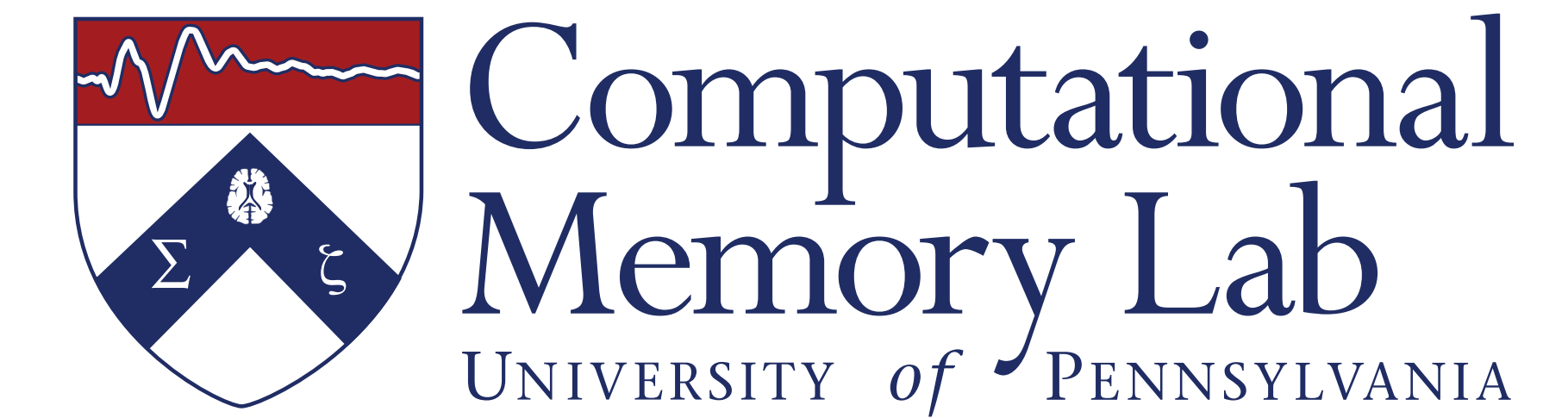


Predicting Recall of Words and Lists

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Introduction

- While earlier studies establish the importance of several variables as predictors of word-level recall, list-level recall has not been thoroughly investigated.

Aim 1: Create models of variability in recall of words and lists

Aim 2: Assess the commonalities and differences between these models at the level of individual subjects.

