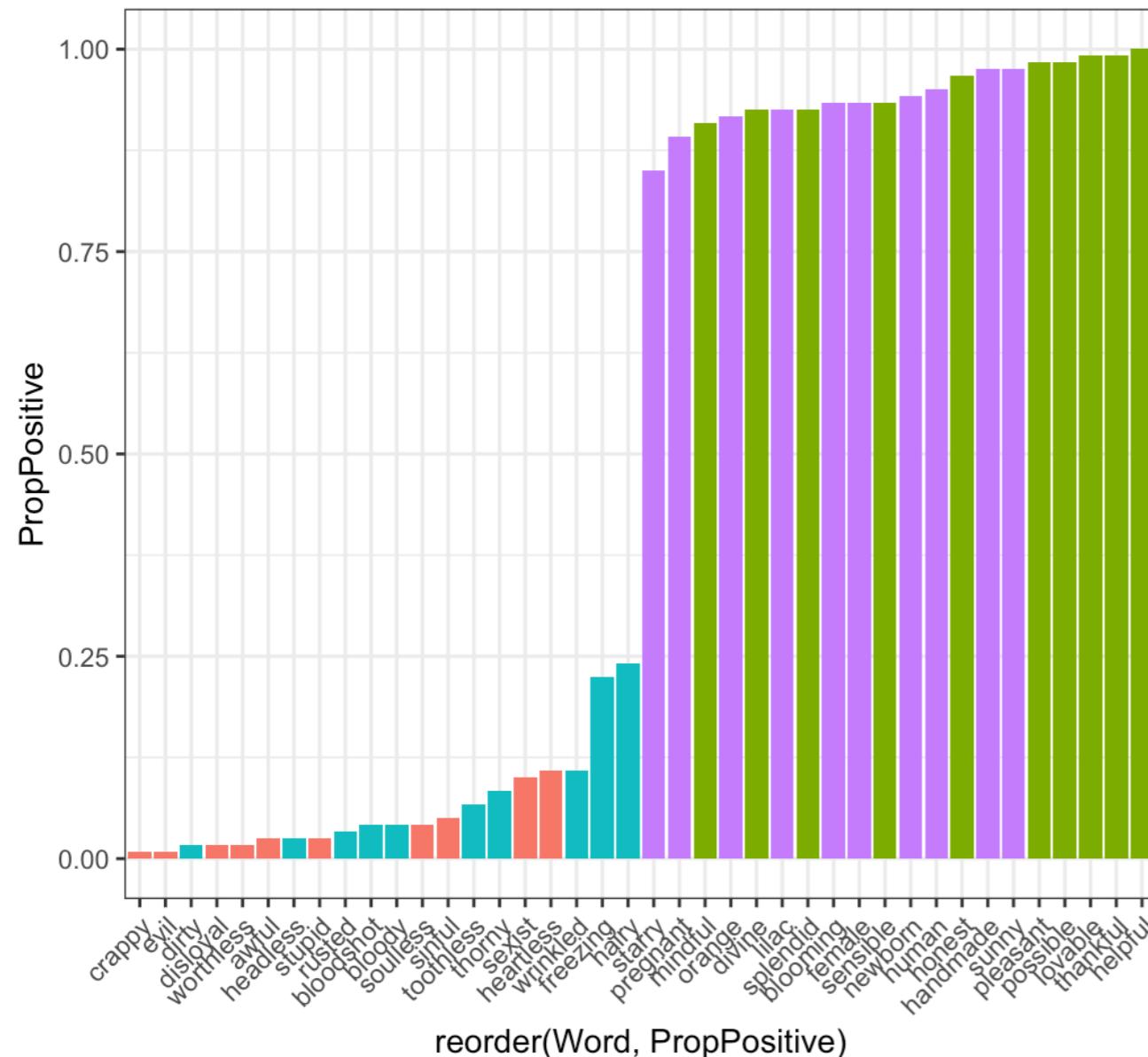
- abstract-negative
- abstract-positive
- concrete-negative
- concrete-positive



# Responses - Adjs

ConcValCombo

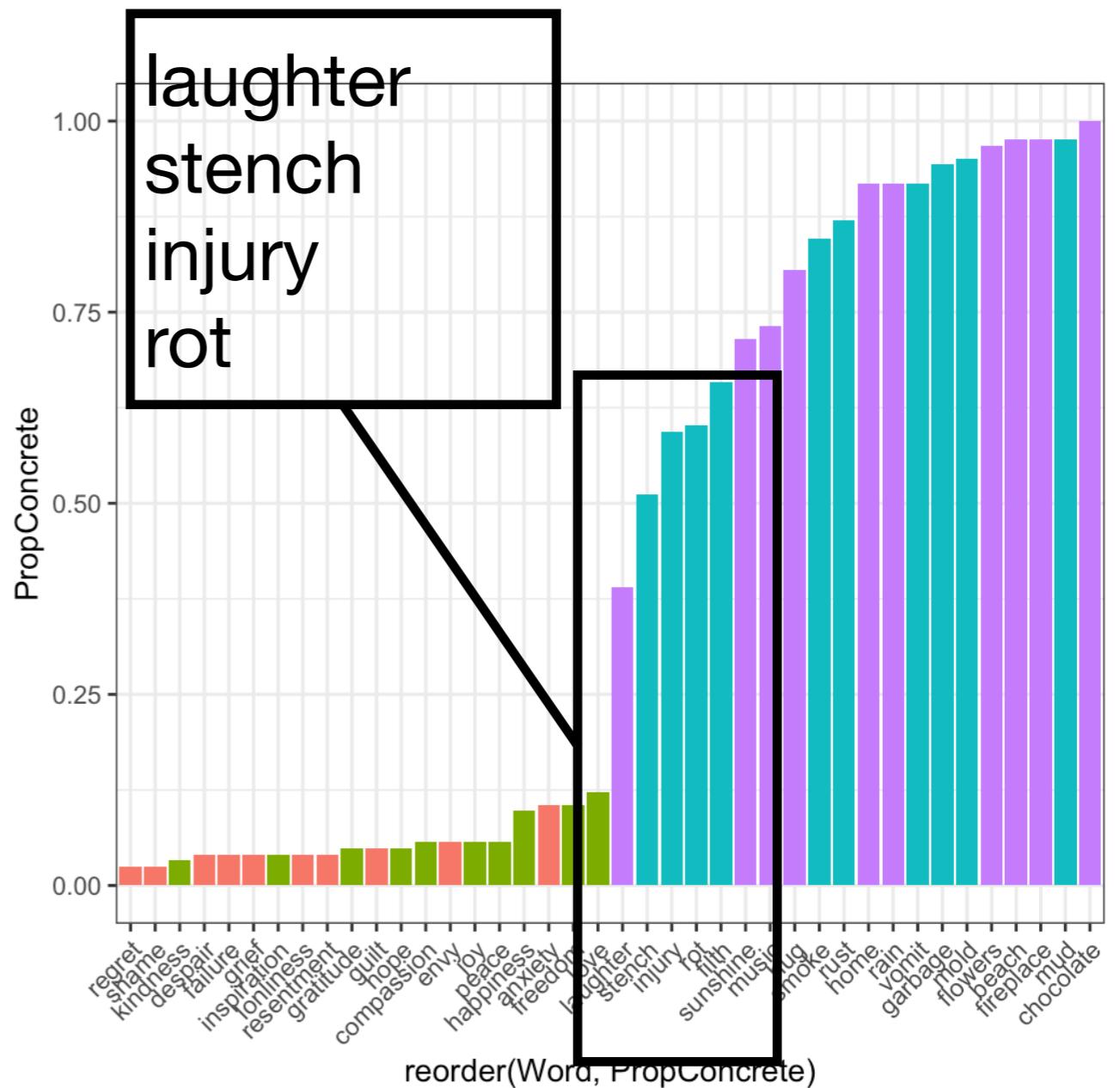
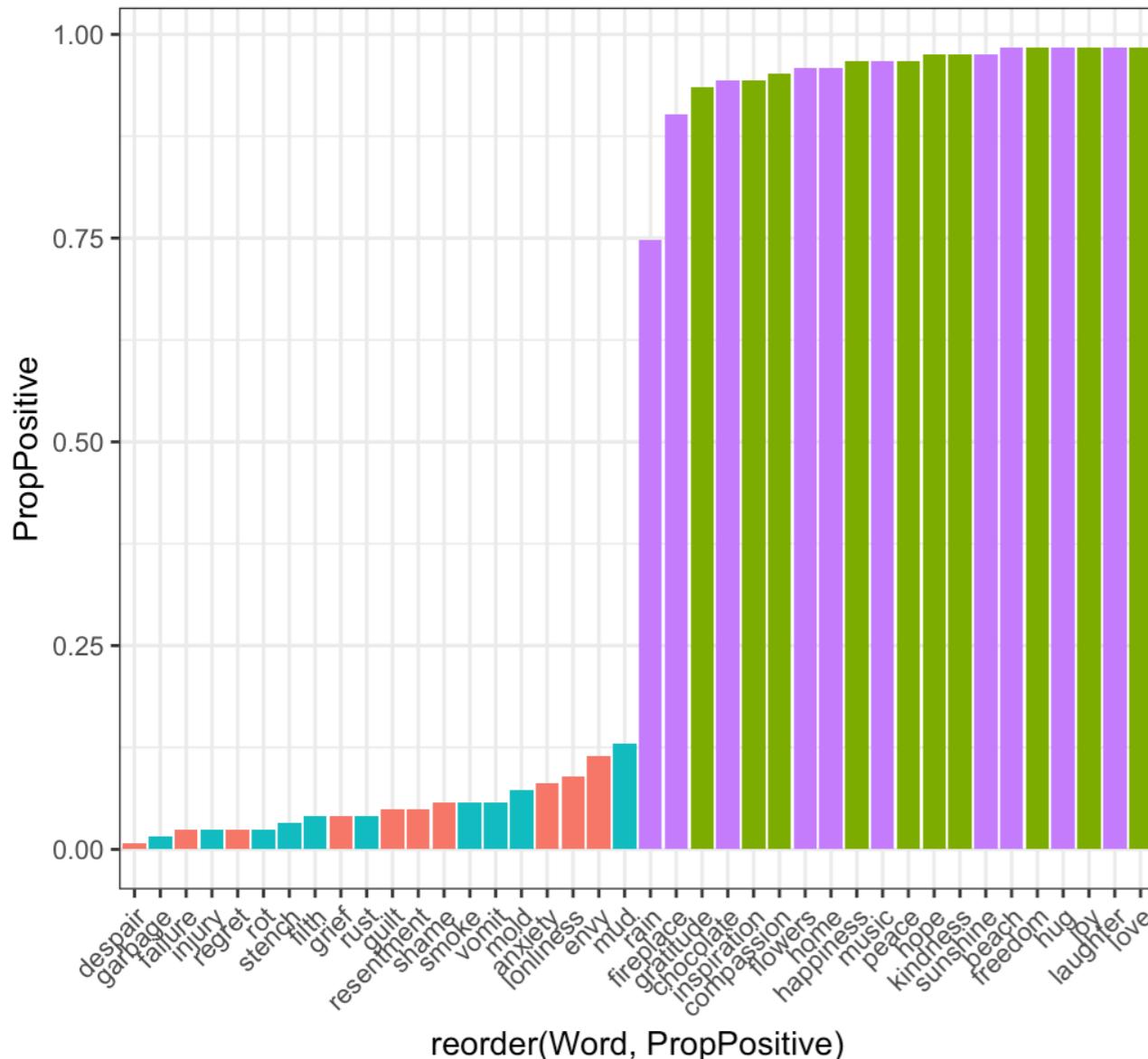
- abstract-negative
- abstract-positive
- concrete-negative
- concrete-positive



# Responses - Nouns

ConcValCombo

- abstract-negative
- abstract-positive
- concrete-negative
- concrete-positive



# RT Analysis

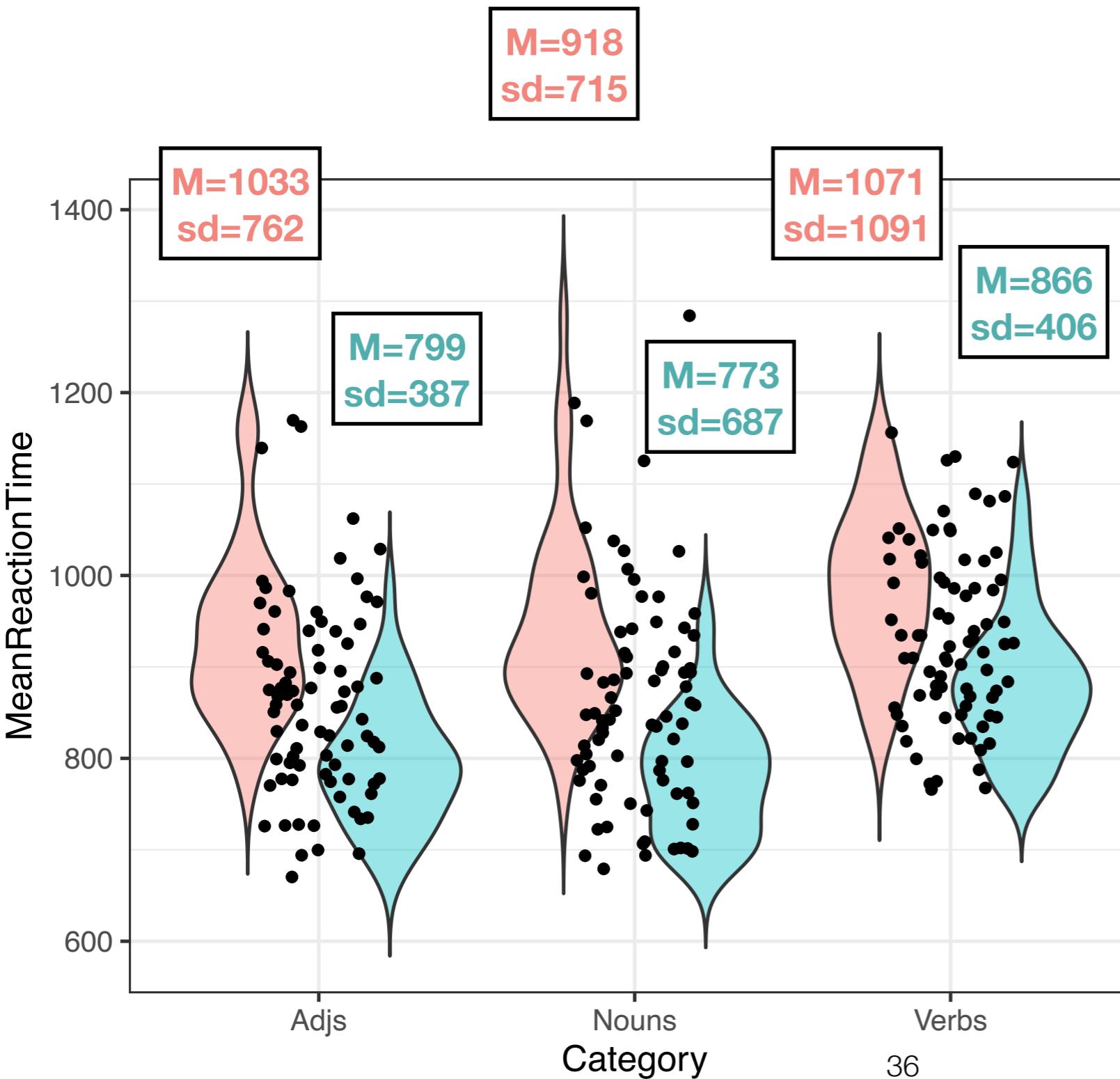
- Inaccurate participants removed (Accuracy < 75%)
- Only Accuracy trials included
- Outliers exclusions: +/- 3\*IQR LogRT

