Lancaster University

Influential predictors of single word recognition: a research synthesis

1 September 2017

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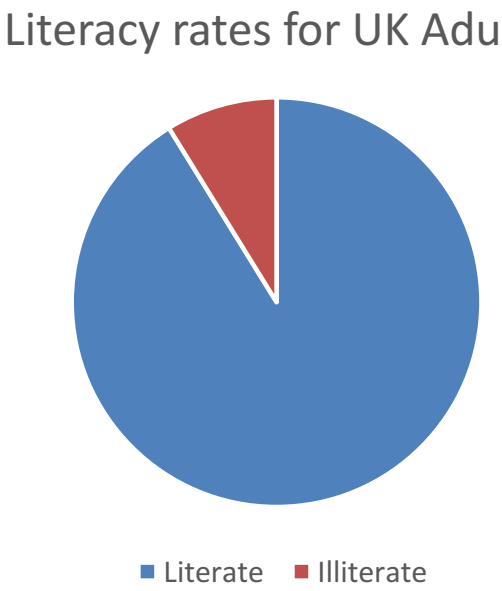
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Literacy skills



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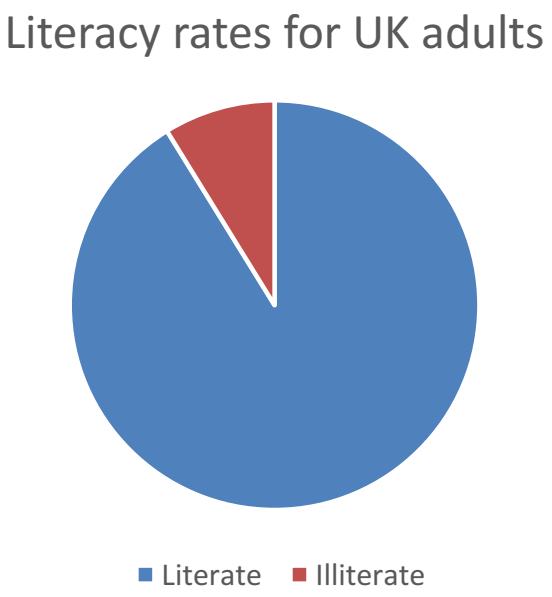
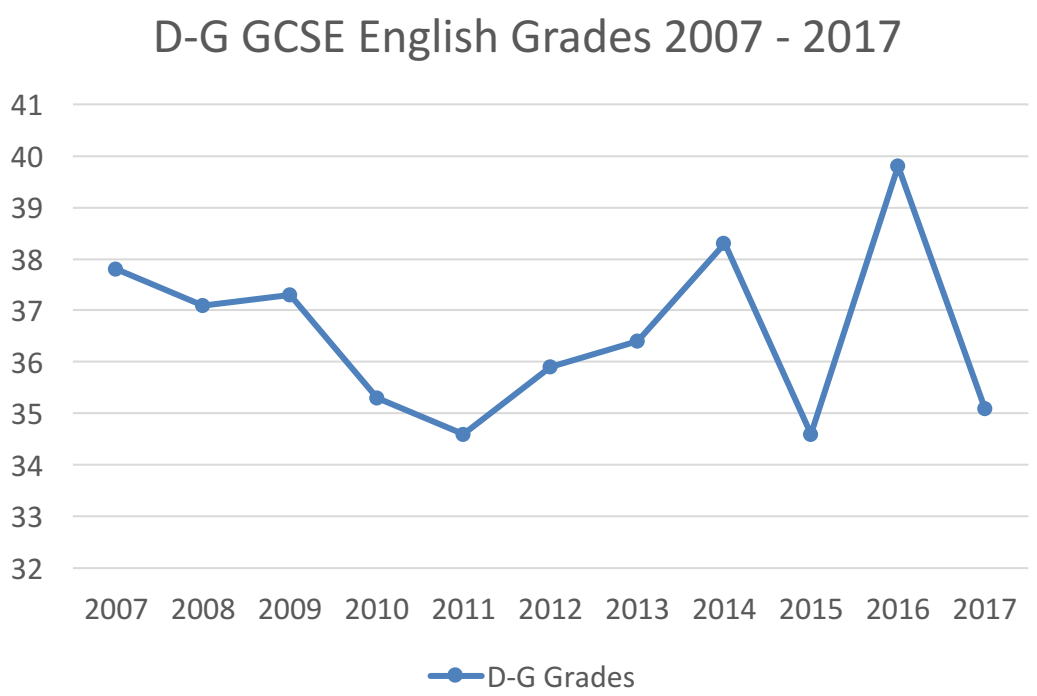
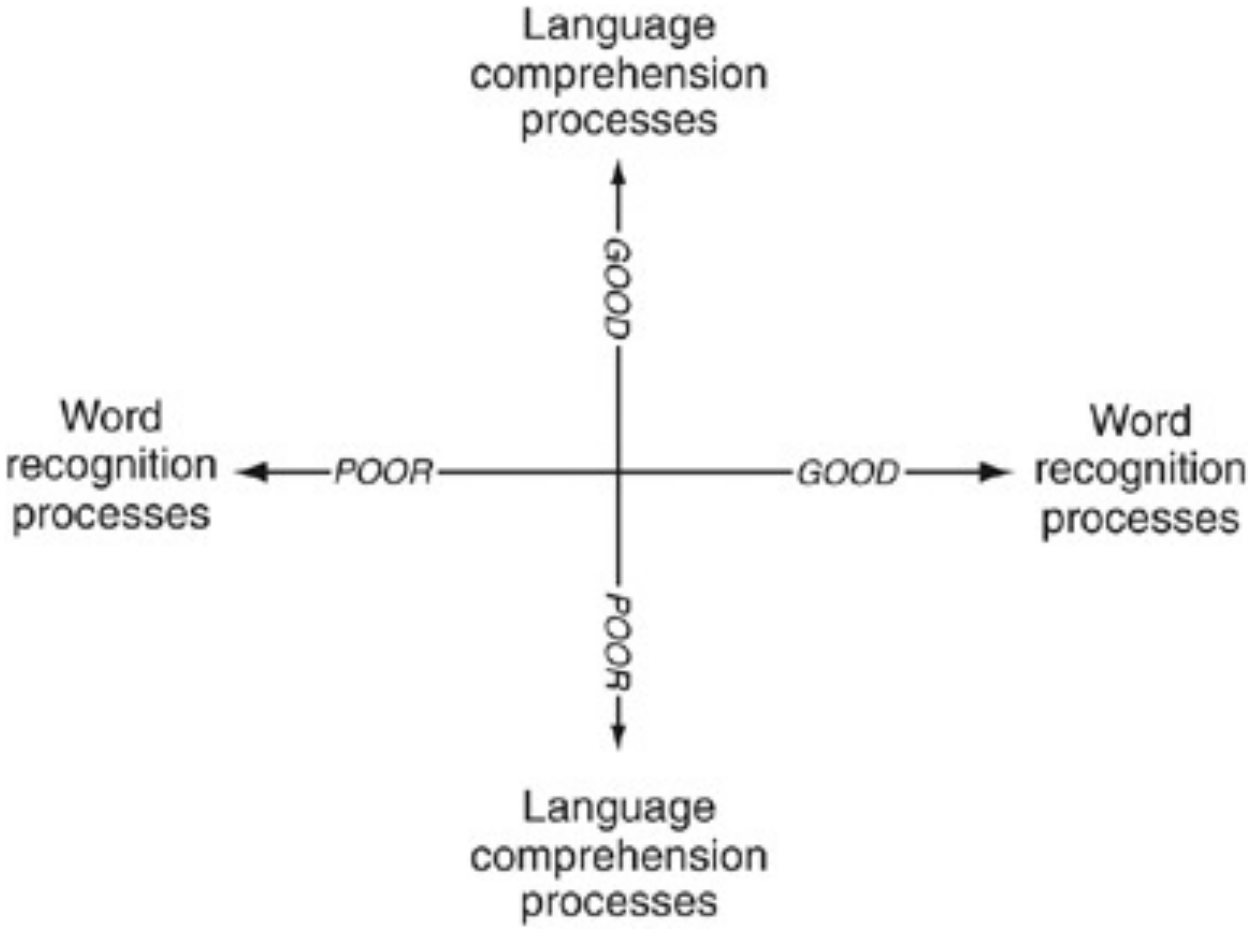




Simple view of reading



(Gough & Tunmer, 1986)