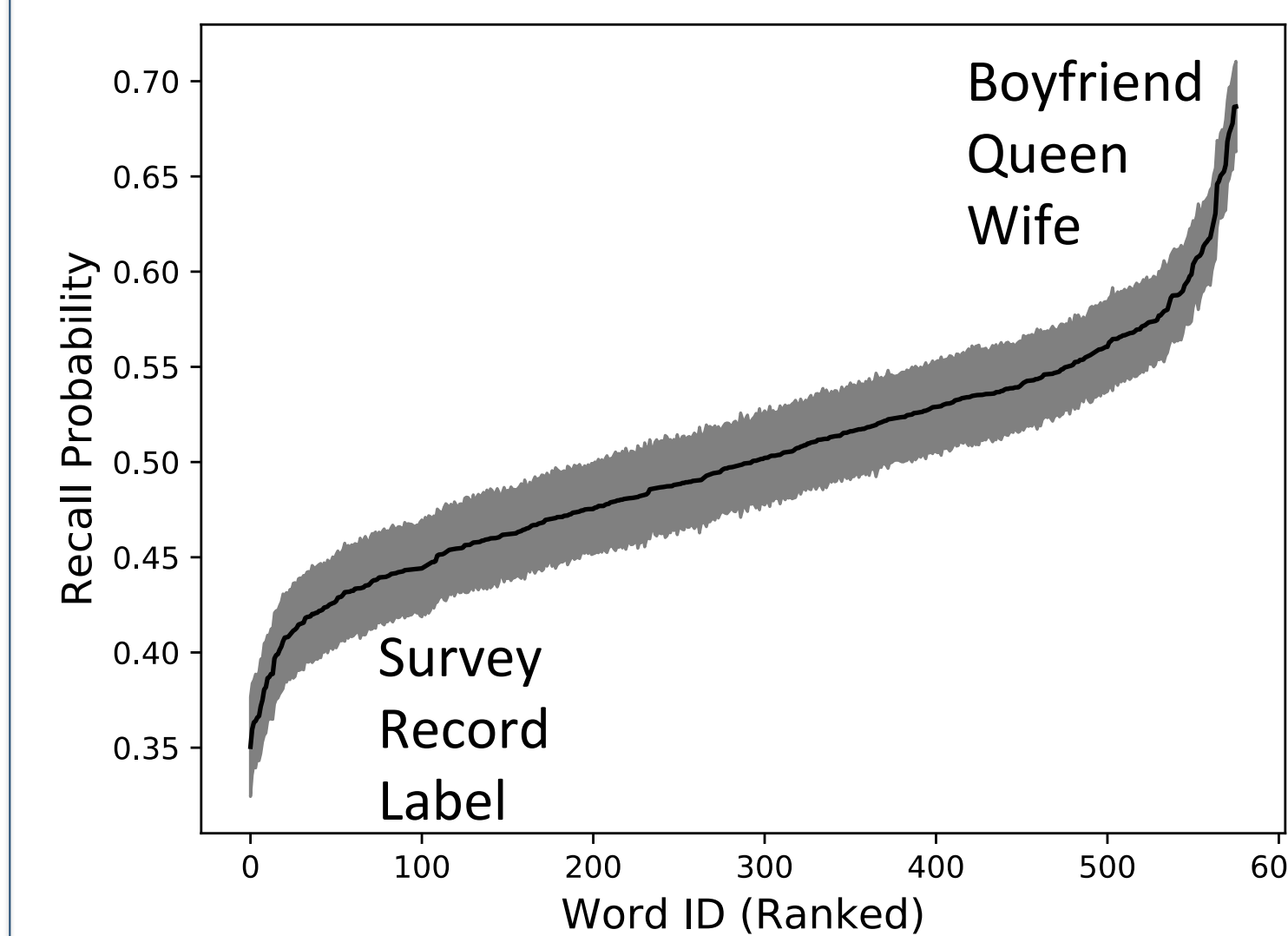
- Our model included concreteness, word frequency, word length, emotional valence, and arousal as well as two new measures of meaningfulness based on corpus similarity measures (i.e., Word2Vec¹):

- List meaningfulness: average semantic relatedness between a given word and all of the words in its presented list
- Pool meaningfulness: average semantic relatedness between a given word and all of the words in our word pool