Range of data excluded across exps: ~10-15%

Model

$\text{lmer( LogRT } \sim \text{ Task} + (1 + \text{Task} | \text{ID}) + (1 + \text{Task} | \text{Word}))$

# Experiment 1 Results



**Valence < Conc/Abs**

- **Verbs:**  $\beta=-0.12$ , SE=.03,  $t=-4.3$ ,  $p<.0005$
- **Adjs:**  $\beta=-0.12$ , SE=.03,  $t=-4.3$ ,  $p<.0005$
- **Nouns:**  $\beta=-0.12$ , SE=.03,  $t=-4.3$ ,  $p<.0005$

Category differences:  
Nouns fastest, then  
adjs, then verbs  
slowest

# Adjs



# Nouns



# Verbs



# **Experiment 2a-b: physical vs psychological (verbs)/ social (adjs)**

# physical v. psychological/ social

Infants are attuned to many differences between physical vs. psychological/social

- Social agents create order but physical objects do not (Newman et al. 2010)
- Proximal causation for physical objects but not social agents / distal causation for social agents but not physical objects (Leslie & Keeble 1987, Spelke et al. 1995)
- Objects not capable of self-propelled motion but social agents are (Saxe et al. 2005)

Remains important in adulthood: ascribing causation (Strickland et al . 2017), and iconicity and category boundaries (Kuhn et al. 2021)

Roughly “basic-level” distinction (Rosch et al 1976)

# Exp 2 Stimuli

## Verbs:

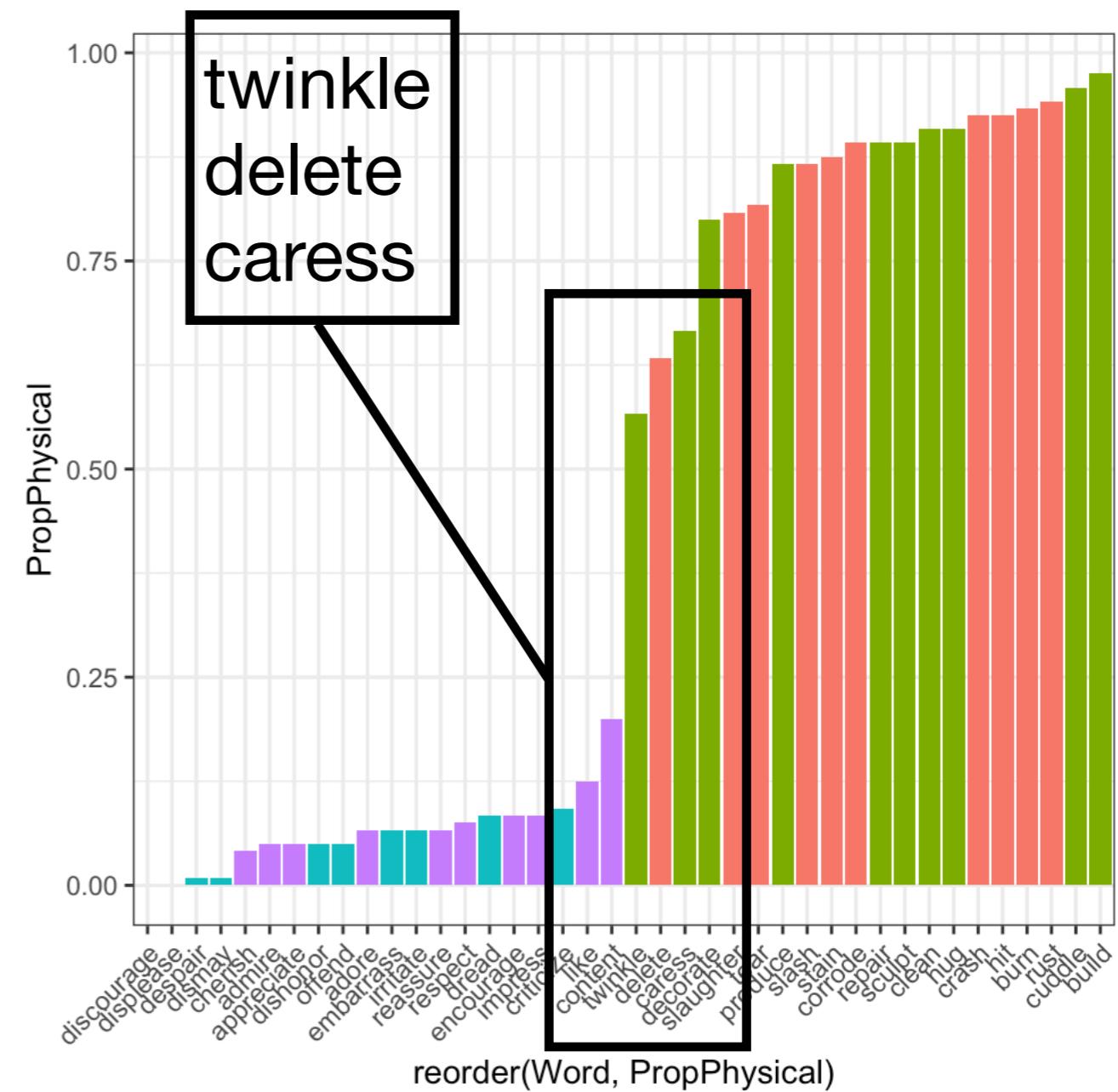
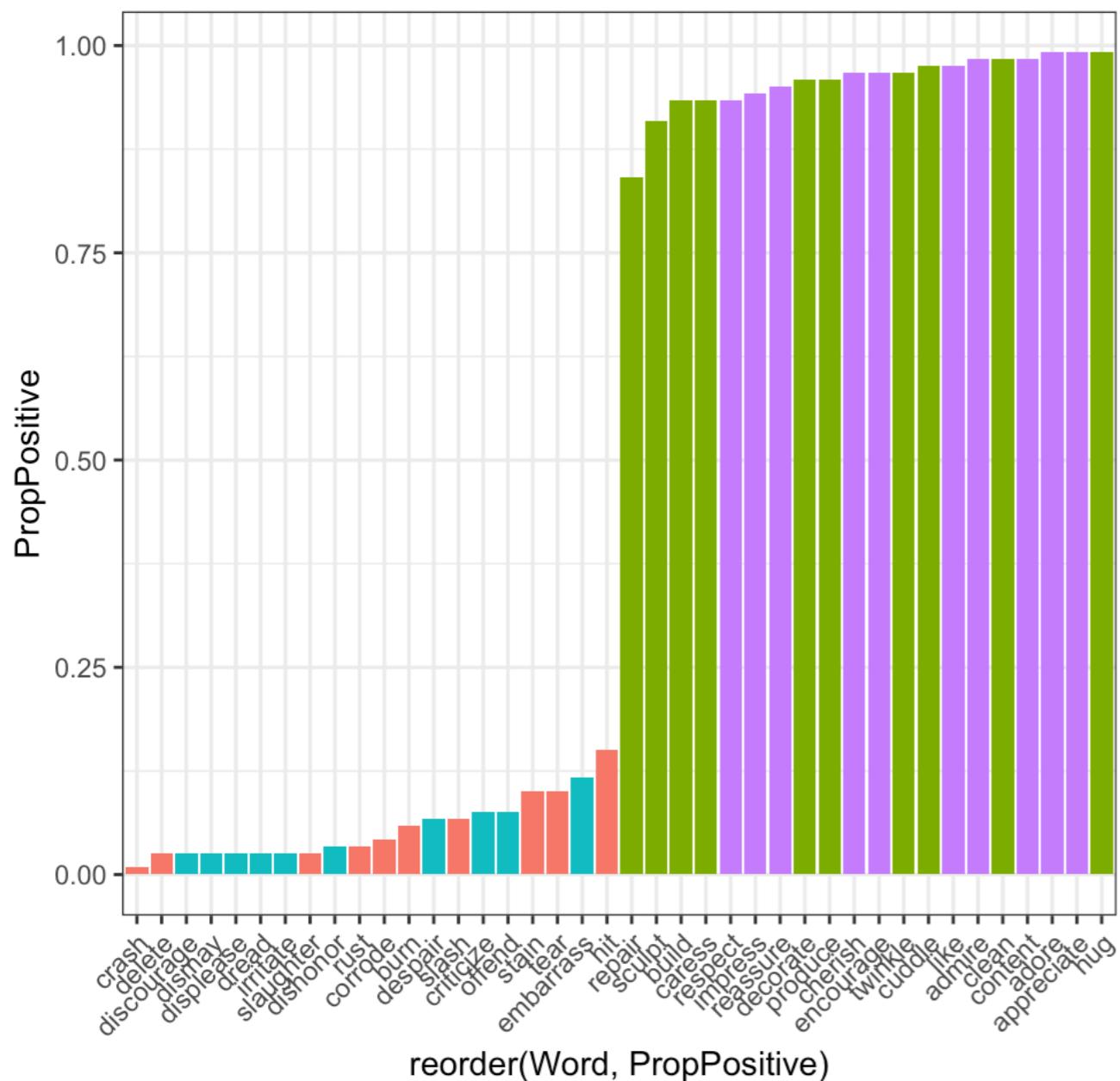
- Pre-test norming of 168 verbs from Levin (1993)
- Evaluated on Valence/Conceptual (phys-psych) 7-pt likert scale
- Verbs chosen based on distance to endpoint

## Adjectives (pilot):

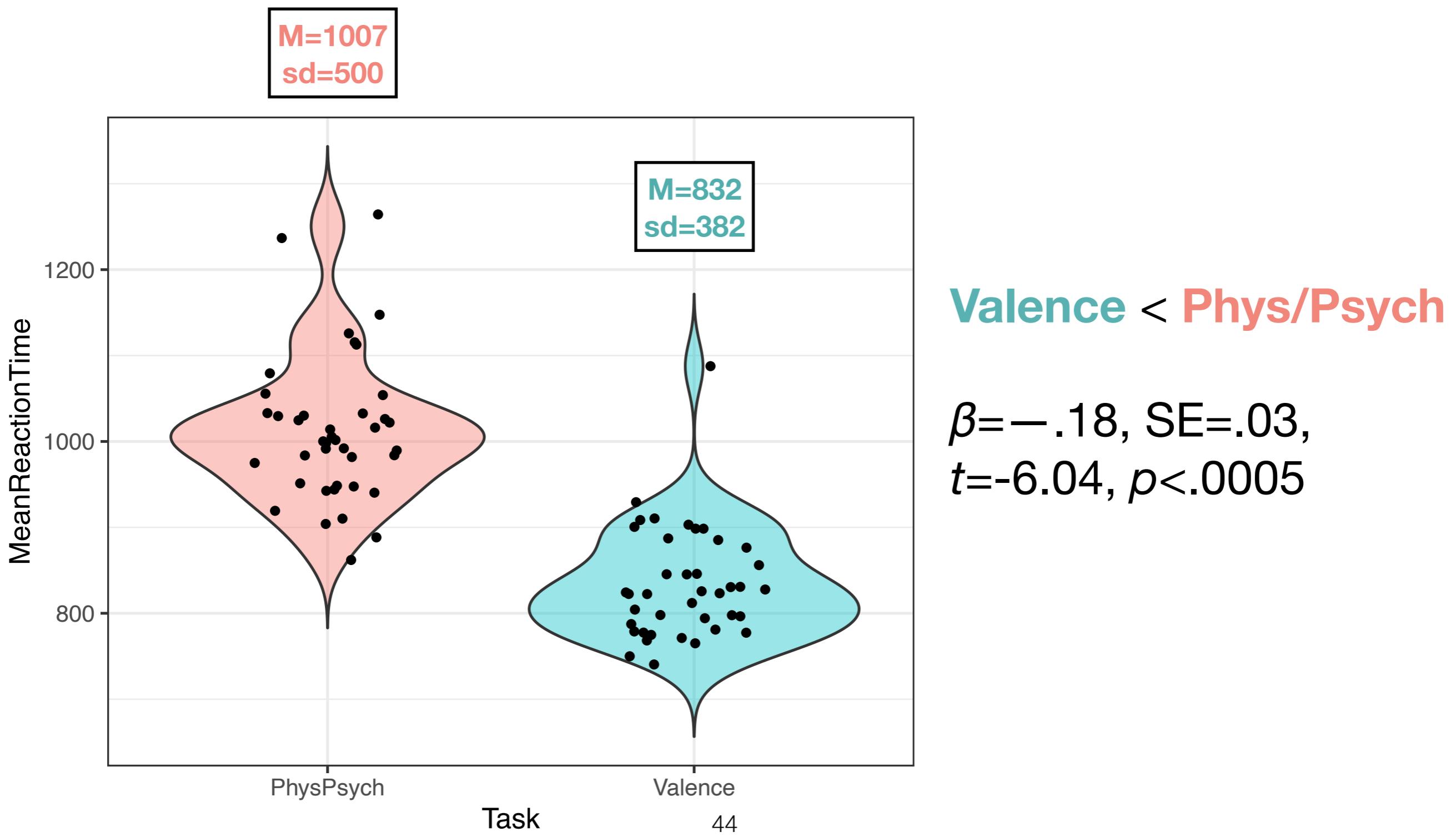
- Pilot Used AI tools asking about each four combo:
  - “what 10 adjectives do you think people would perceive as the most positive (i.e., make them feel happy, pleased, satisfied, contented, hopeful) and refer to social concepts (i.e., relating to society or its organization)?”
- Planned: norming phys/soc ratings from a large list

# Responses 2a

- ConcValCombo
- physical-negative
- physical-positive
- psychological-negative
- psychological-positive