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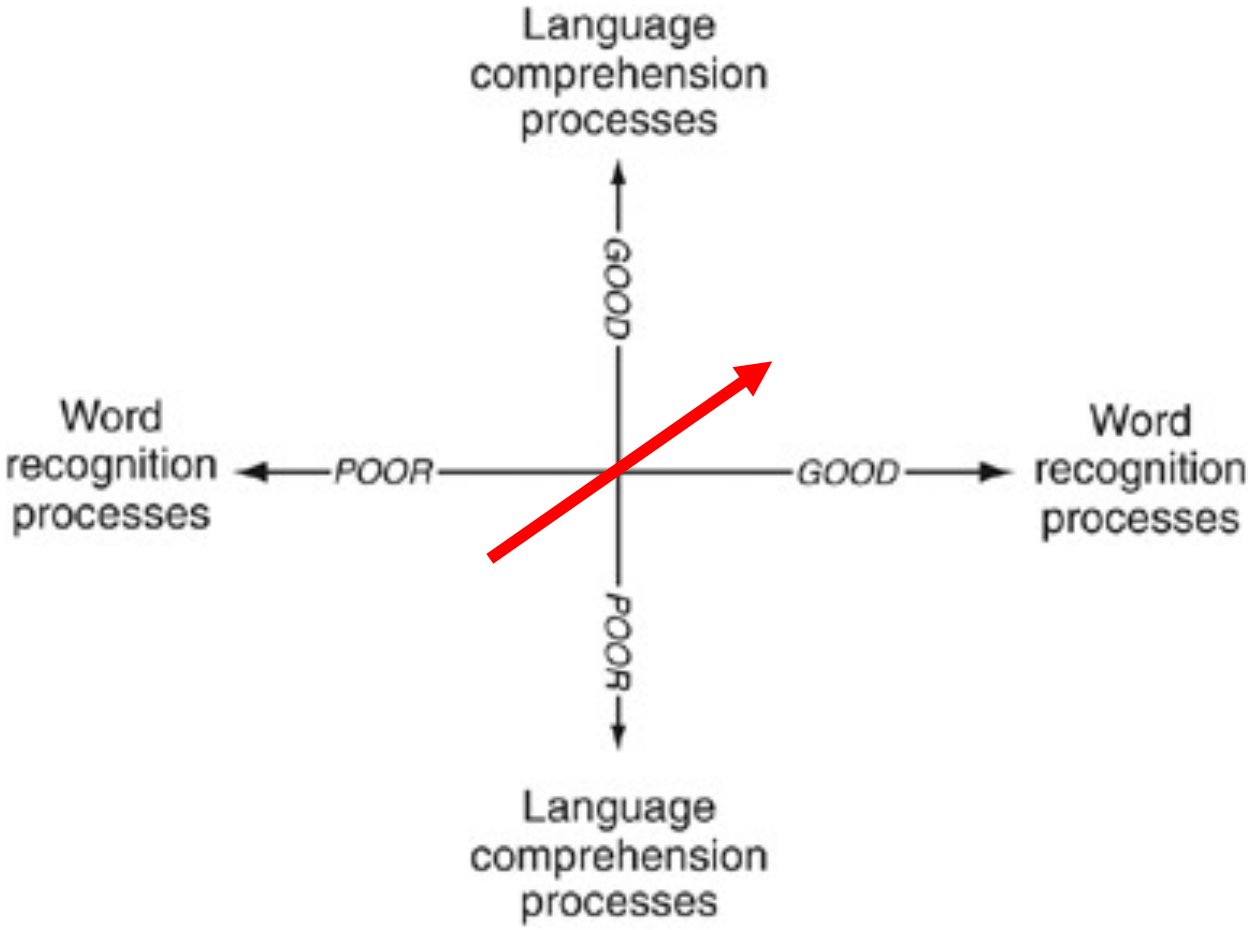

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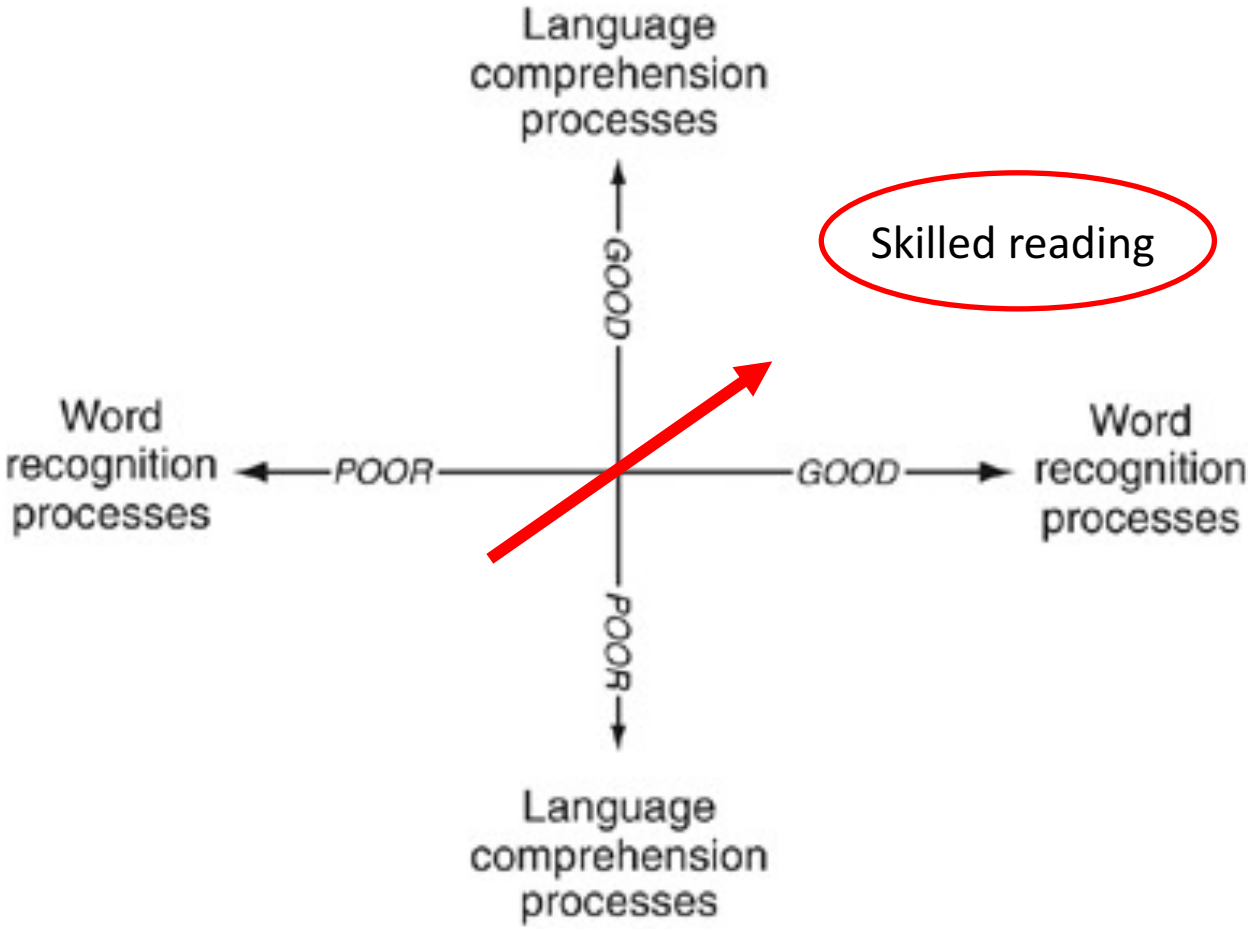