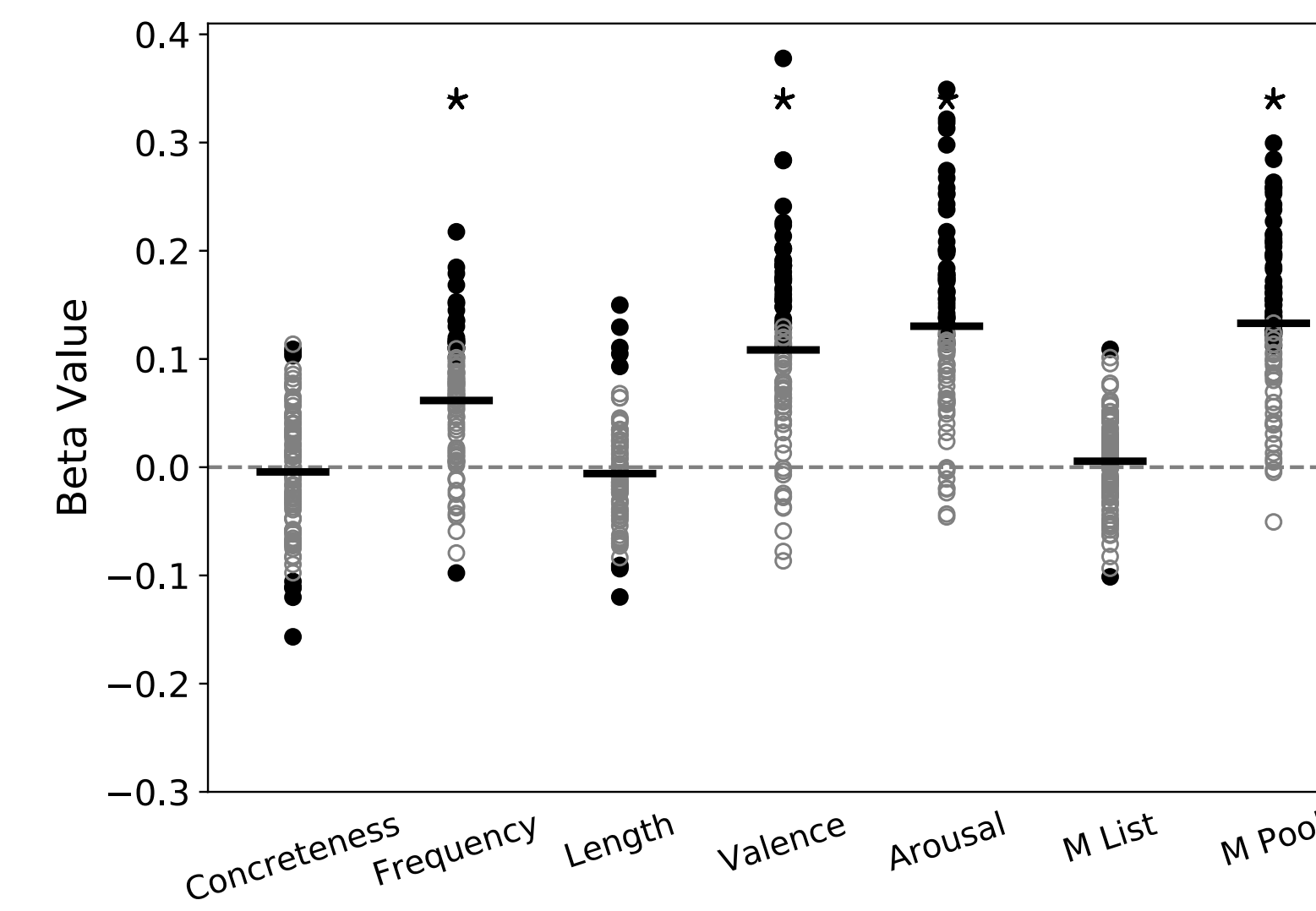
We hypothesized that concrete, common, and emotional words will have an advantage in both word and list-level models. However, we predicted different effects of the two meaningfulness measures between models.