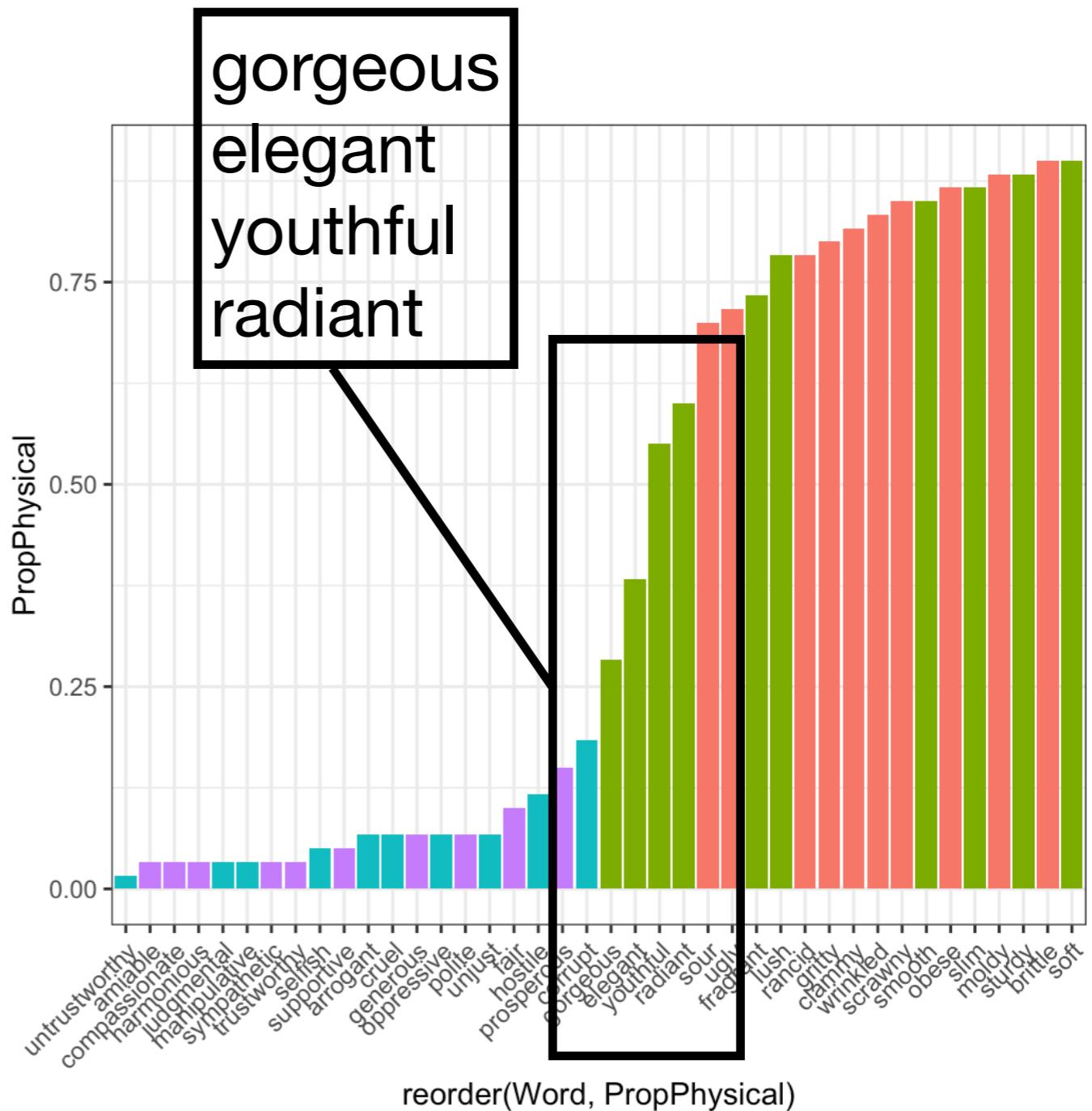
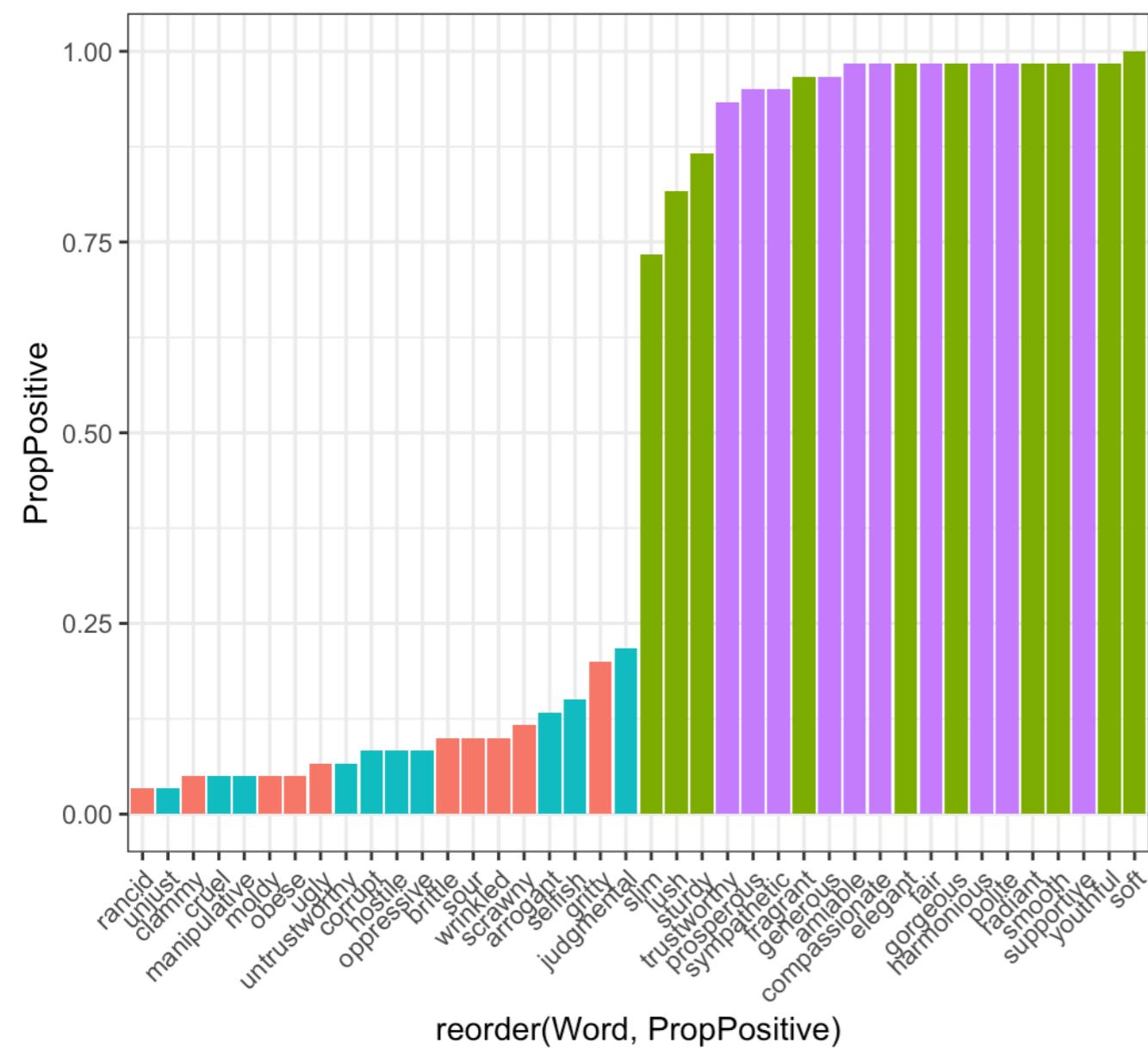
# Exp 2a (Verbs) Results



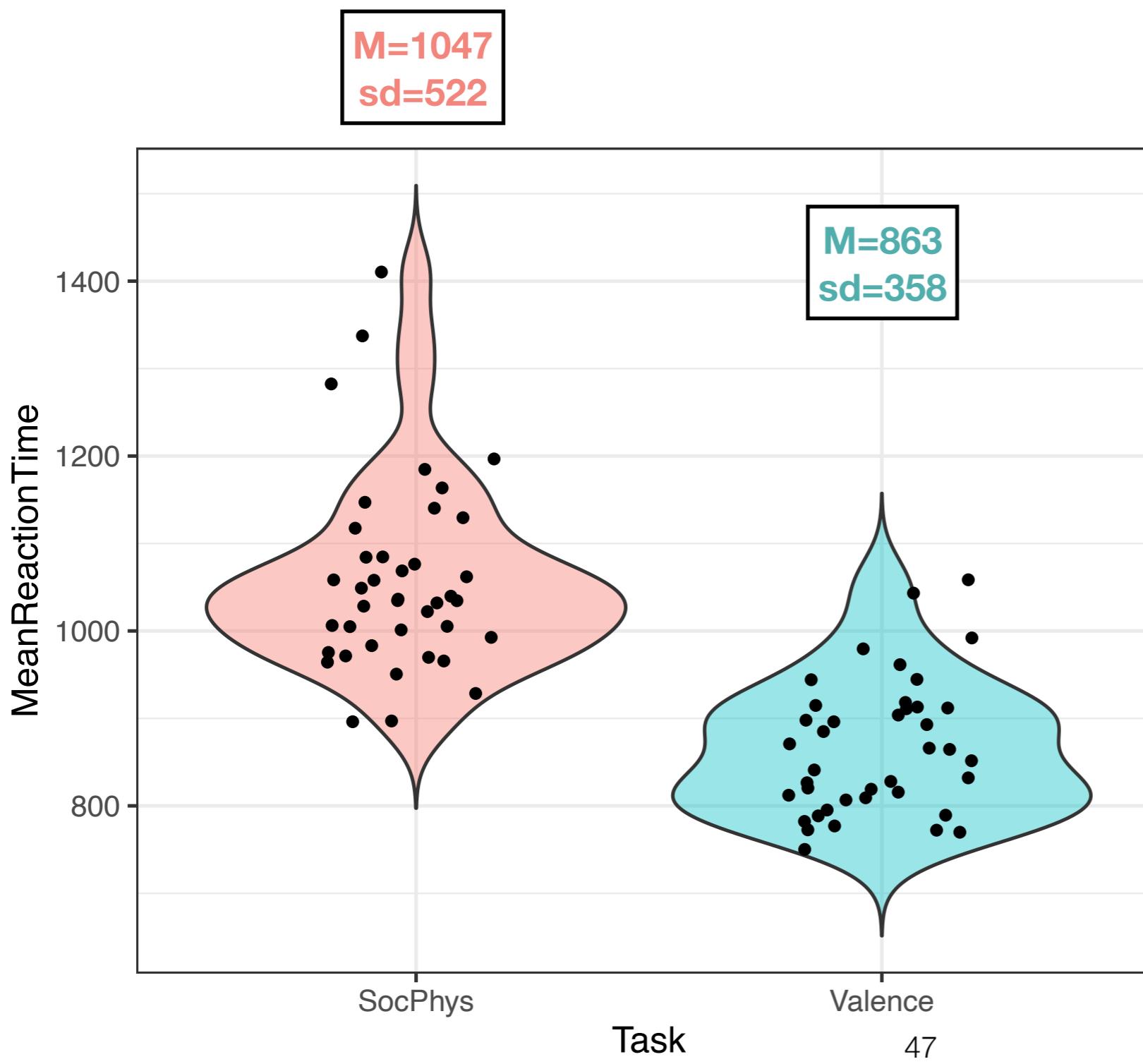
# Verbs



# Responses 2b



# Exp 2b (Adjs) Results



Valence < Phys/Soc

$\beta = -.17$ , SE=.04,  
 $t=3.84$ ,  $p<.0009$

# Adjs



# **Experiment 3: Animacy (Nouns)**

# Animacy

## Developmentally/Cognitively Special

- Early (Rakison & Poulin-Dubois 2001), distinct neurophysiology (Caramazza & Shelton 1998)
- Causation (Spelke, Phillips, & Woodward 1995), word learning (Childers & Echols 2004), mindreading (Baron-Cohen 1995), biological processes (Carey 1985)

## Linguistically Special

- Most if not all languages show grammatical reflexes of animacy (Vihman & Nelson 2019)

# Exp 3 Stimuli

Using Corpus norms for Valence (Warriner et al 2013)