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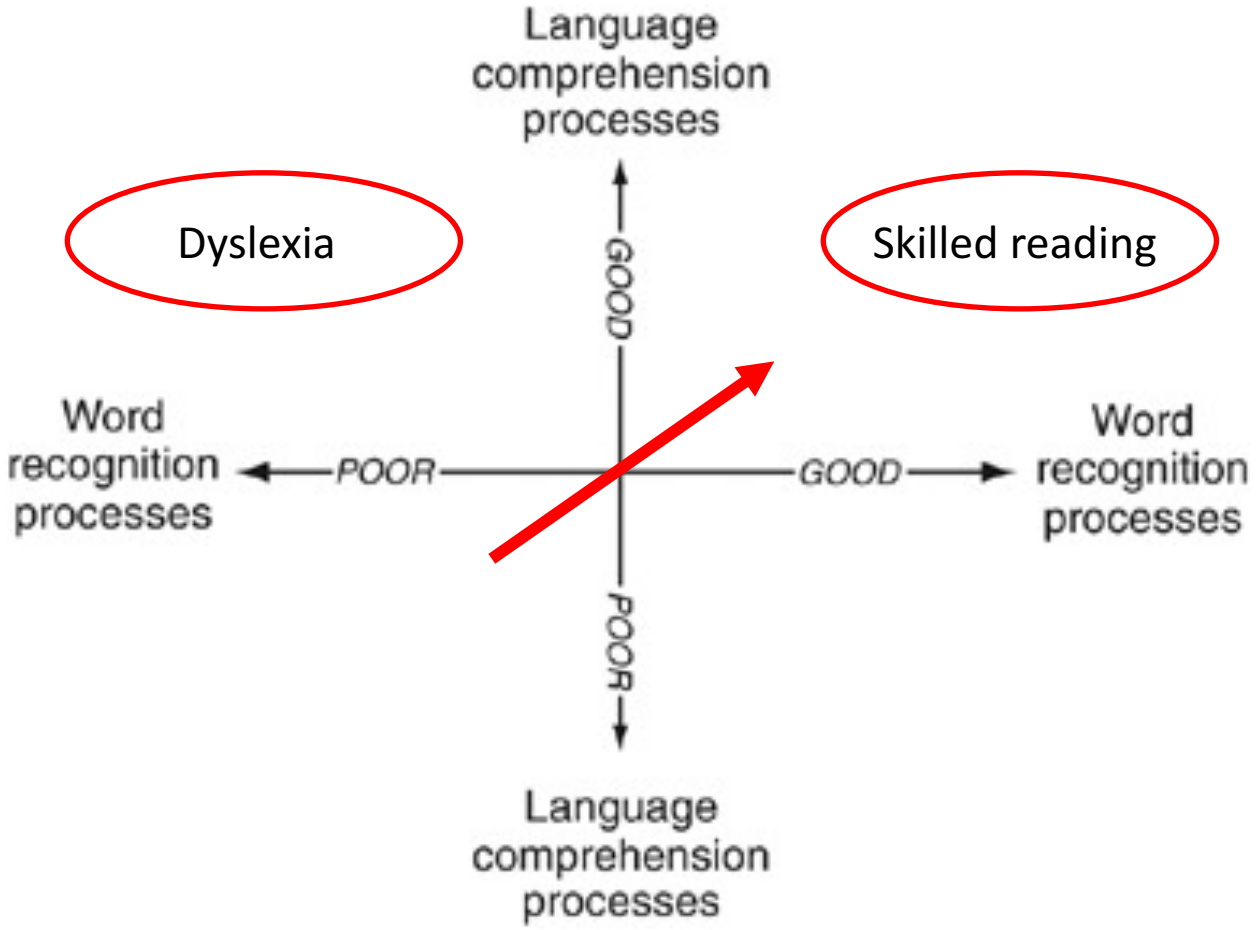

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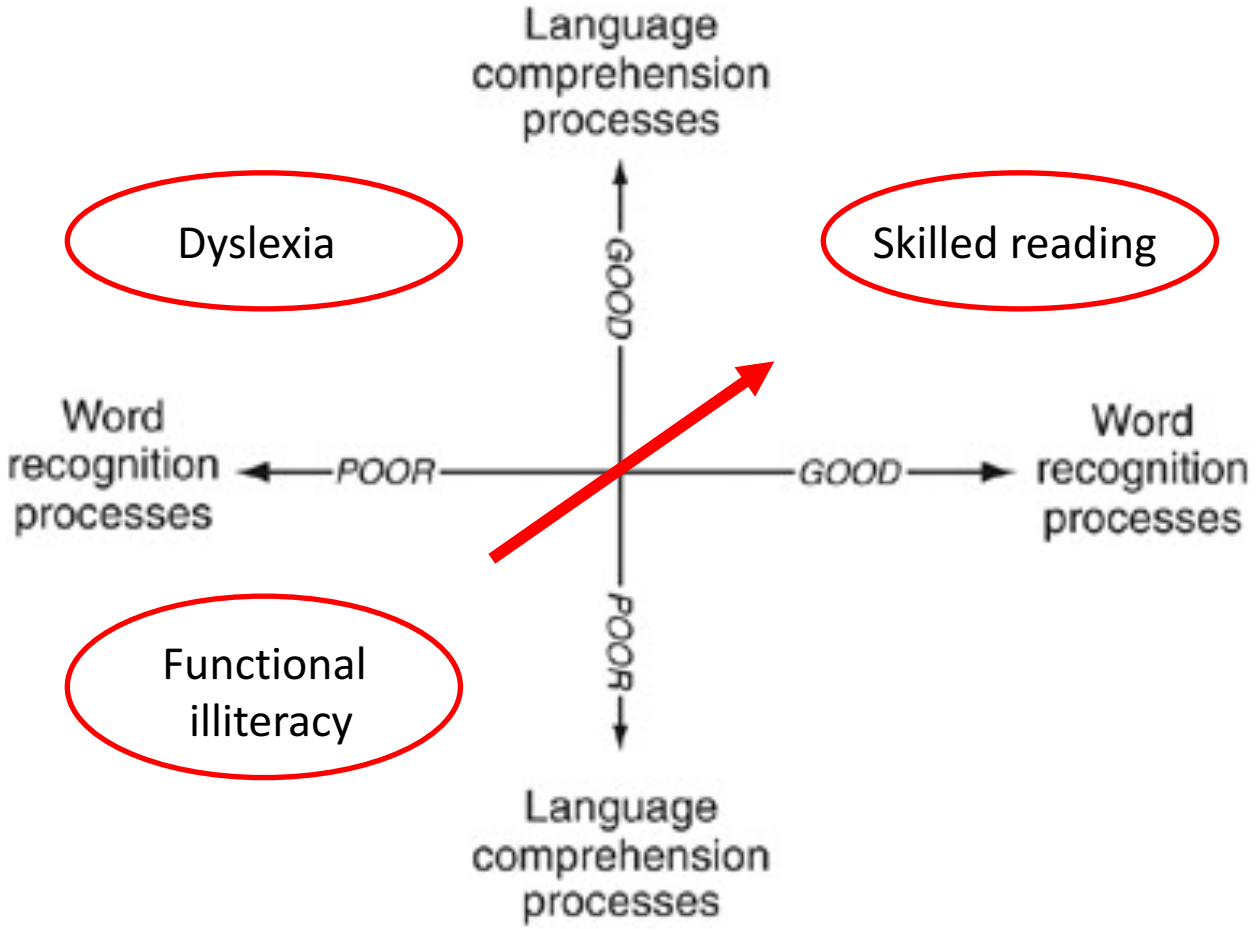

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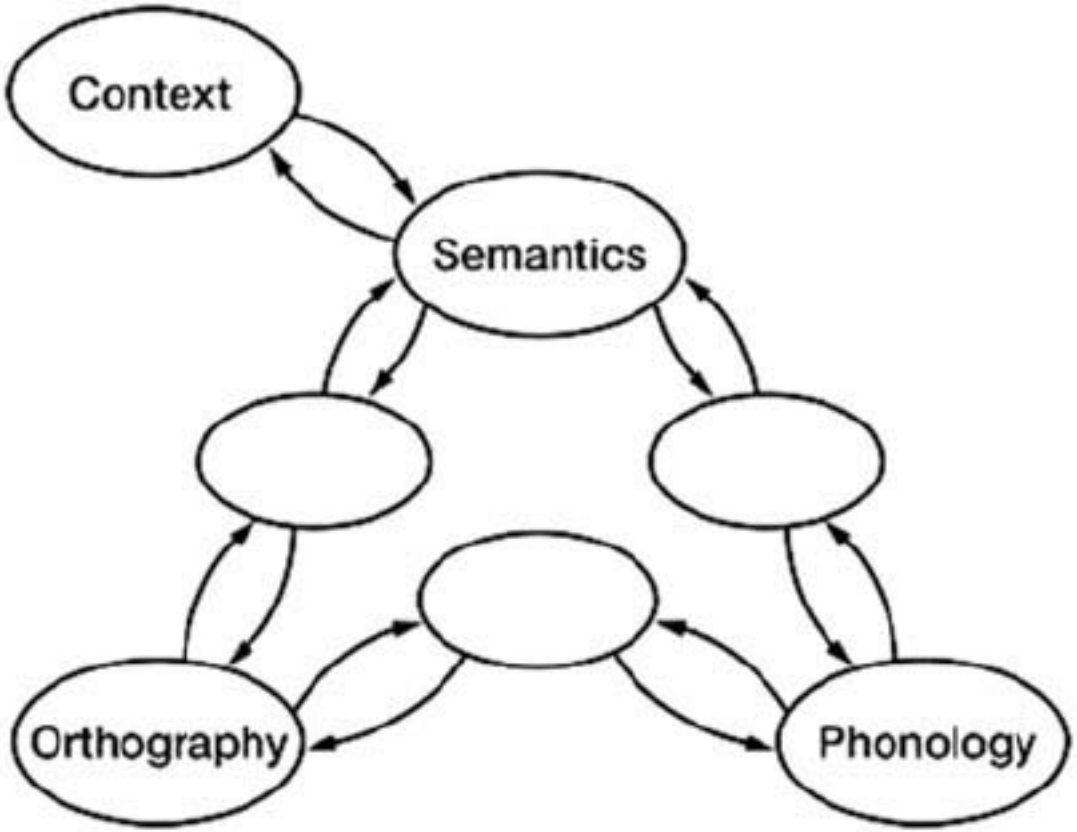
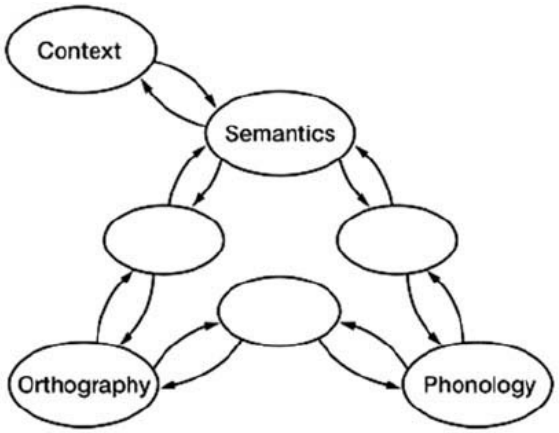
Cognitive models of reading:



(Seidenberg & McClelland, 1989)

Proxy measures at two levels:



Phonology:

P: Sound – letter knowledge

W: Pronunciation

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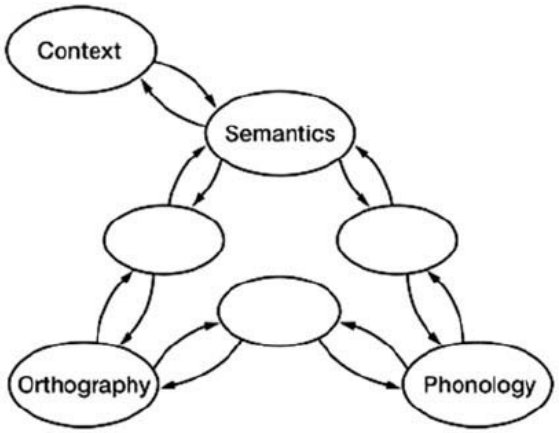

Orthography:

P: Spelling ability

W: Frequency

Phonology:

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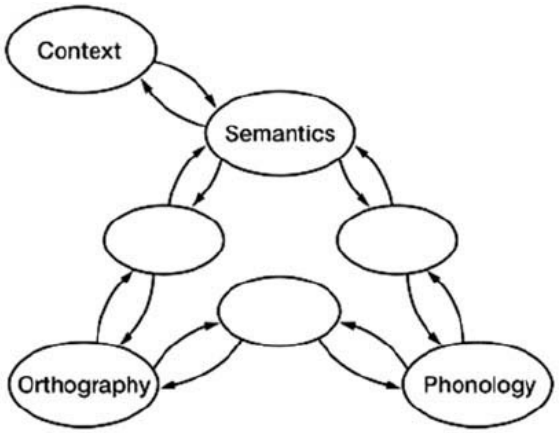
W: Pronunciation

Proxy measures at two levels:

Semantics:
P: Vocabulary knowledge

W: Imageability



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A research synthesis: Method

1. Scoping search
   - 3 databases
   - “Individual differences” and word-level predictors e.g. frequency

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   - studies included if:
     - contrast groups AND
     - word naming OR lexical decision task AND
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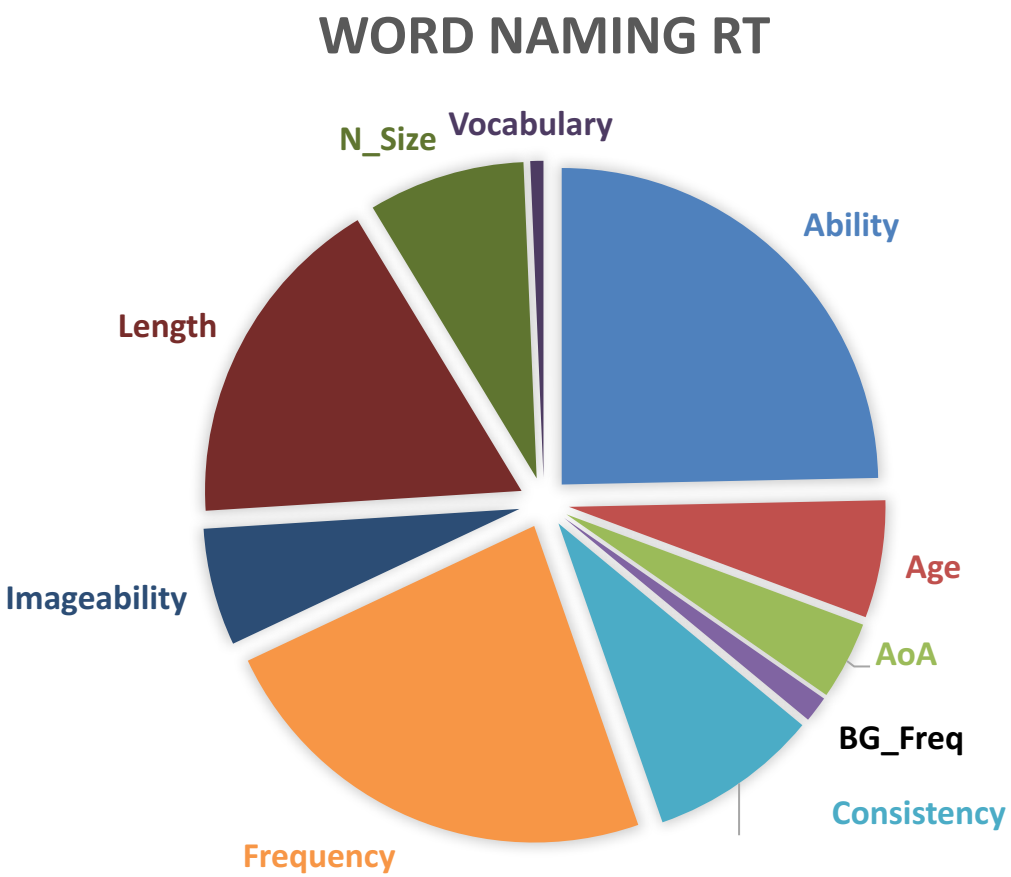
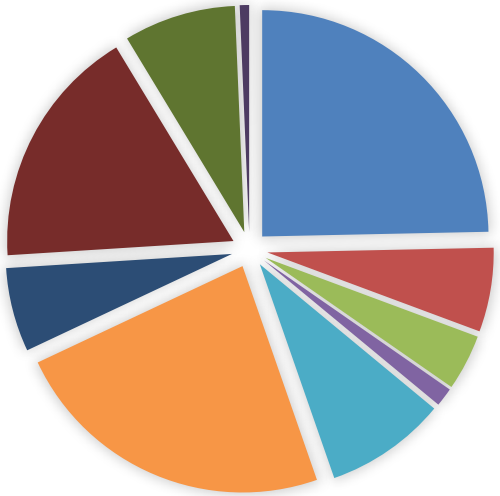
87

How many effects and for whom?