Word Recall Model

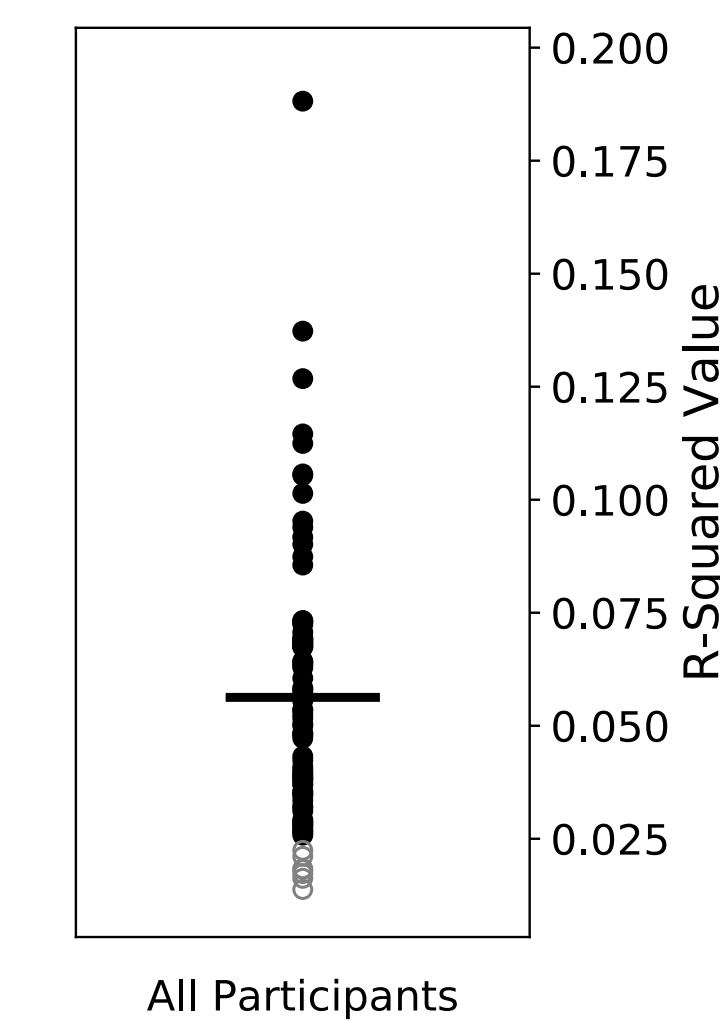
Variability in Word Recall



Strengths of Variables



R² Values



Multiple Regression Variables

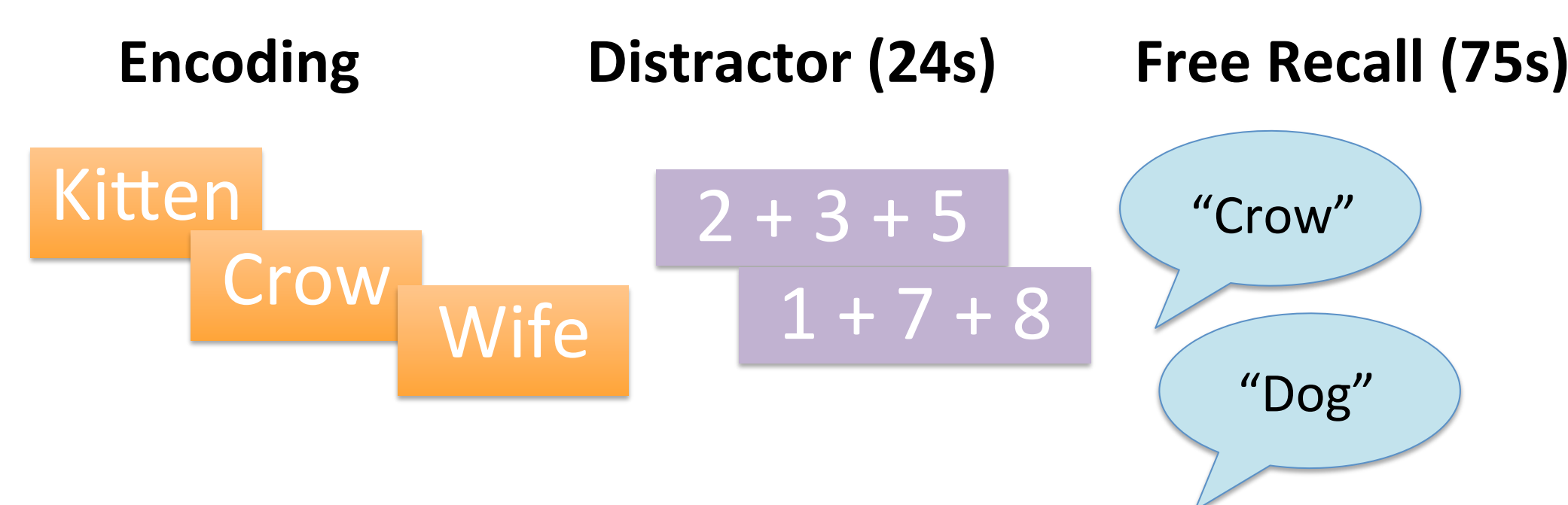
	Mean β
Concreteness	-0.004
Word Frequency	0.062***
Word Length	-0.006
Valence	0.108***
Arousal	0.130***
M List	0.006
M Pool	0.133***

*p < 0.05, **p < 0.01, ***p < 0.001

Methods

Penn Electrophysiology of Encoding and Retrieval (PEERS) Experiment 4:

- 93 college-aged participants
- 23 experimental sessions
- Each session consists of 24 lists with 24 words
- 576-word pool (identical in each session)
- A+B+C arithmetic distractor