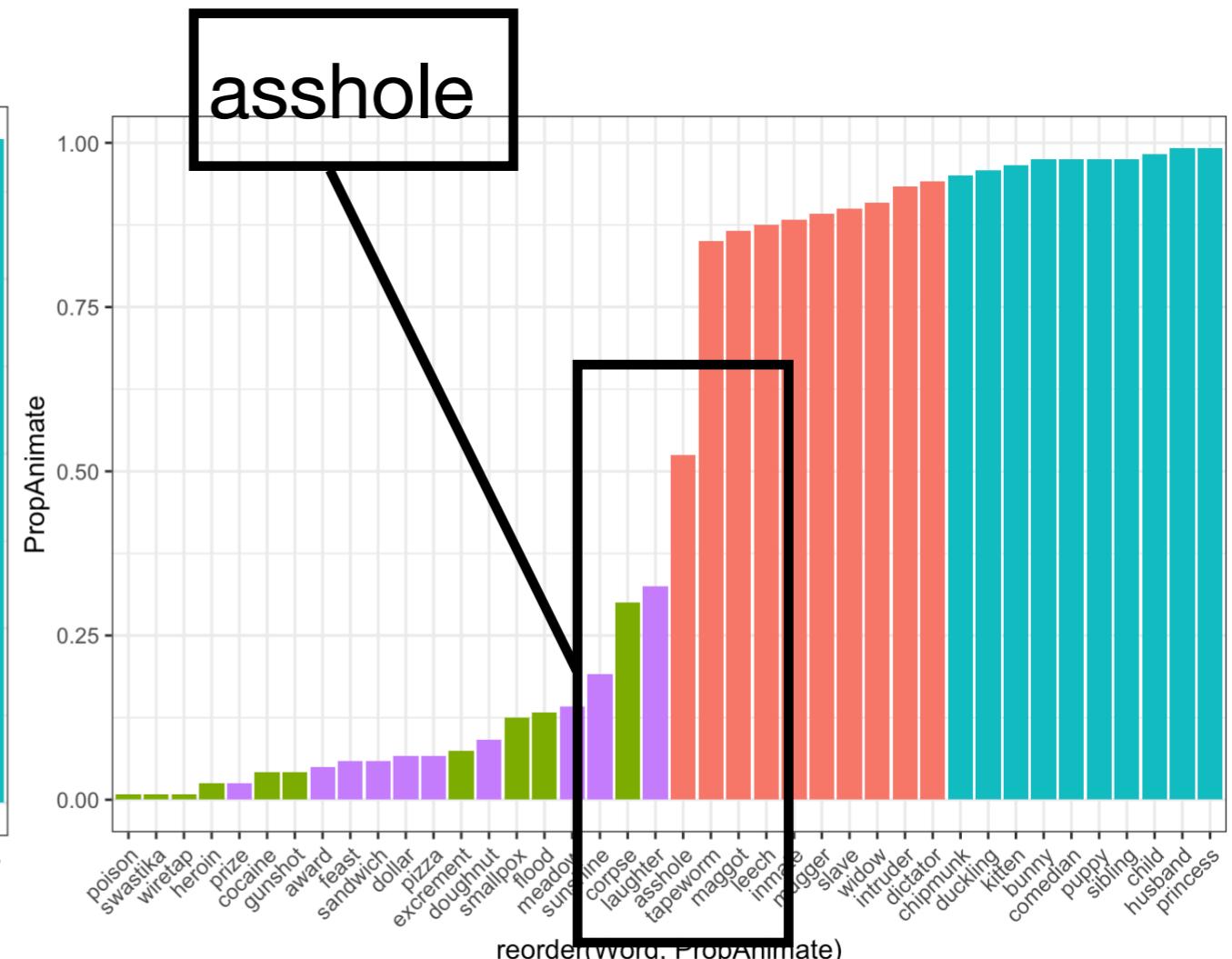
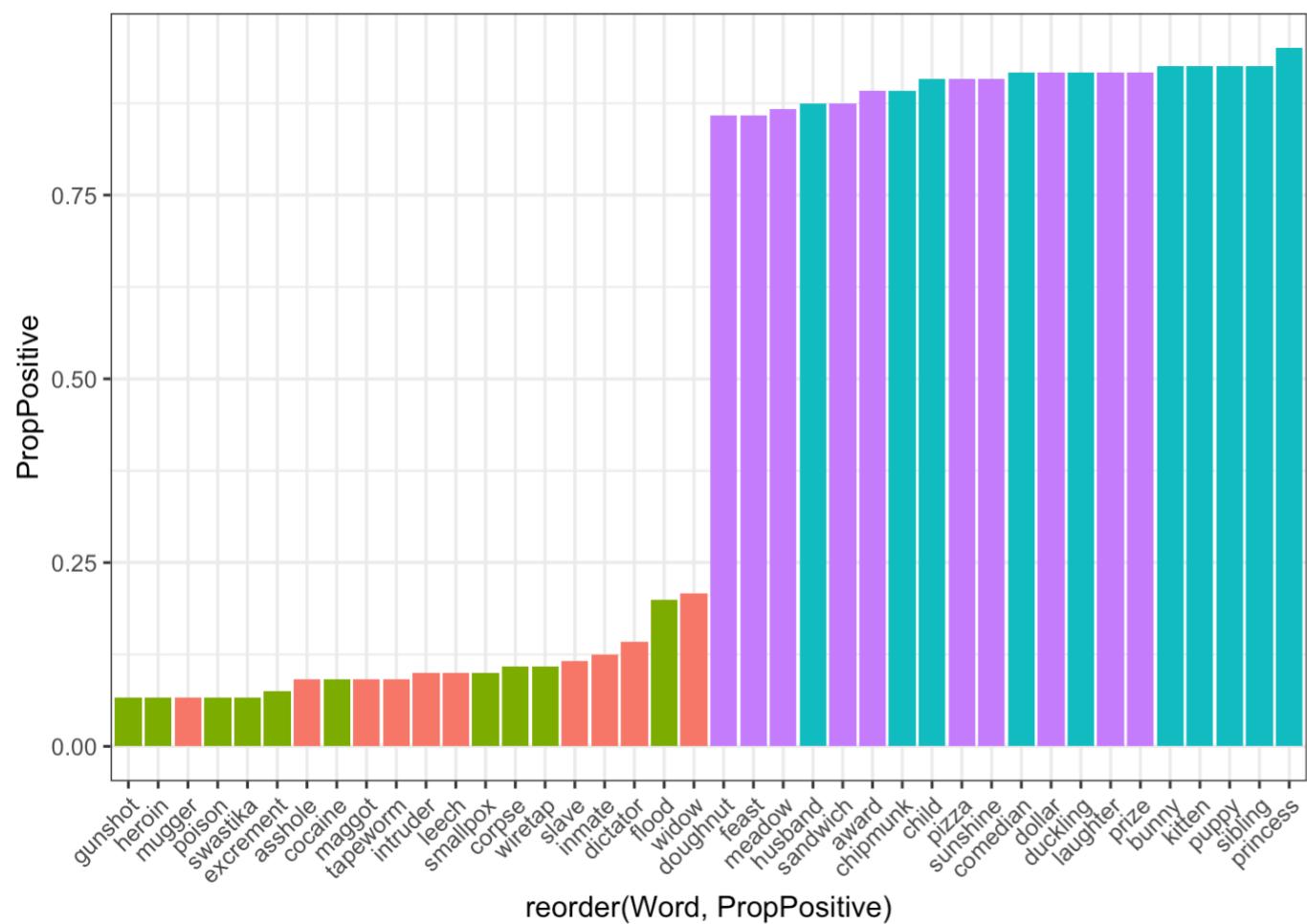
WordNet (Fellbaum 1998) words with ‘living thing’ or ‘organism’ as synset

High Frequency, and within +/-2sd of mean Word Length

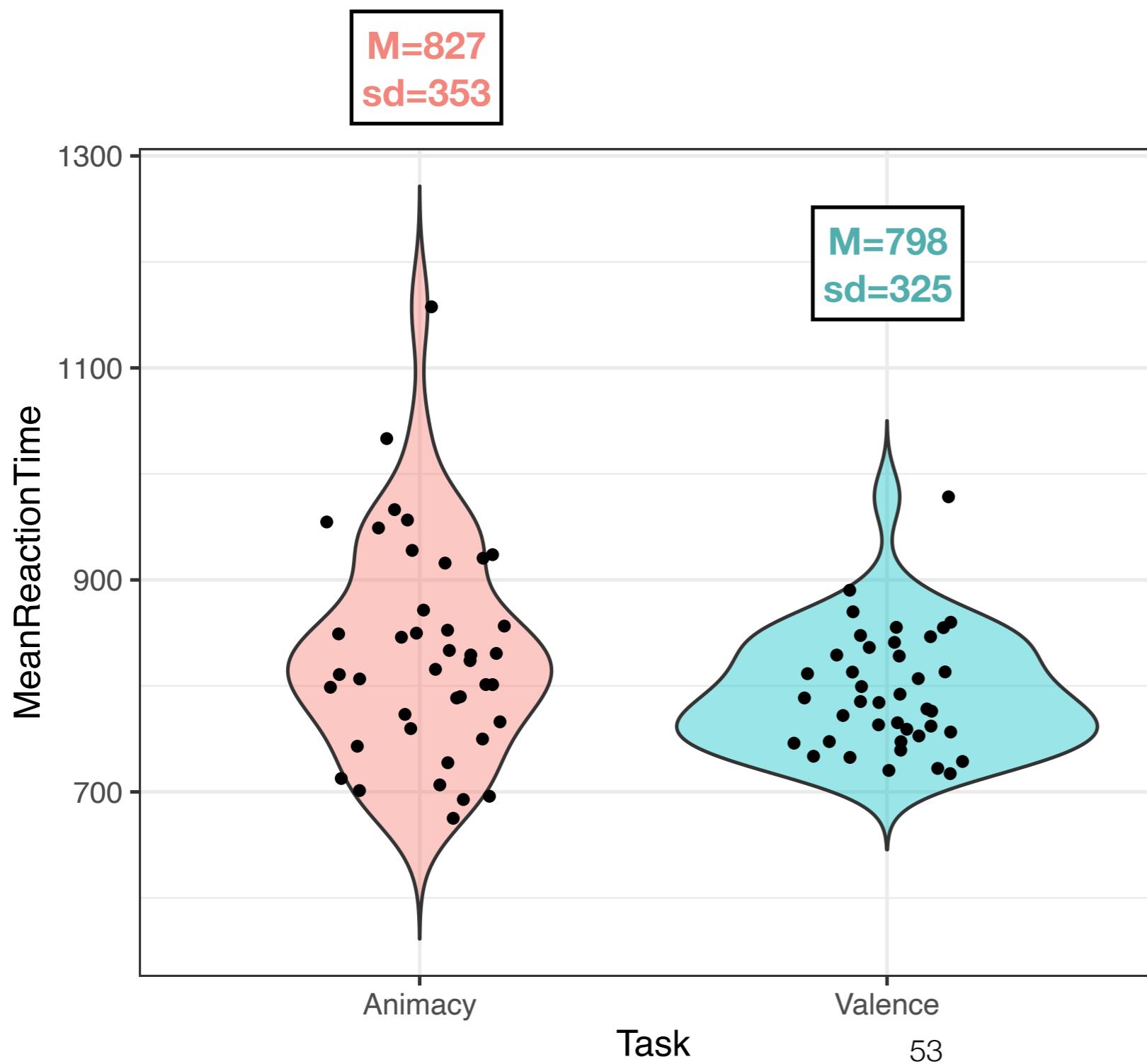
# Responses Exp3

ValAniCombo

- █ negative-animate
- █ negative-inanimate
- █ positive-animate
- █ positive-inanimate



# Exp 3 Results (Nouns)



**Valence  $\approx$  Animacy**

$\beta = -.03$ ,  $SE = .02$ ,  
 $t = -1.42$ ,  $p = .16$

But, Valence means are lower than Animacy means

# Nouns



# **Experiment 4:**

# **Syntax**

# Syntactic categorization

Lexical information about syntactic category argued to be retrieved early (Strijkers & Costa 2011)

Is judging syntactic category (pre-conceptual) faster than valence?

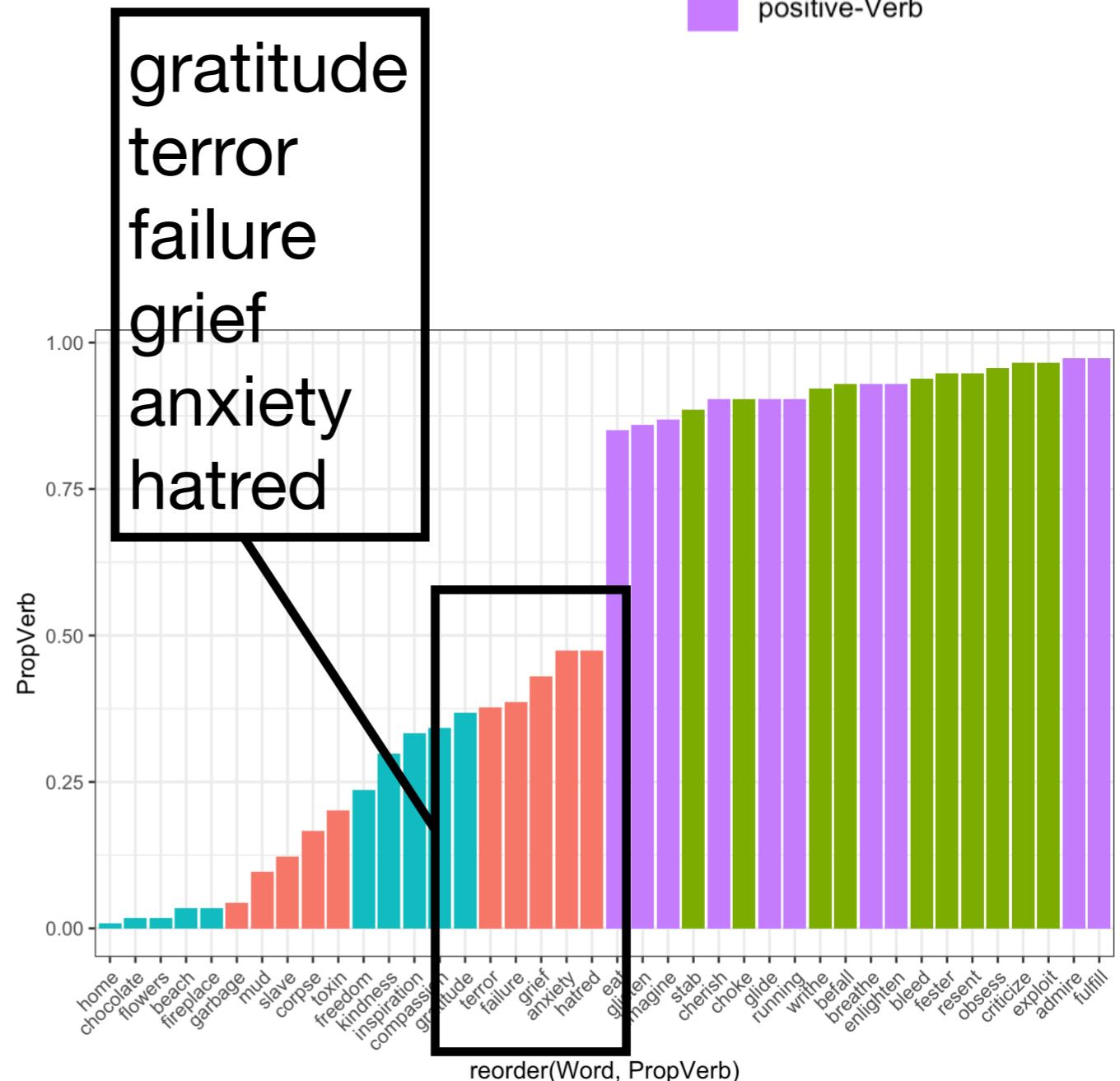
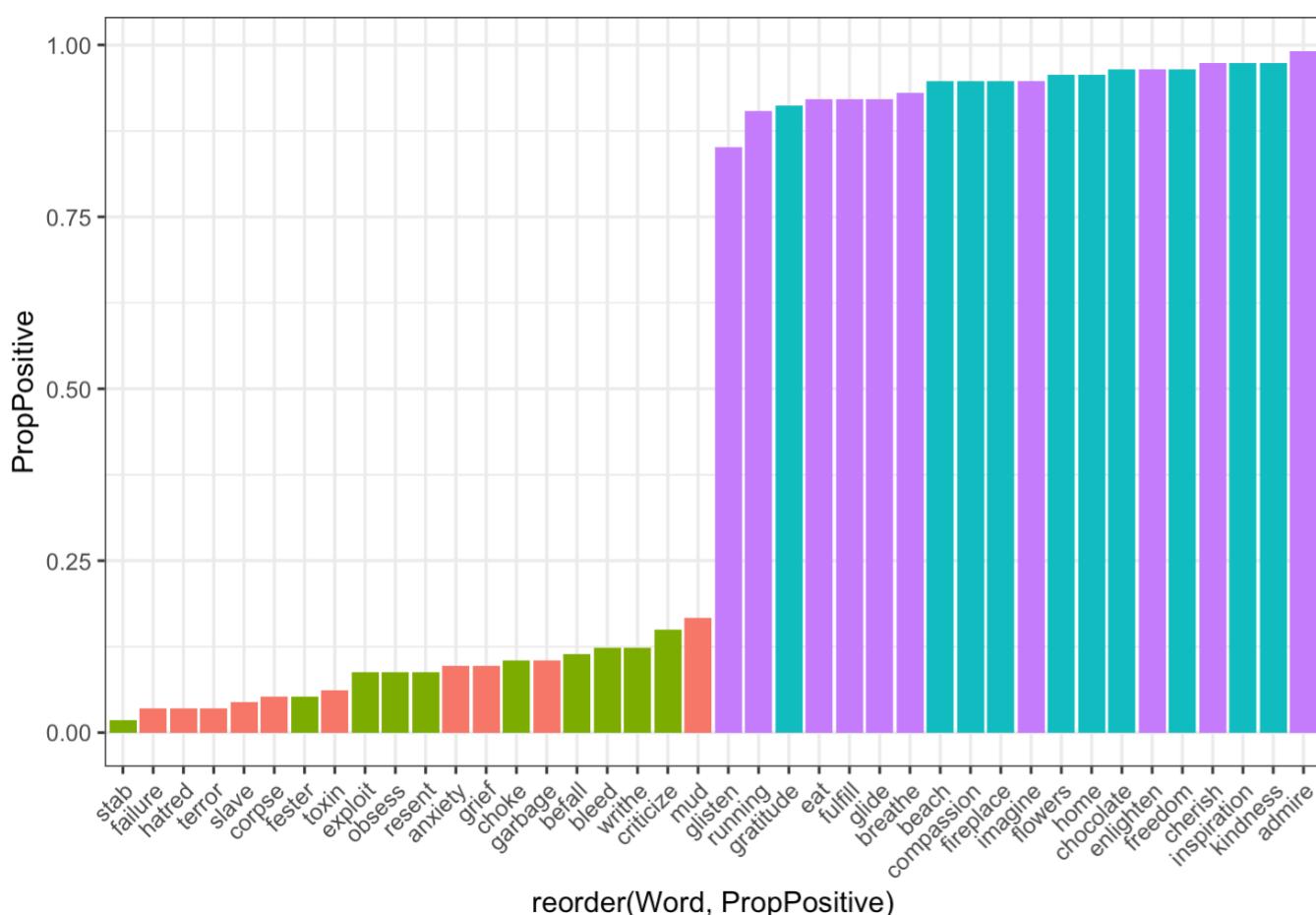
Noun vs. Verbs