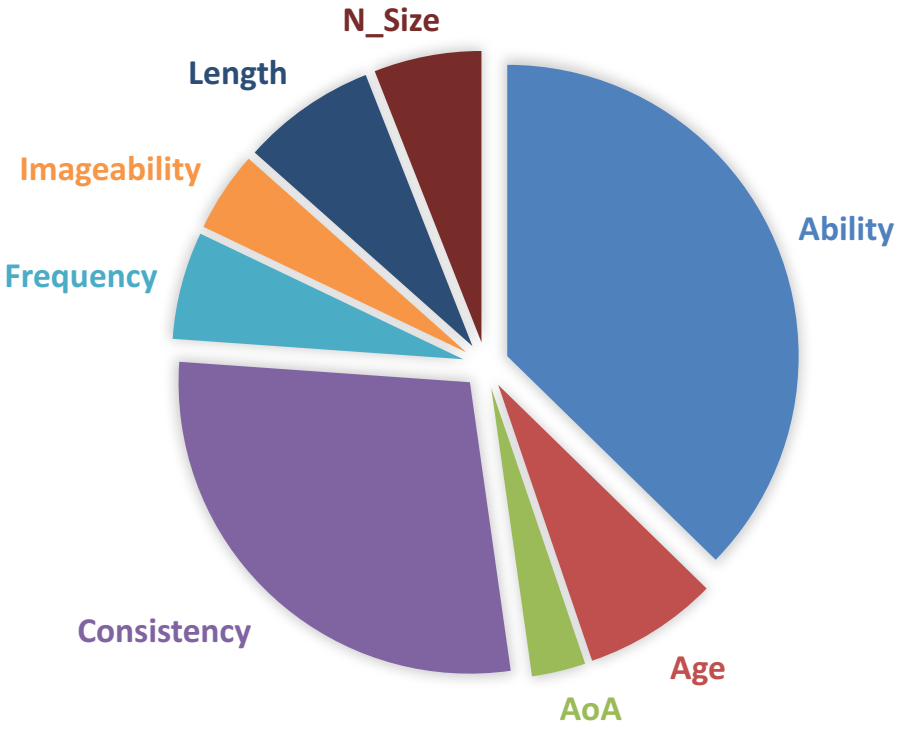


Word naming studies

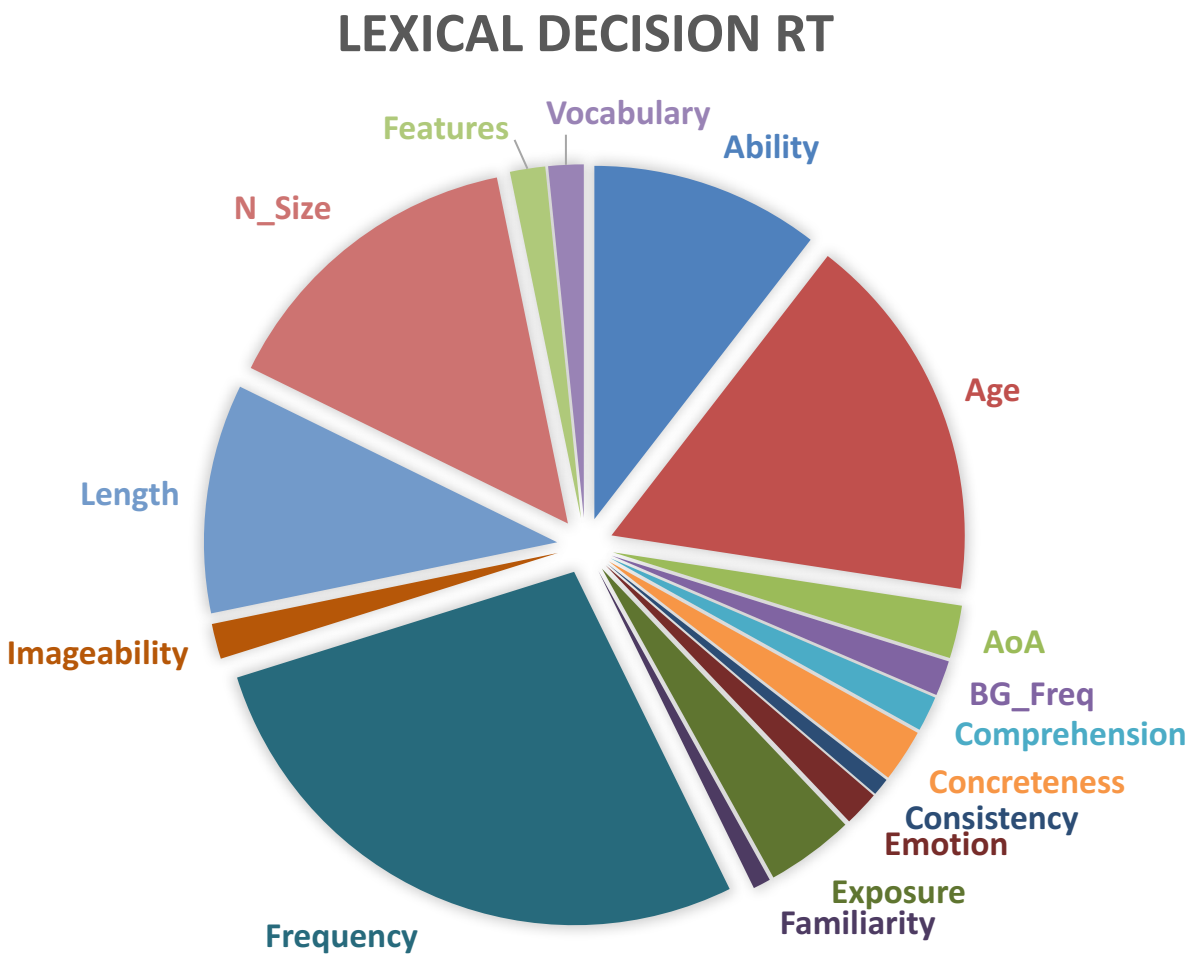
WORD NAMING RT



WORD NAMING ACCURACY



Lexical decision studies



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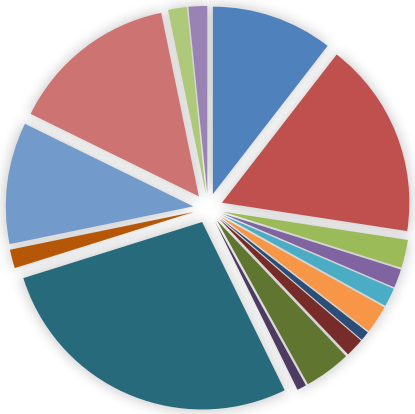

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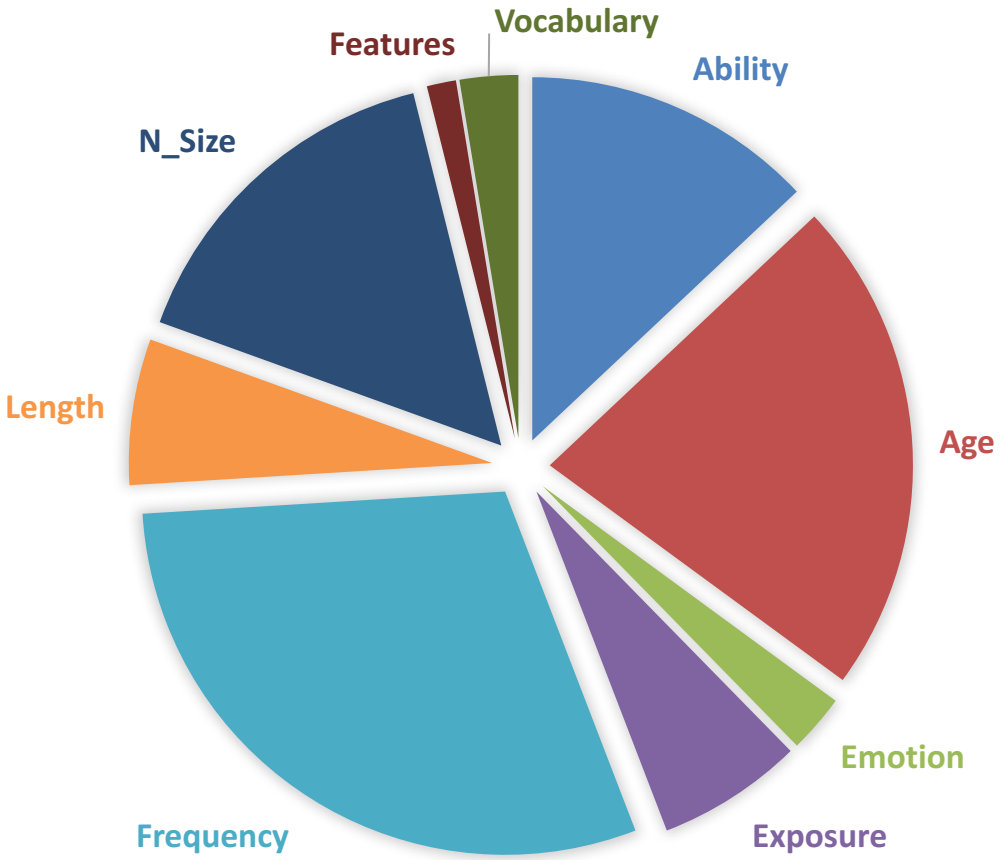
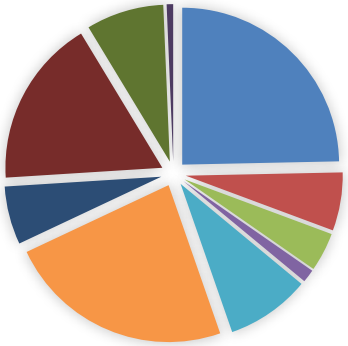
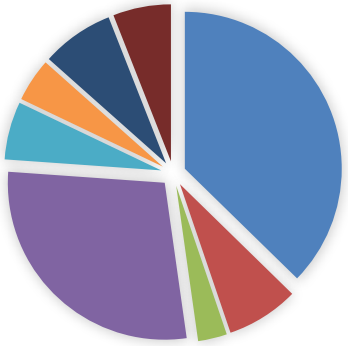