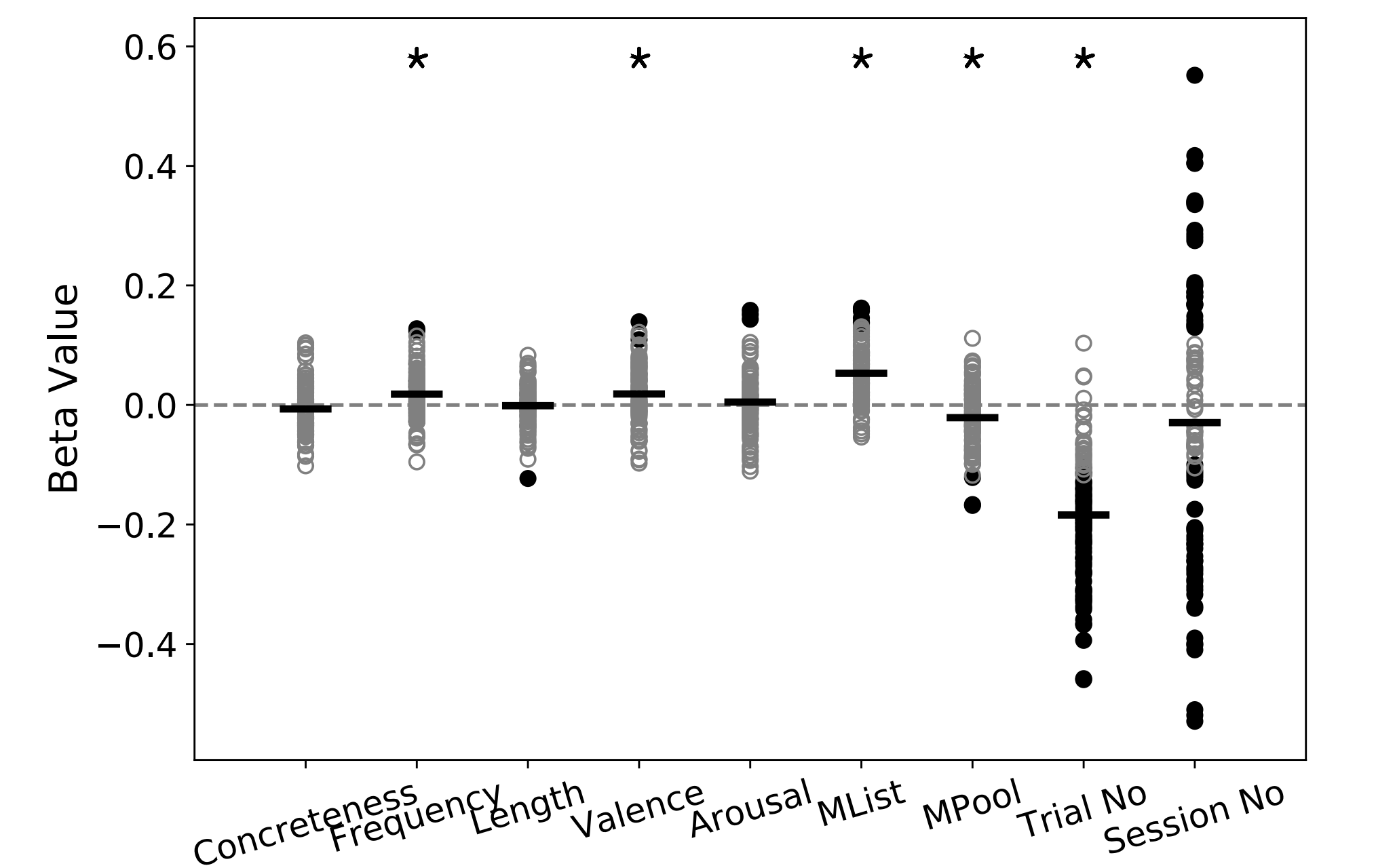


- Two Statistical Models (Word-Level and List-Level):