- Conceptually more distinct than combo w/ Adjs
- Used only unambiguously N or V words

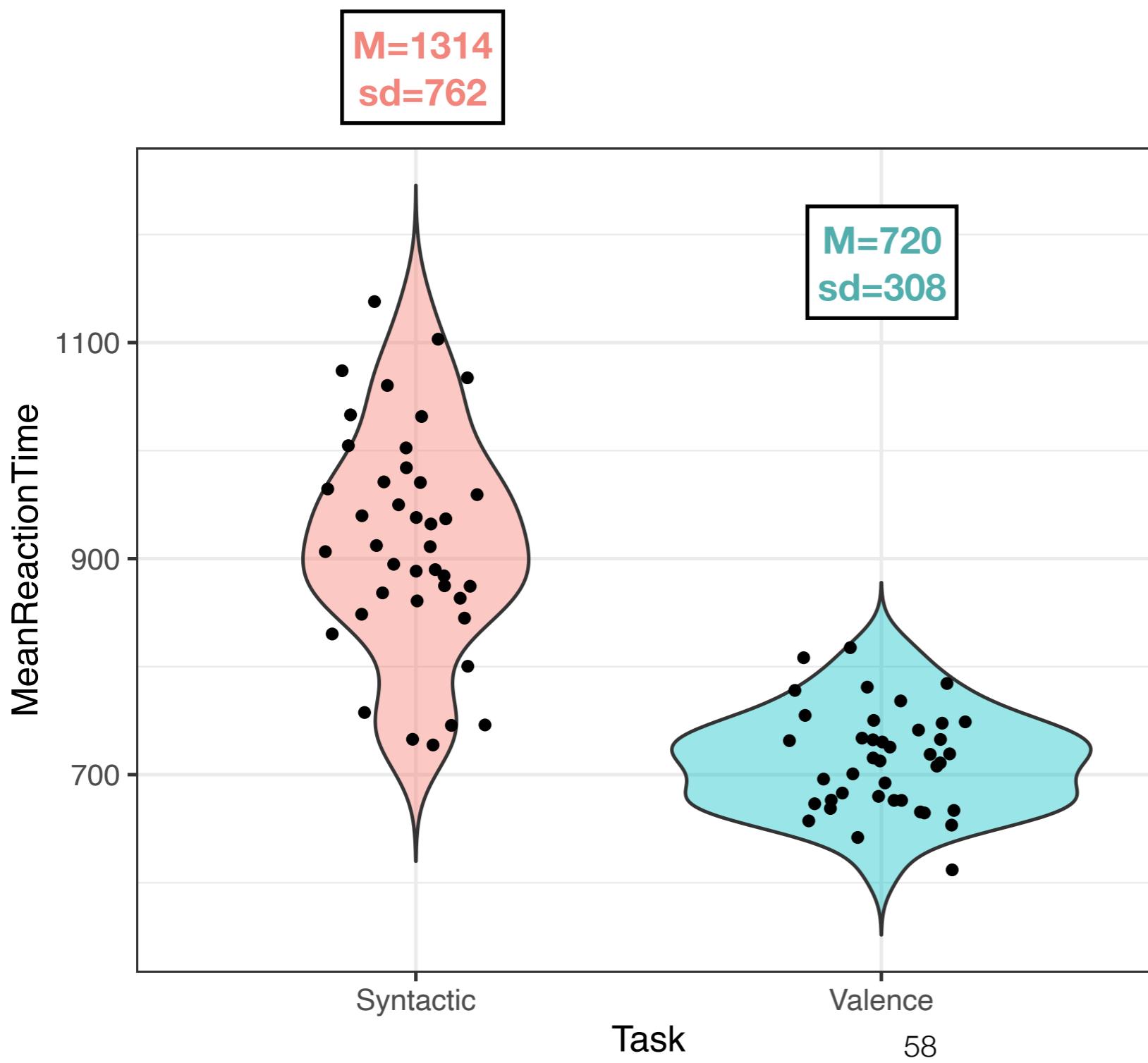
# Responses Exp4

ValSynCombo

- █ negative-Nouns
- █ negative-Verb
- █ positive-Nouns
- █ positive-Verb



# Exp 4 Results



Valence < Syntactic

$\beta = -.23$ , SE = .03,  
 $t = -8.08$ ,  $p < .0005$

# Verbs Nouns



# **Accuracy Redux**

# Accuracy

Is affect really faster, or is it still a reflection of a poor conceptual foil?

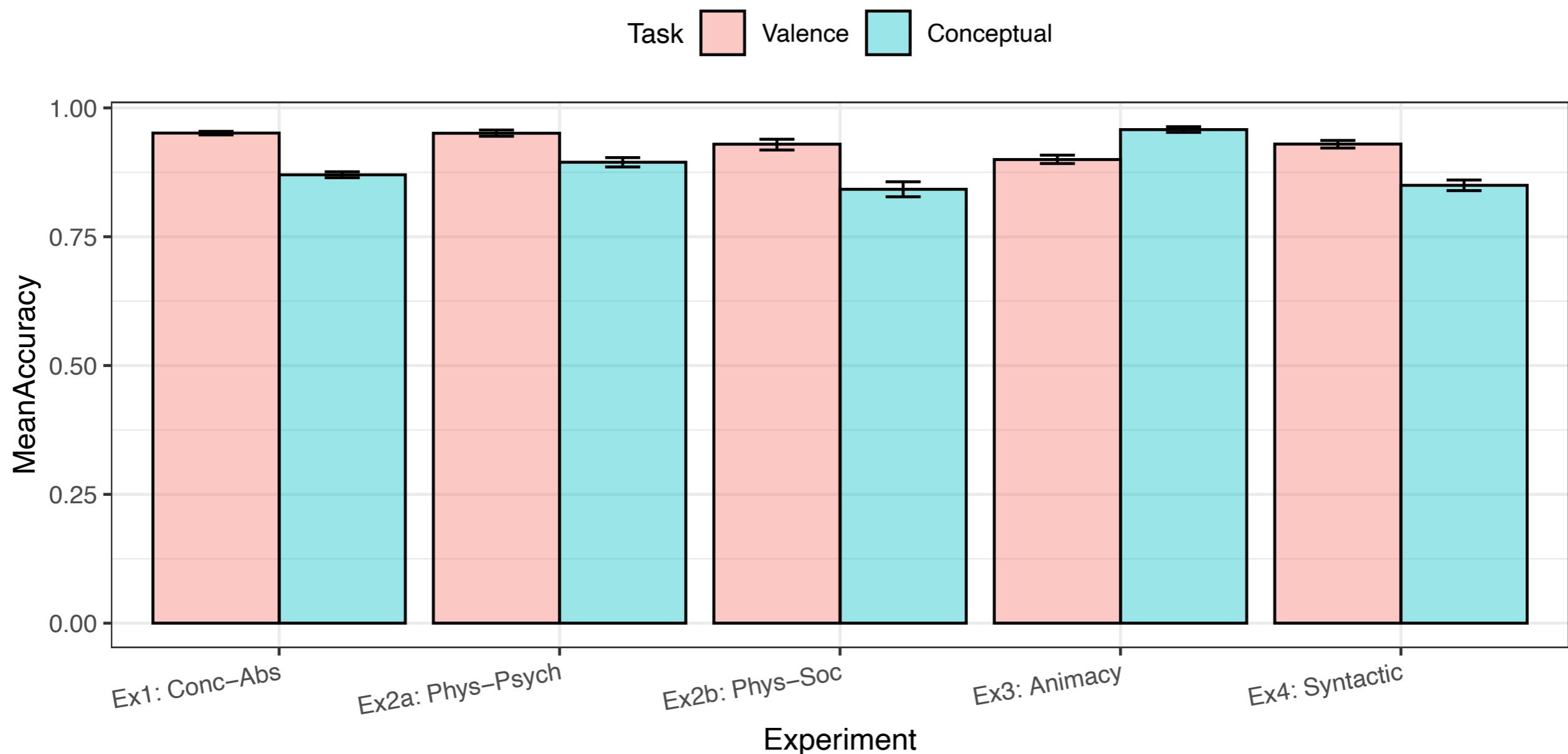
- longer RTs could be attributed to uncertainty about conceptual categorization

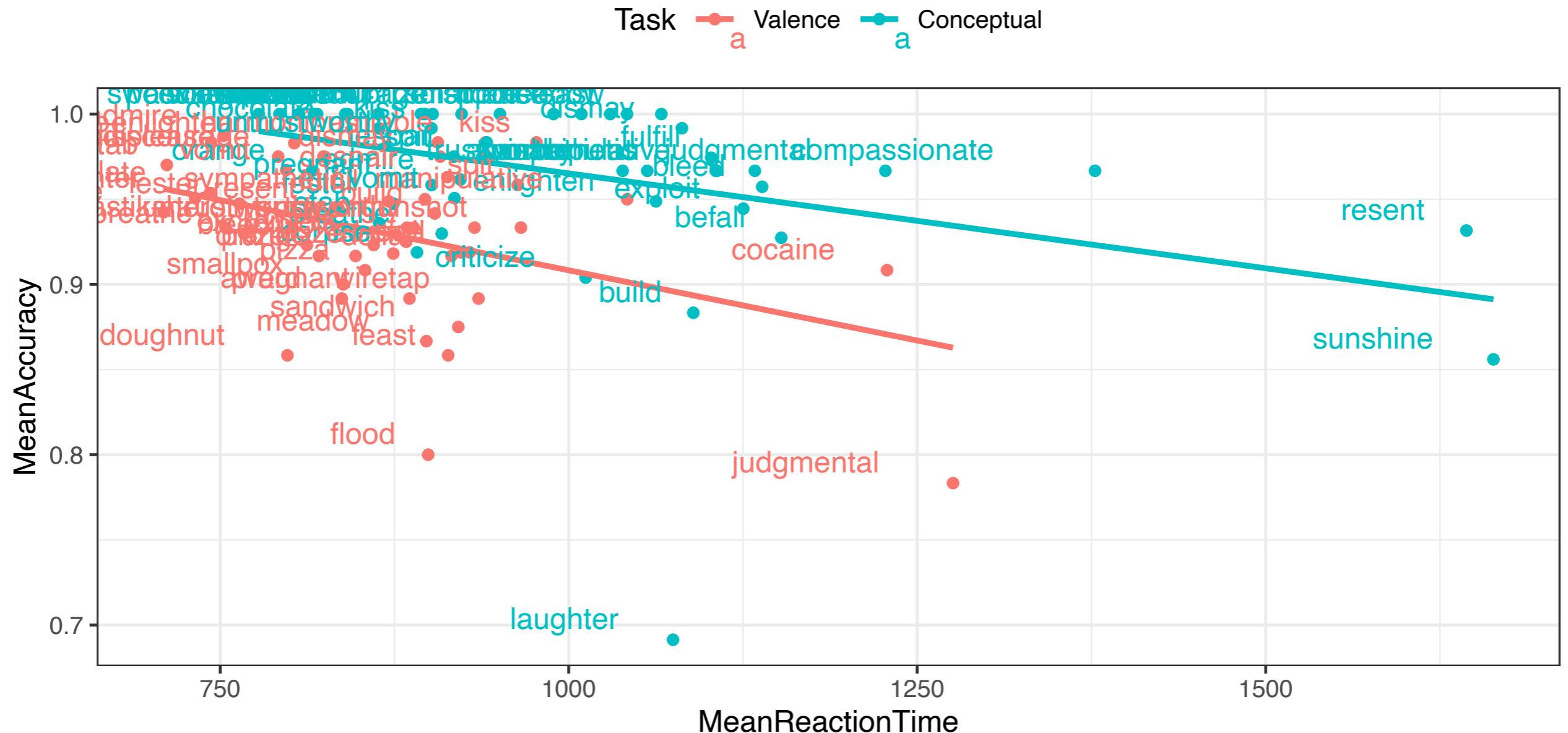
Is valence just the most salient?