All studies: no of effects = 433

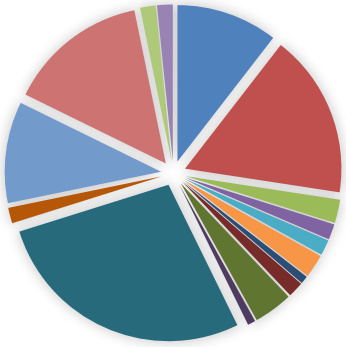
WORD NAMING RT



ACCURACY



LEXICAL DECISION RT



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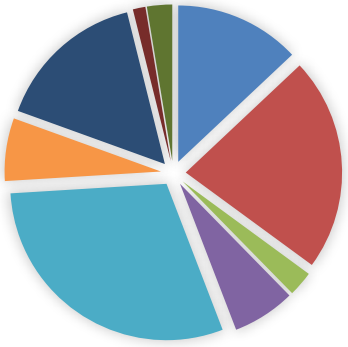
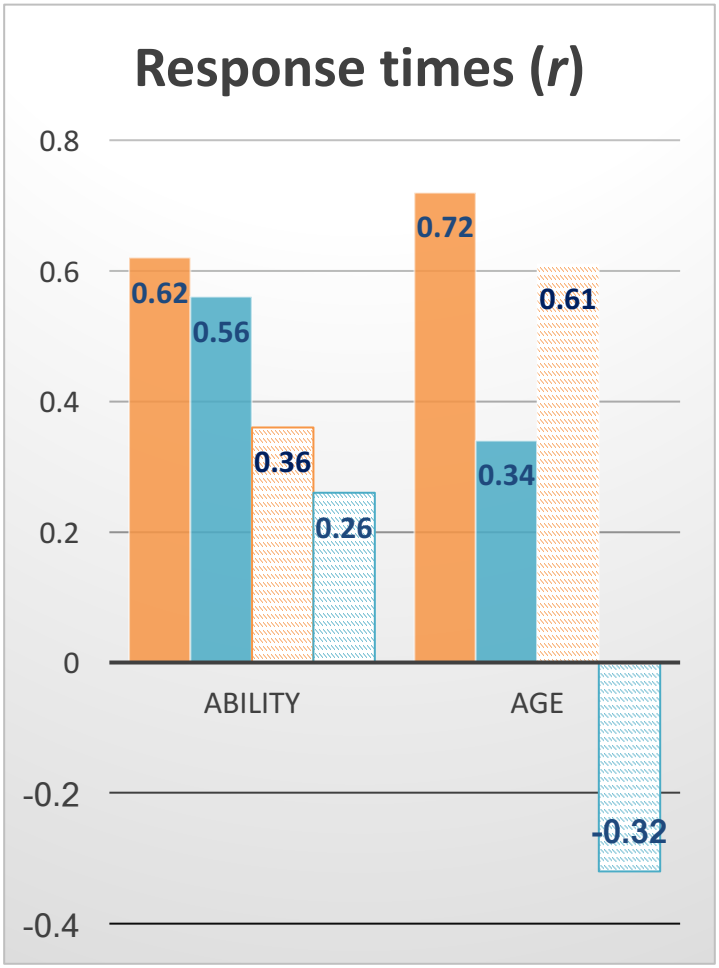


Person-level effect sizes



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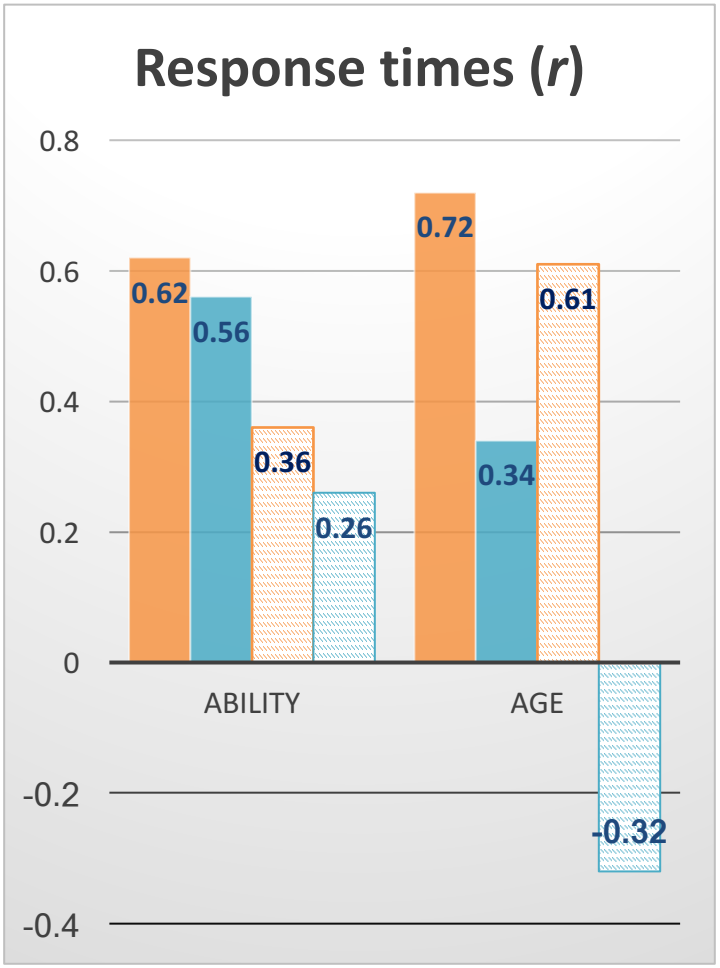