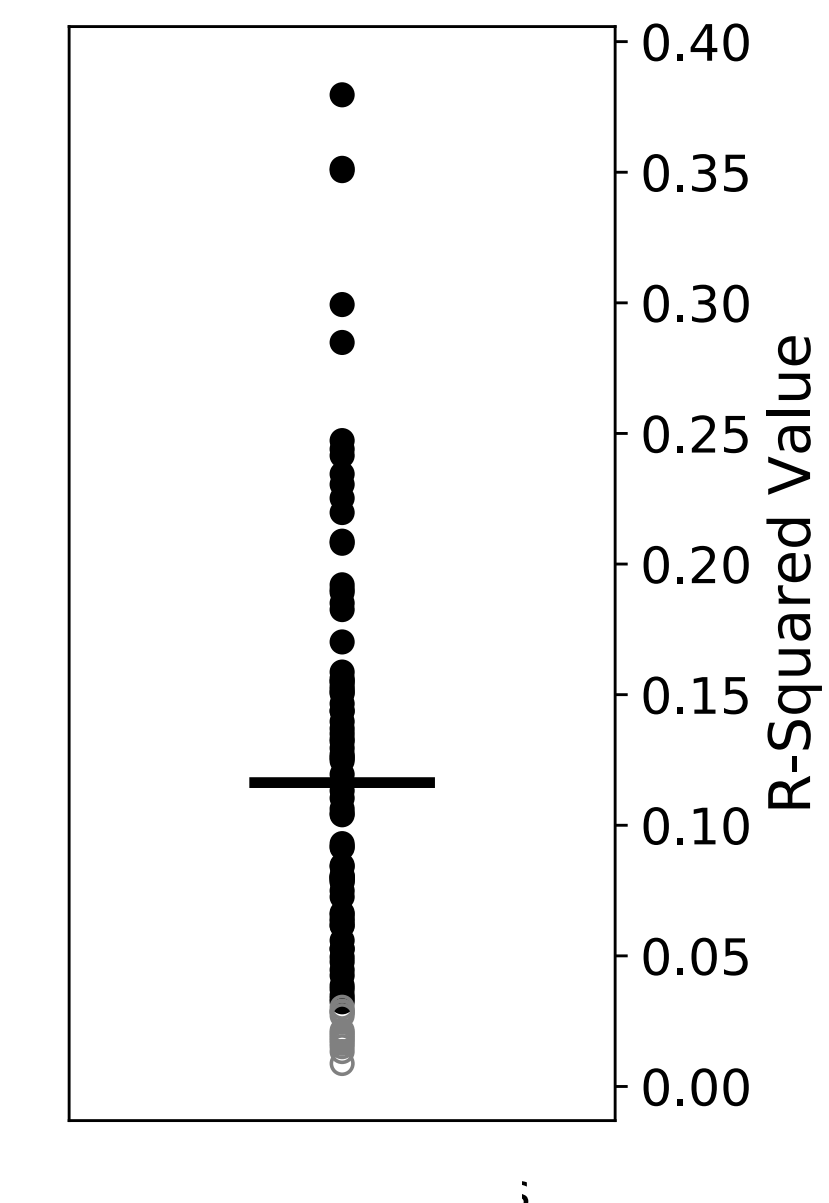
$$P(\text{Rec}) = \beta_0 + \beta_1(\text{Concreteness}) + \beta_2(\text{Word Frequency}) + \beta_3(\text{Word Length}) + \beta_4(\text{Valence}) + \beta_5(\text{Arousal}) + \beta_6(\text{List Meaningfulness}) + \beta_7(\text{Pool Meaningfulness})$$

List Recall Model

Strengths of Variables



R² Values



Mean β

	Mean β
Concreteness	-0.007
Word Frequency	0.018***
Word Length	-0.001
Valence	0.018**
Arousal	0.005
M List	0.053***
M Pool	-0.021***
Trial No	-0.184***
Session No	-0.030

*p < 0.05, **p < 0.01, ***p < 0.001

Conclusions

- Multivariate models revealed positive effects of word frequency and emotional valence on both word and list recall.
- Whereas words were best recalled when they were similar to many other words in the lexicon, lists were best remembered when their constituent words were similar to one another but different from out-of-list words.

References

- ¹Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013a). Distributed Representations Of Words and Phrases and their Compositionality. 1–9. doi: 10.1162/jmlr.2003.3.4-5.951
- ²Rubin, D. C., & Friendly, M. (1986). Predicting which words get recalled: measures of free recall, availability, goodness, emotionality, and pronounciability for 925 nouns. Memory & Cognition, 14 (1), 79–94. doi: 10.3758/BF03209231

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