>>> well, animacy is salient

>>>

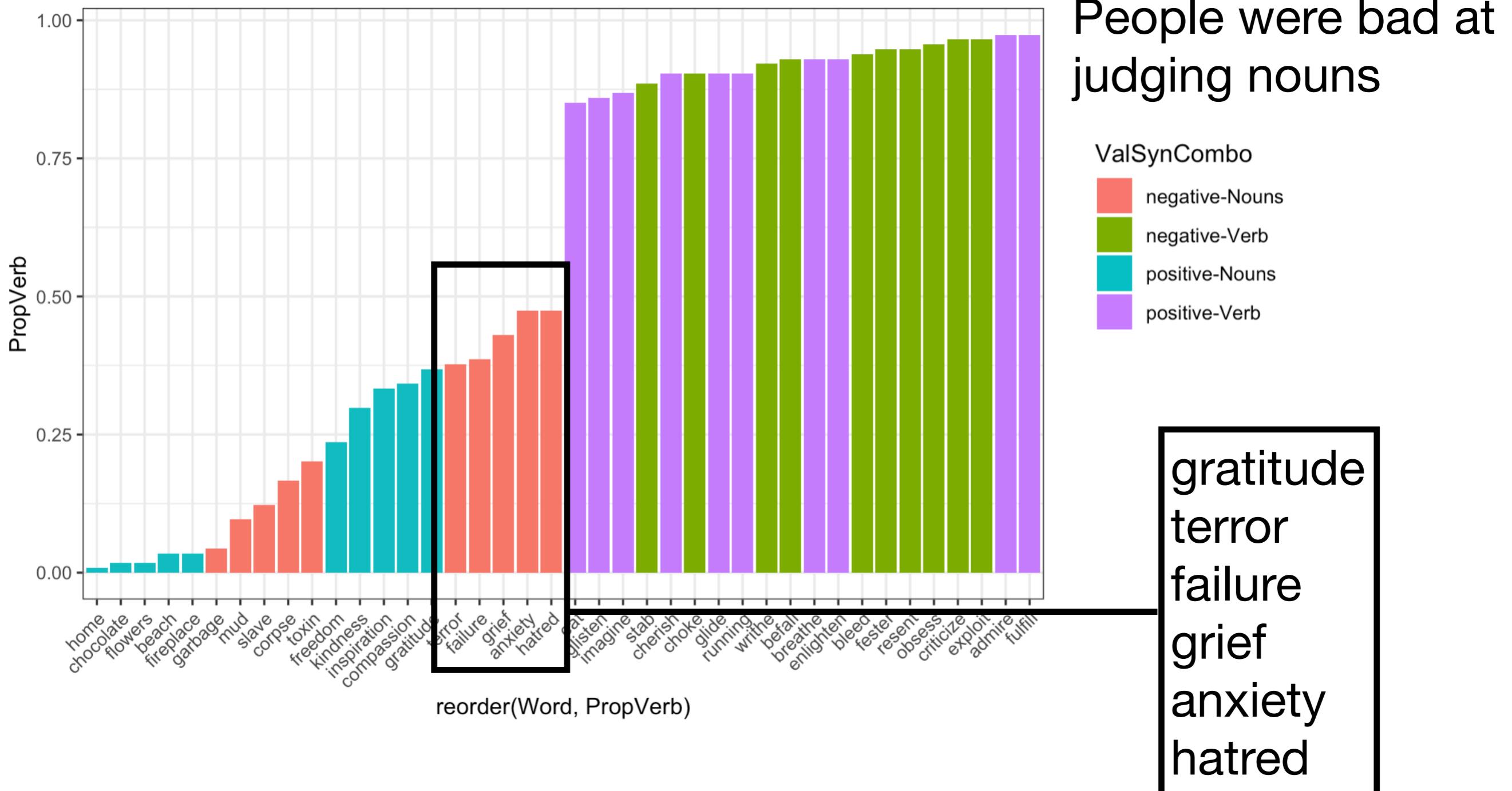
# Results on Accuracy





No main effect of Accuracy but 3-way interaction Accuracy \* Task \* Experiment driven only by the **Exp4: Syntactic**

# Responses on Syntax



People were bad at  
judging nouns

ValSynCombo

- negative-Nouns
- negative-Verb
- positive-Nouns
- positive-Verb

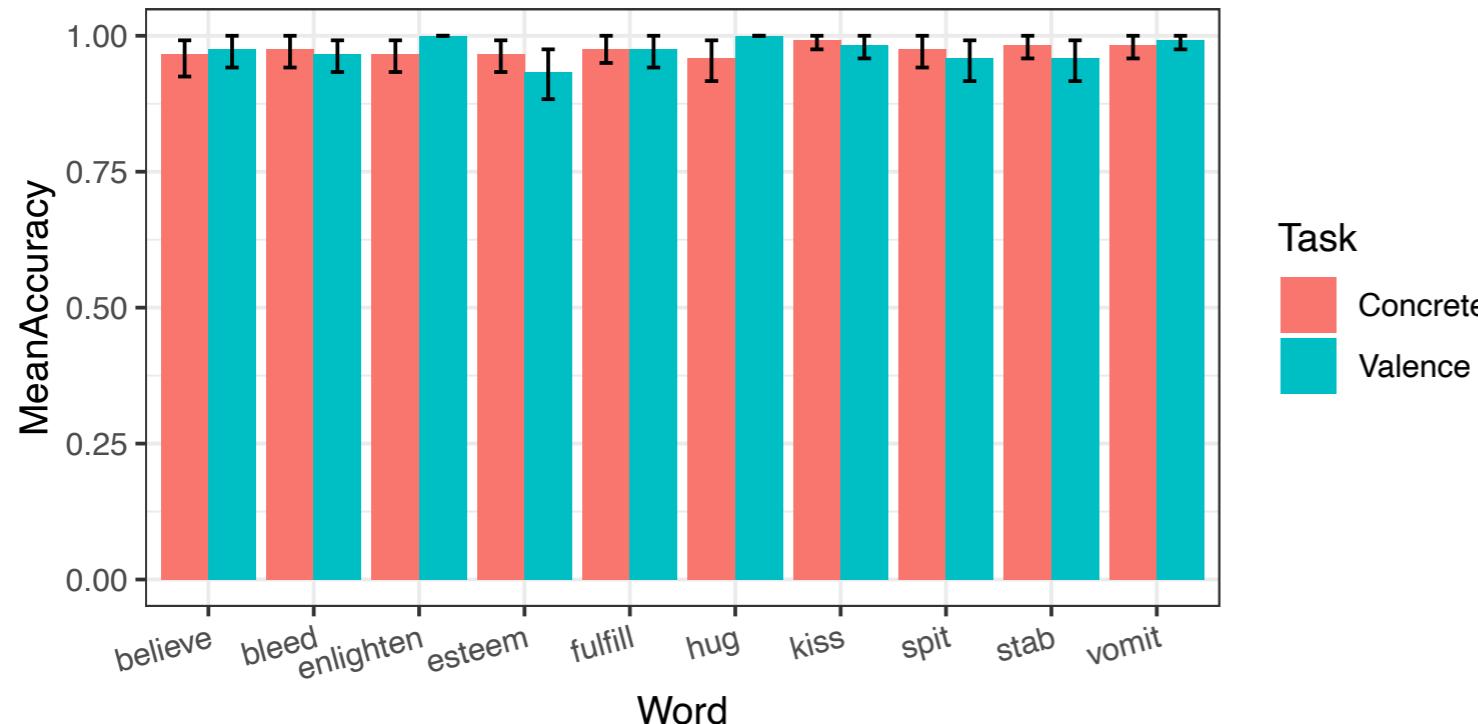
gratitude  
terror  
failure  
grief  
anxiety  
hatred

# Most Accurate Concp Words

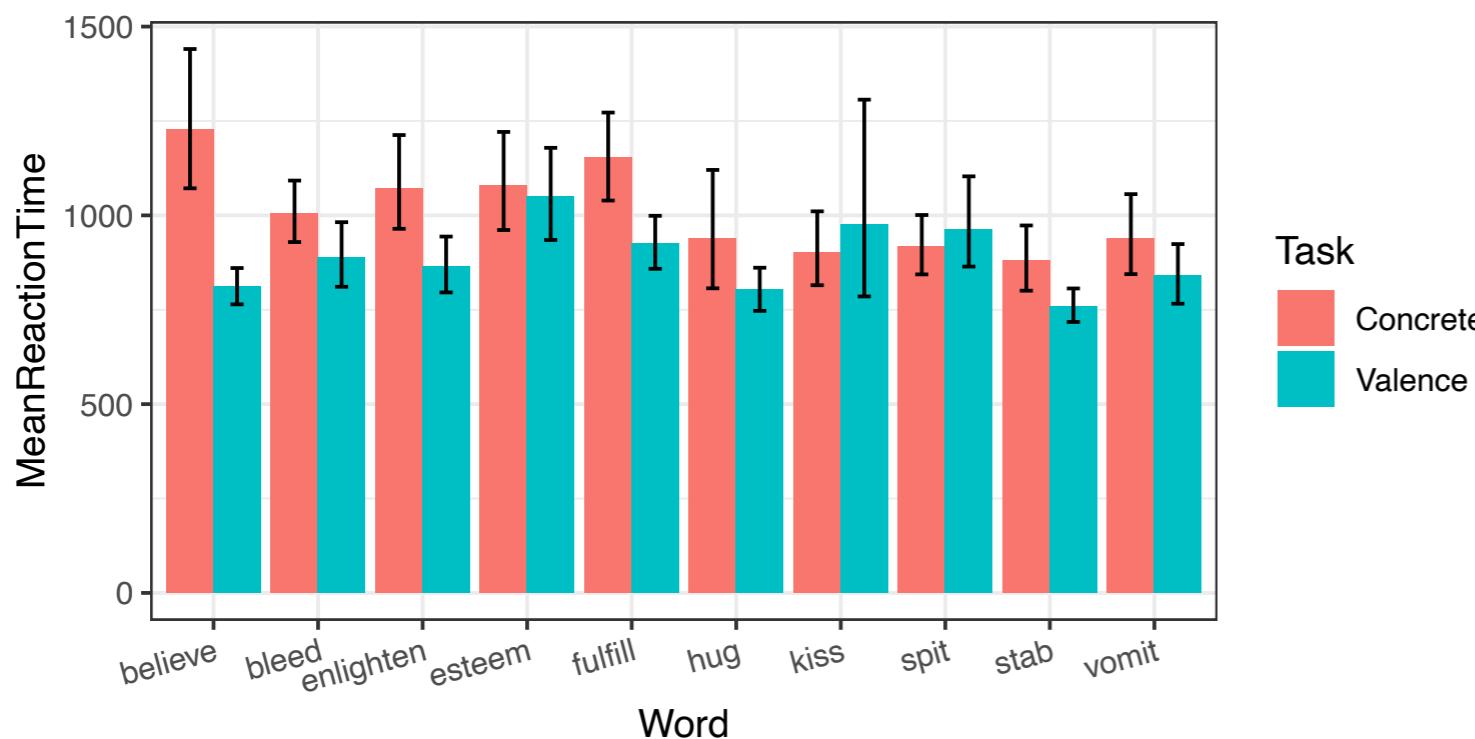
```
> print(concrete_accuracy_tot$Word)
```

[1] "untrustworthy"	"orange"	"amiable"	"compassionate"	"harmonious"	"judgmental"
[7] "manipulative"	"sympathetic"	"trustworthy"	"pregnant"	"chocolate"	"award"
[13] "cocaine"	"corpse"	"dollar"	"doughnut"	"excrement"	"feast"
[19] "flood"	"gunshot"	"heroin"	"laughter"	"meadow"	"pizza"
[25] "poison"	"prize"	"sandwich"	"smallpox"	"sunshine"	"swastika"
[31] "wiretap"	"admire"	"fulfill"	"criticize"	"exploit"	"obsess"
[37] "fester"	"resent"	"bleed"	"befall"	"breathe"	"enlighten"
[43] "discourage"	"displease"	"kiss"	"despair"	"dismay"	"stab"
[49] "vomit"	"bleed"	"fulfill"	"spit"	"build"	

# Conc/Abs Verbs: most accurate



10 verbs where Accuracy in Conc. Task  $\geq$  Accuracy in Valence



$\beta = -.23$ , SE = .03,  $t = -8.08$ ,  
 $p < .0005$

Seem to be emotion-laden or emotion-label words

# **Experiment 5: Similarity Judgements**

# Similarity judgements

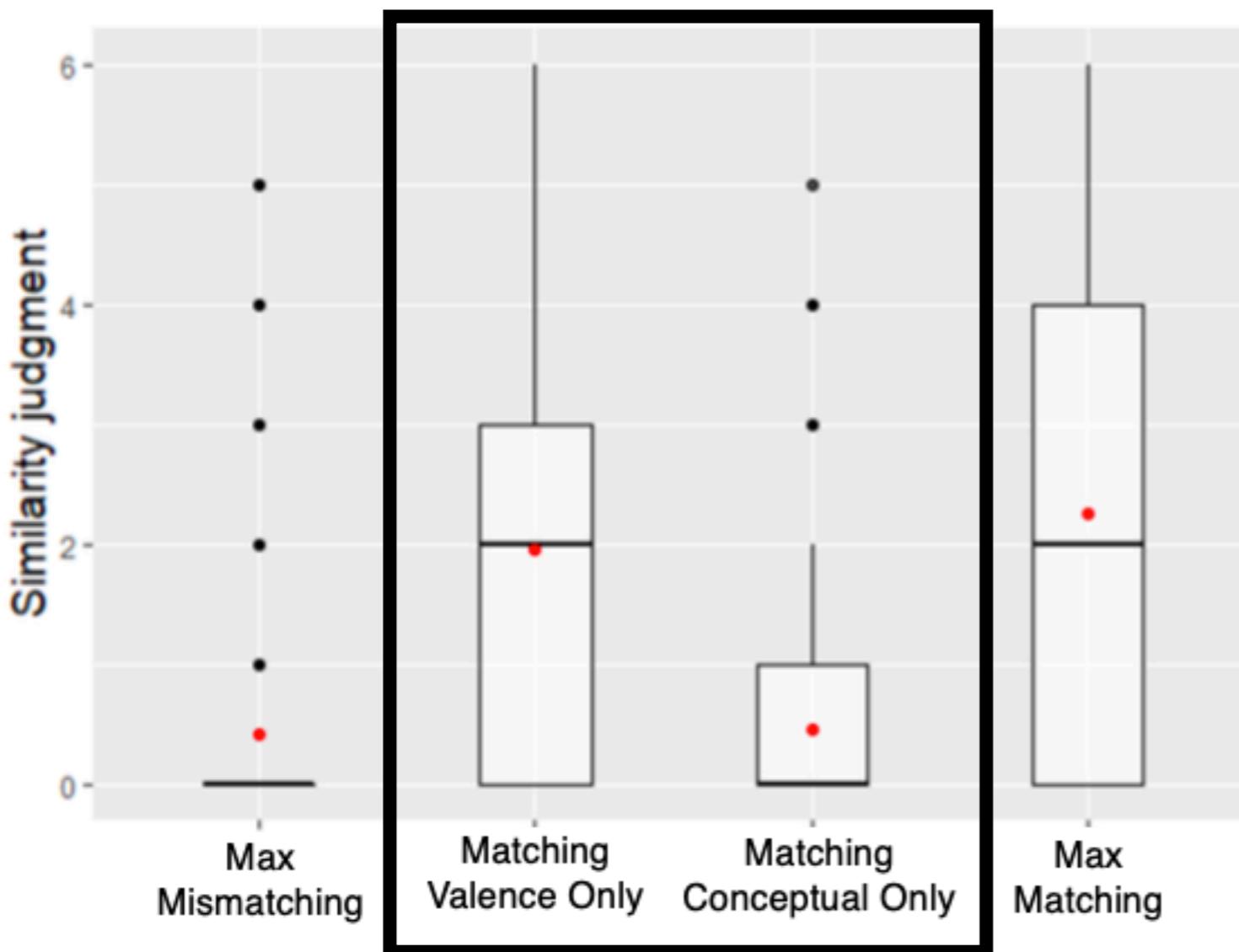
Measure of word meaning (Osgood et al 1957; Degen 2015; De Deyne, Perfors & Navarro 2016, a.o.)