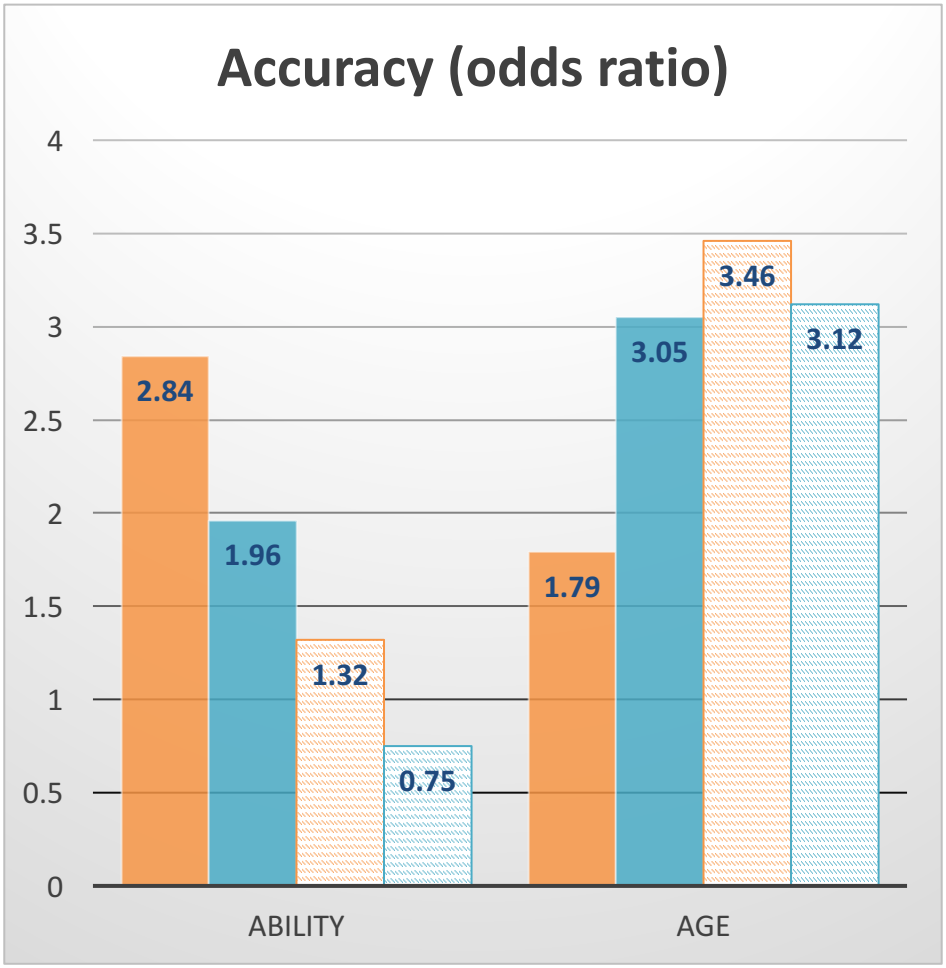

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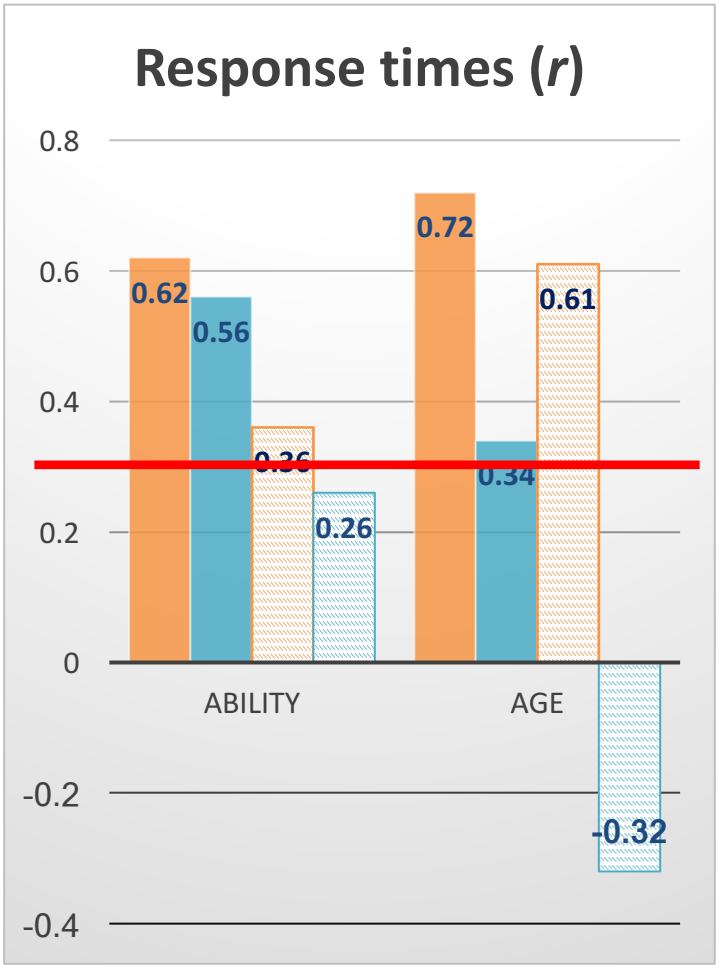