If Valence features are more central to word meaning than Conceptual features, Valence mis/matches should drive similarity judgements

2x2 design

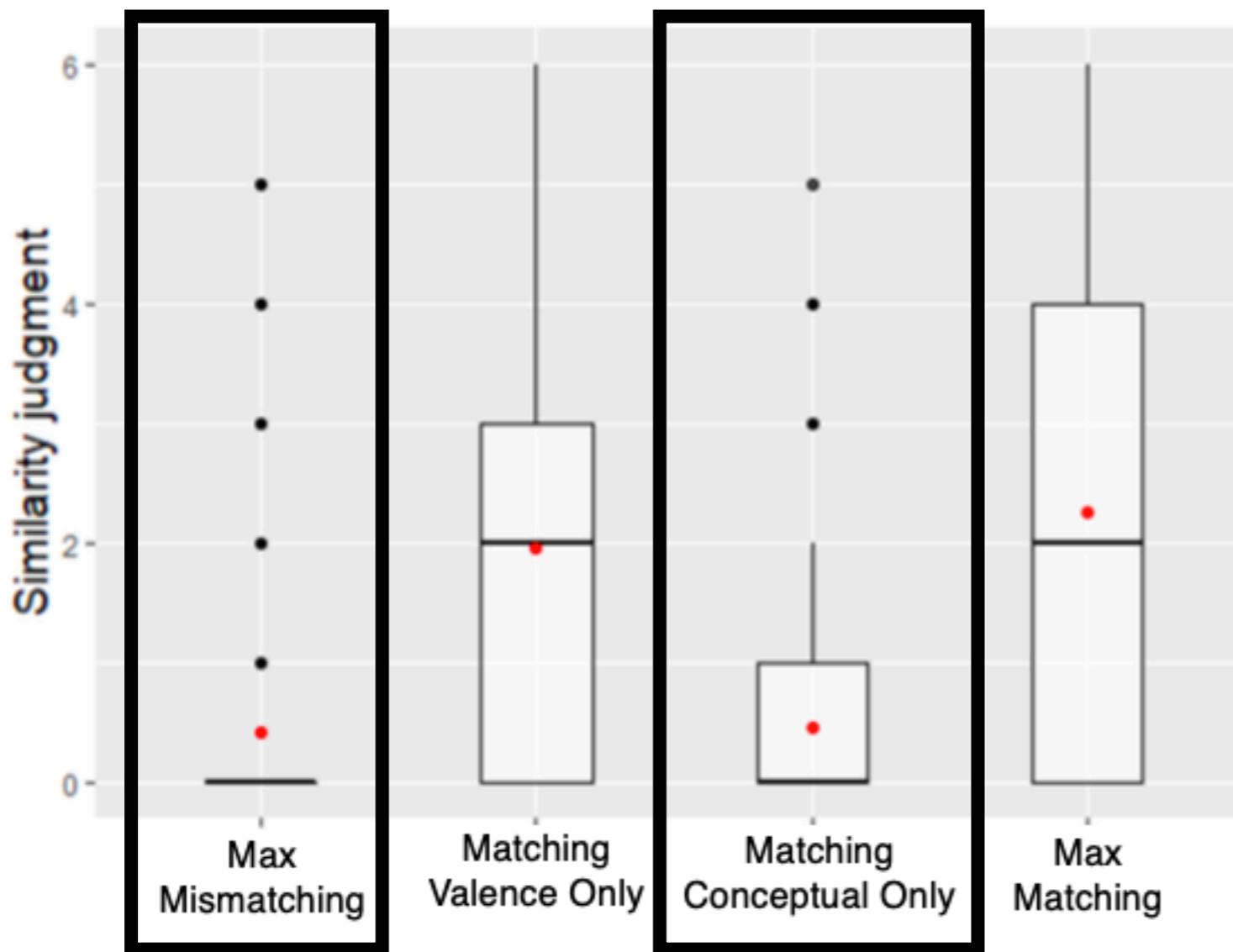
- Valence (pos, neg) x Conceptual (phys, psych)
- Controls: MaxMismatch, MaxMatch
- Test: **MatchingValence only**, MatchingConceptual only
- DM: slider from 0 (dissimilar) to 6 (similar)

# Results (n=62)



**Participants judge similarity based on Valence Match more than the Conceptual Match ( $t=6.41$ ,  $p<.0001$ )**

# Results (n=62)



**Participants judge similarity based on Valence Match more than the Conceptual Match ( $t=6.41$ ,  $p<.0001$ )**

If Valence mismatches, its as if all features mismatch — no diff. Between Matching Conceptual only and Max Mismatch ( $t=.17$ ,  $p>.8$ )

# Discussion

Evidence for AFH : Valence faster than most Conceptual categories except Animacy

> Animacy and affect both special for developmental and cognition

Effect found in most word tested ~ words selected to be best candidates for AFH

Yet, differences in lexical items suggest some but not all valence is lexical (Stojanovic & Kaiser 2020)

# Discussion

Language users based judgements of word similarity based on matched/mismatching valence rather conceptual feature

Consistent with idea that affect (lexical or no) drive/ supports/underlies semantic competency (Osgood et al 1957; Lambon Ralph et al 2017; Yap & Show 2017; Souter et al 2023)

In-depth item analyses ~ what natural classes emerge and do they track our linguistic theories ?

# Thank you!

**EPITHETS-STAHL Workshop organizers**

Projet SU - Emergence "REV" OP24-126

Valence Asymmetries, ERC Advanced Grant, grant n° 101142133



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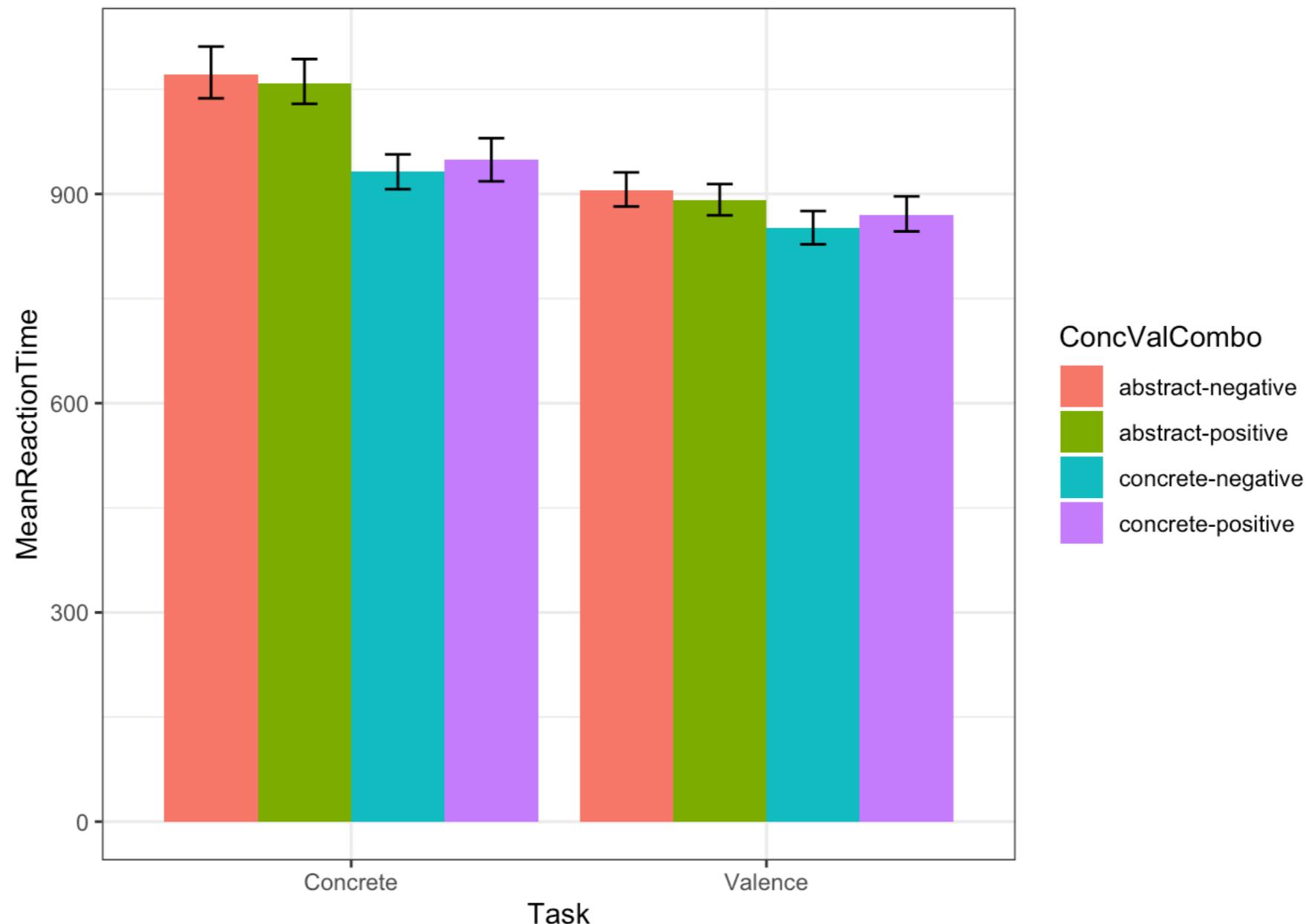
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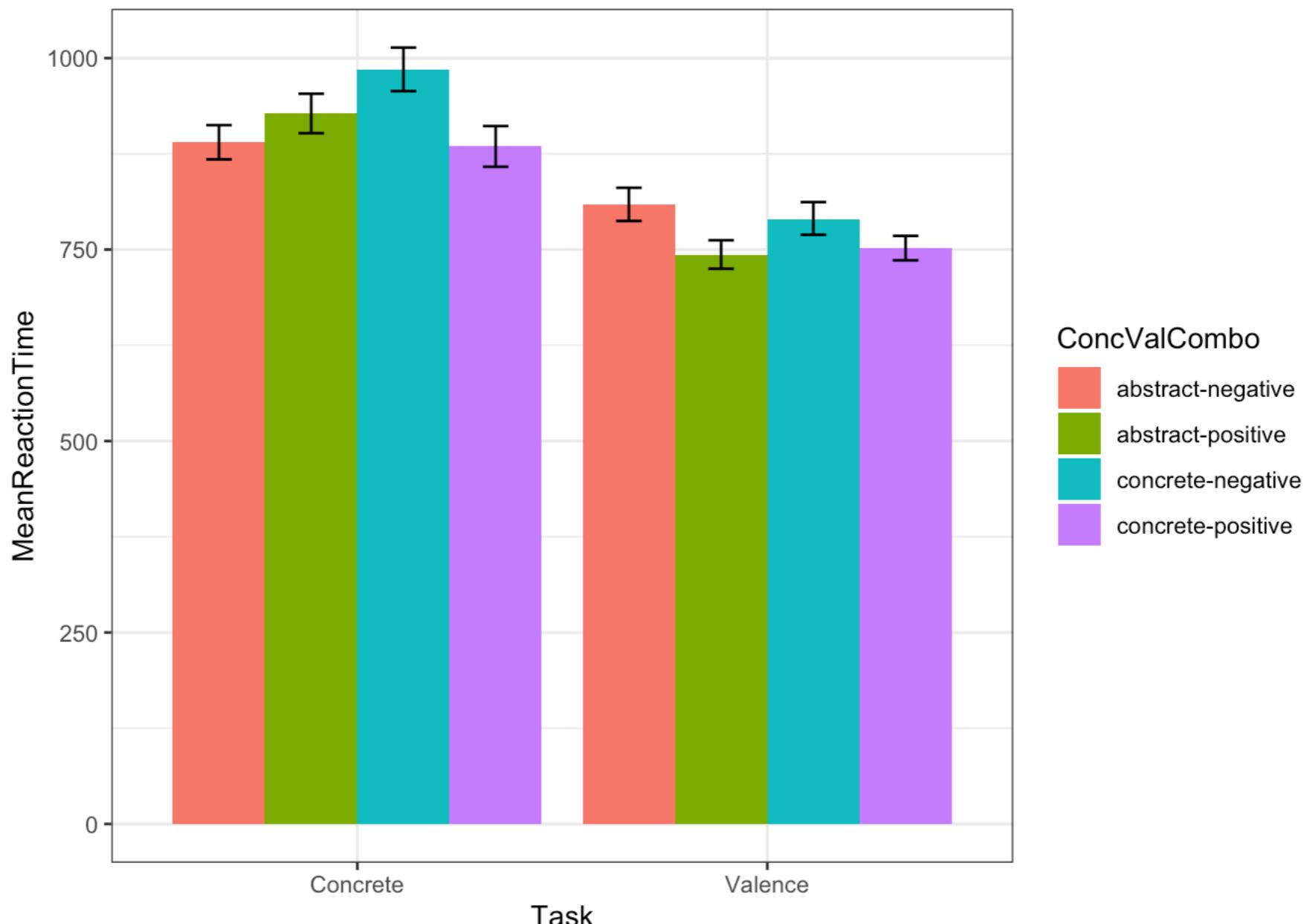
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# **Features and RT**

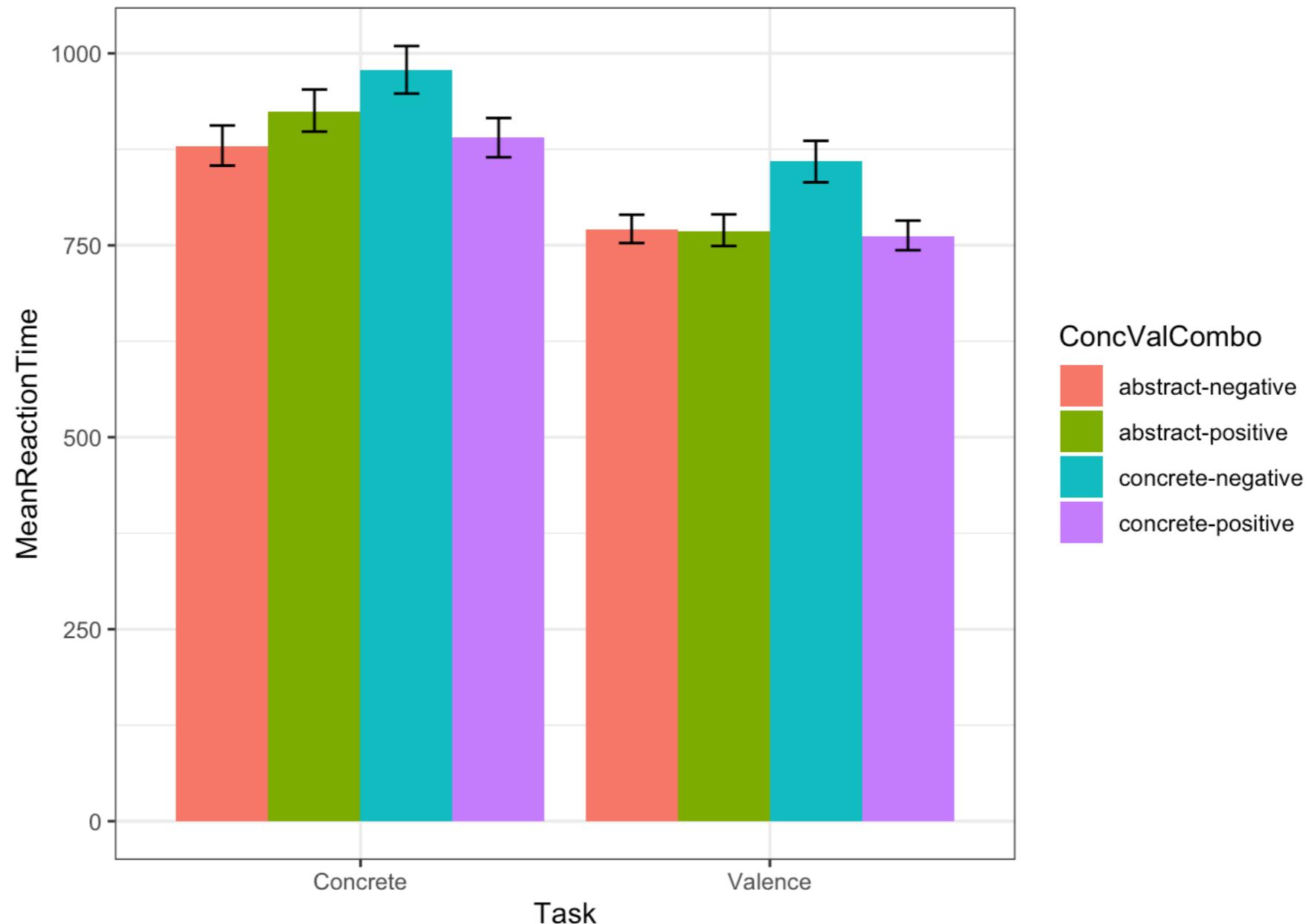
# Concreteness - Verbs



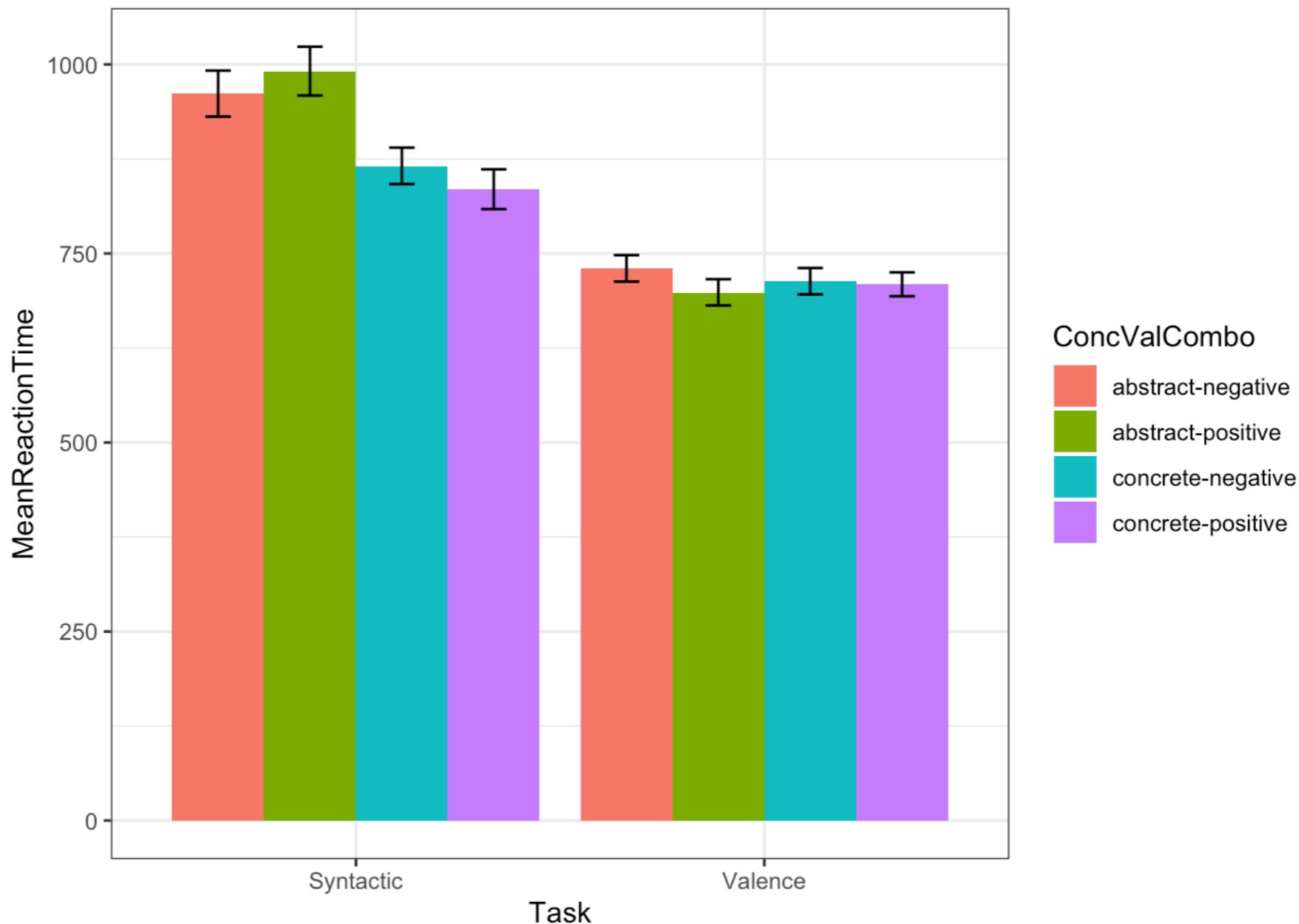
# Concreteness - Nouns



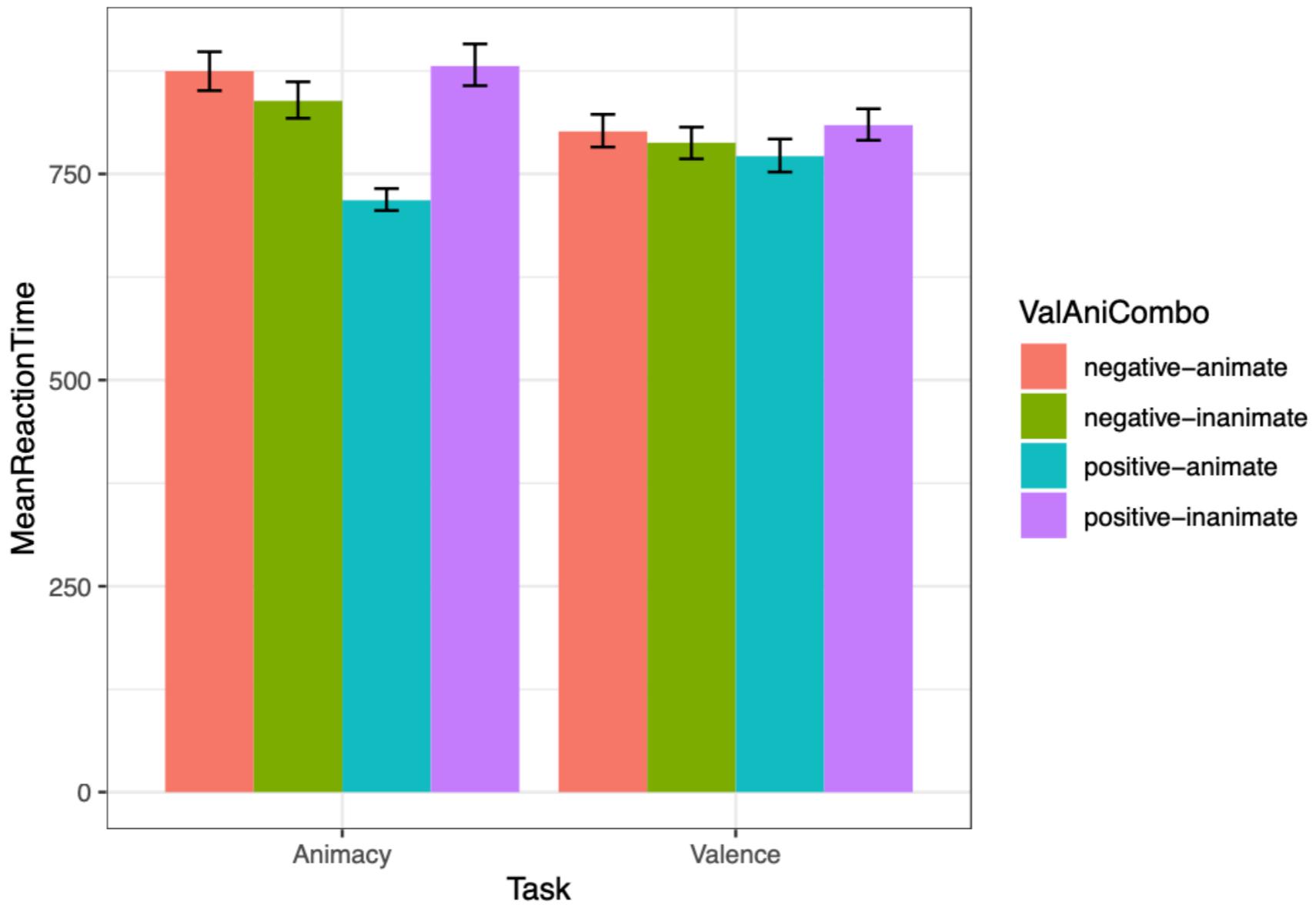
# Concreteness - adjs



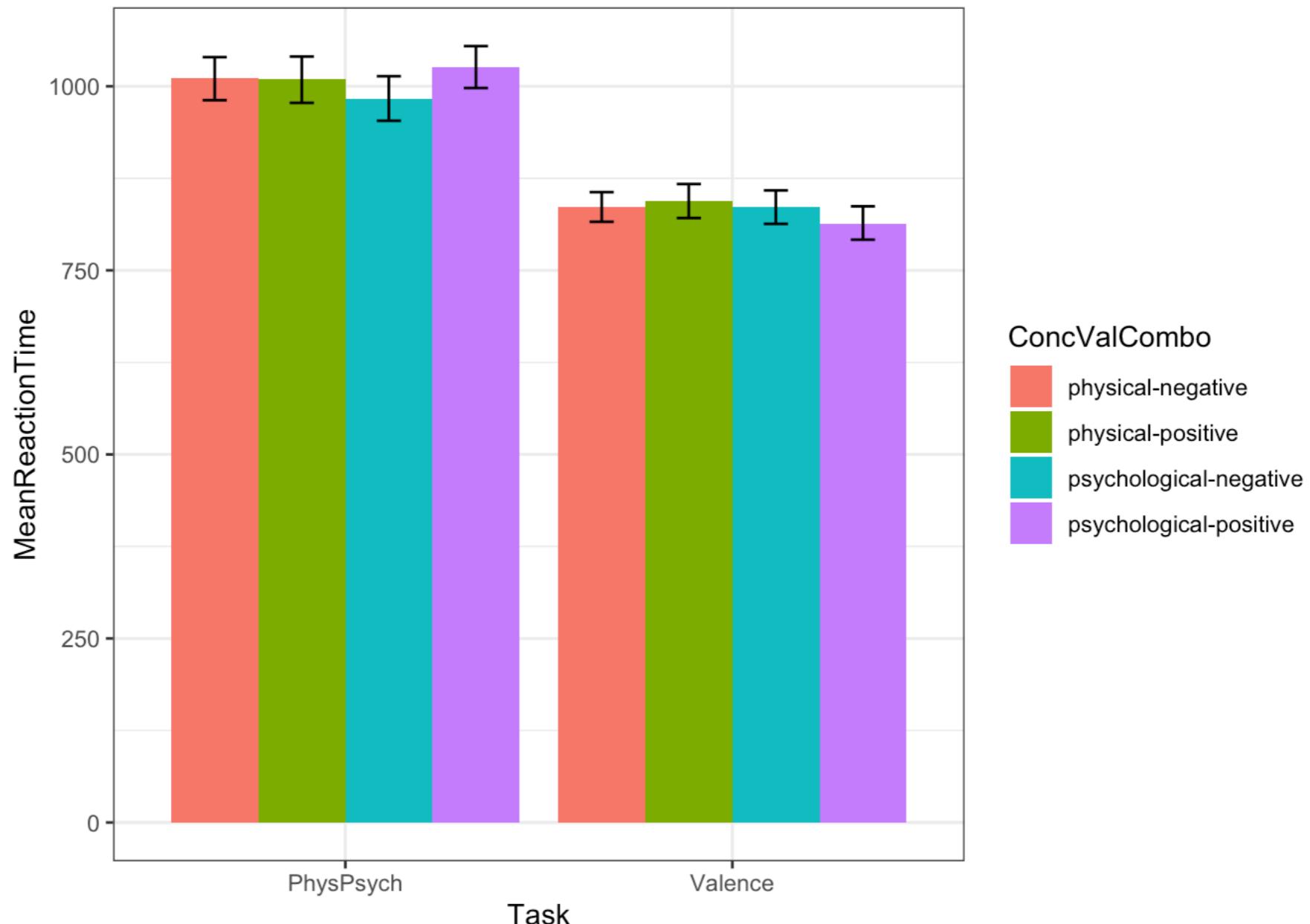
# Syntax



# Animacy



# Physical-psychological



# Physical-social