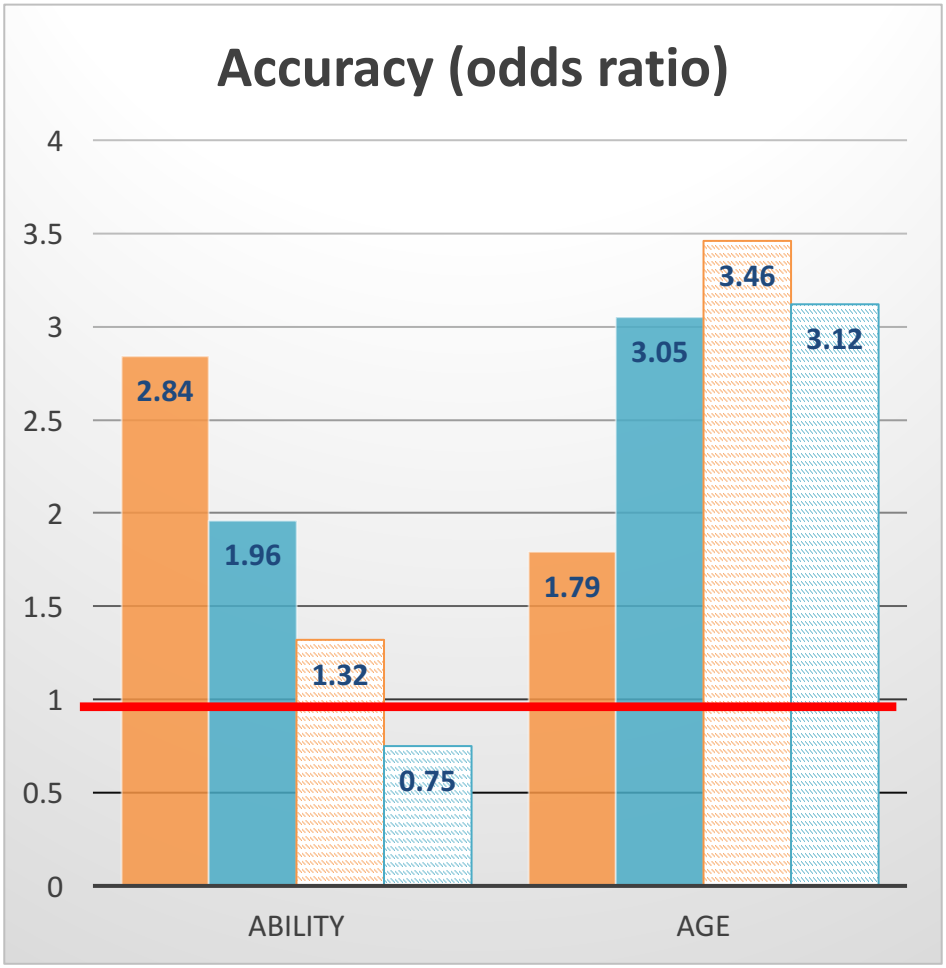

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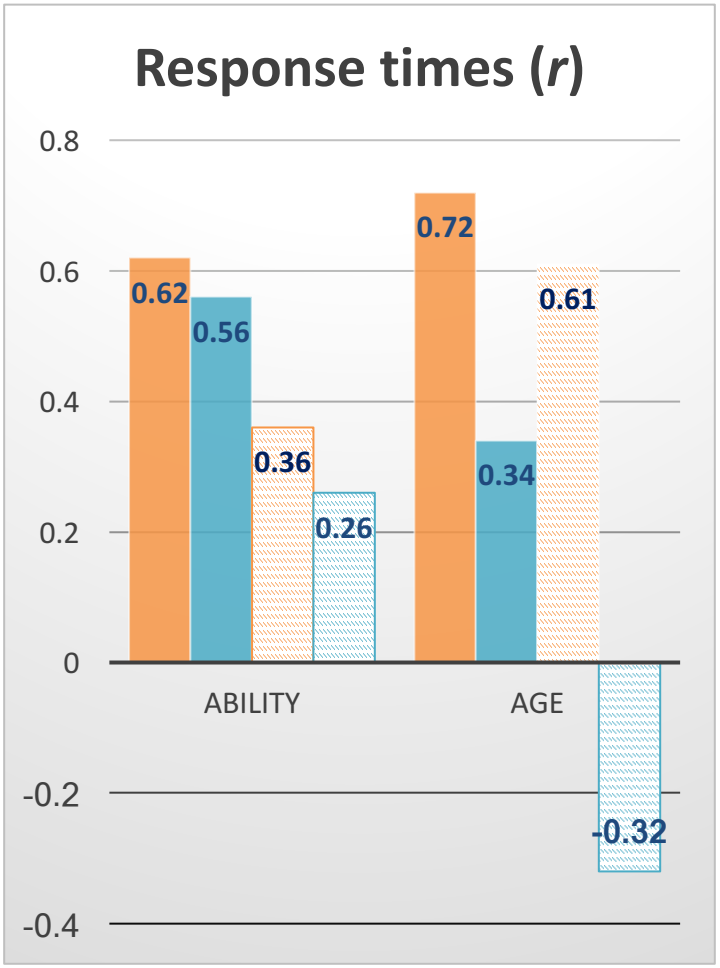
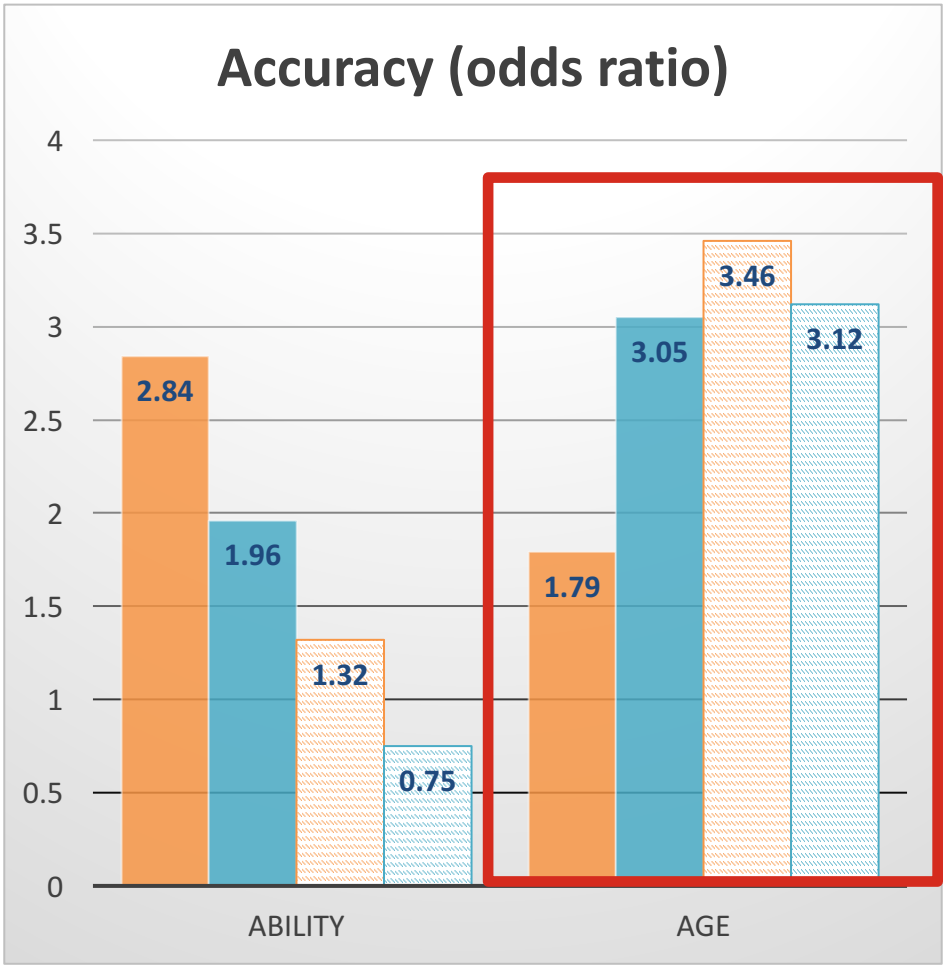
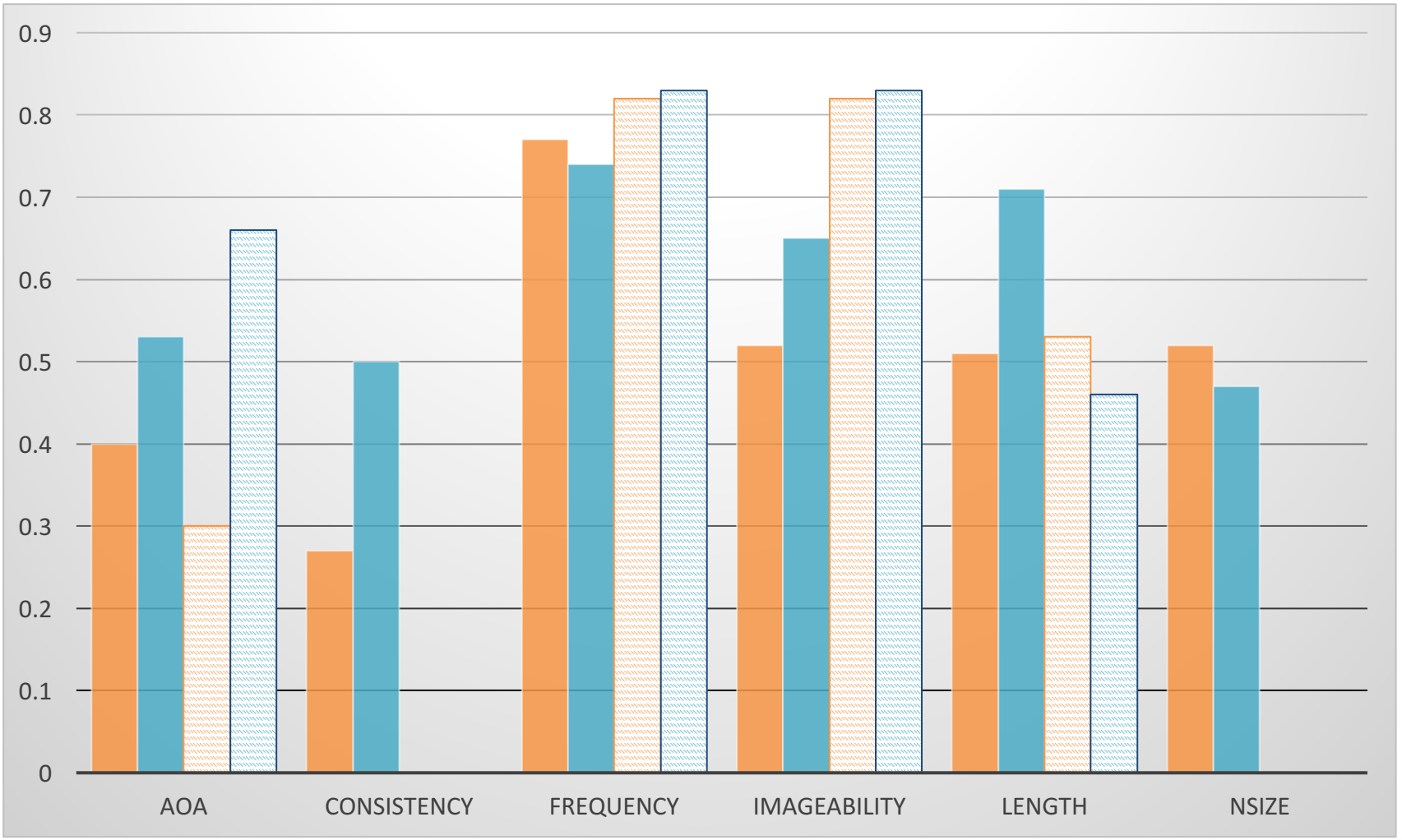
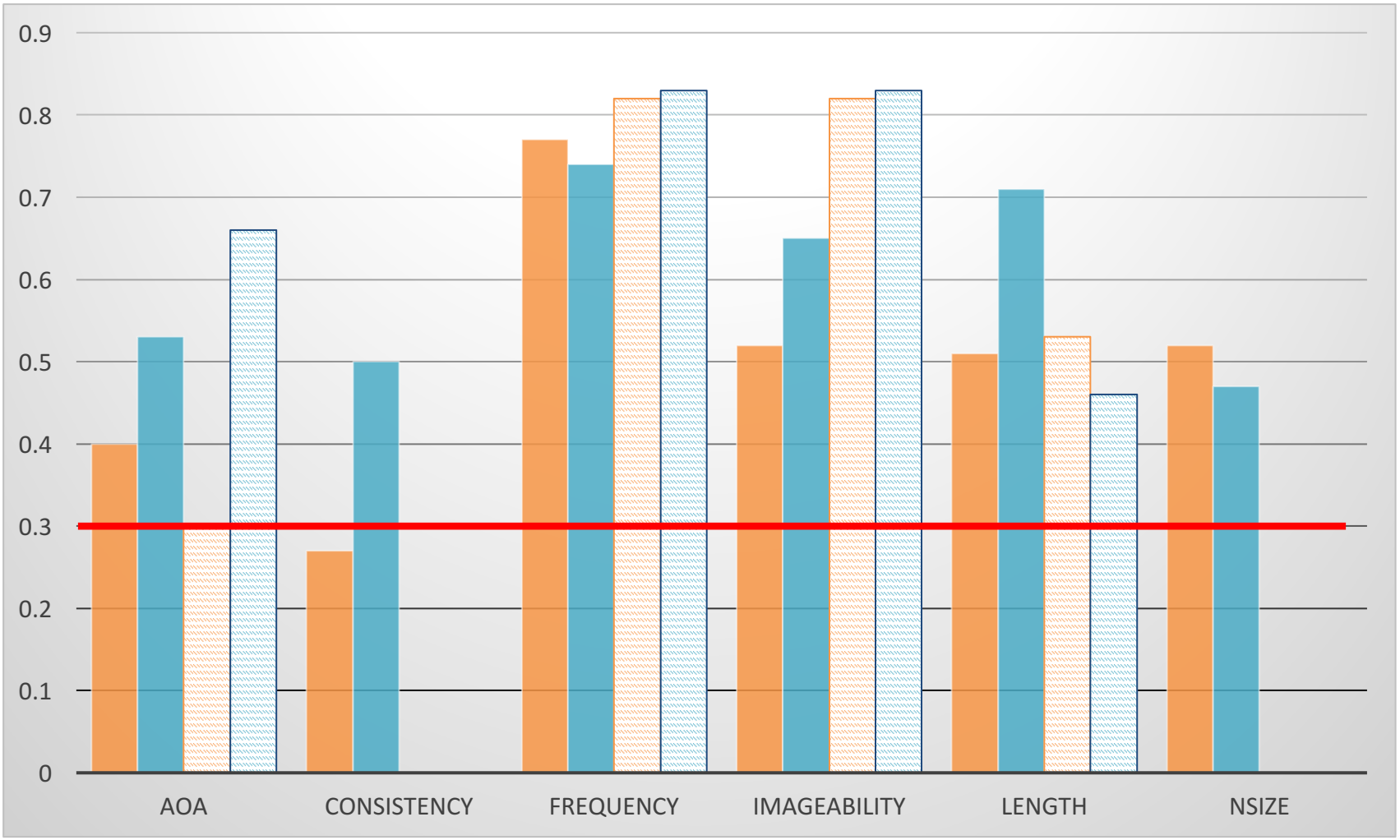




Word-level effect sizes: Response times



Word-level effect sizes: Response times (*r*)



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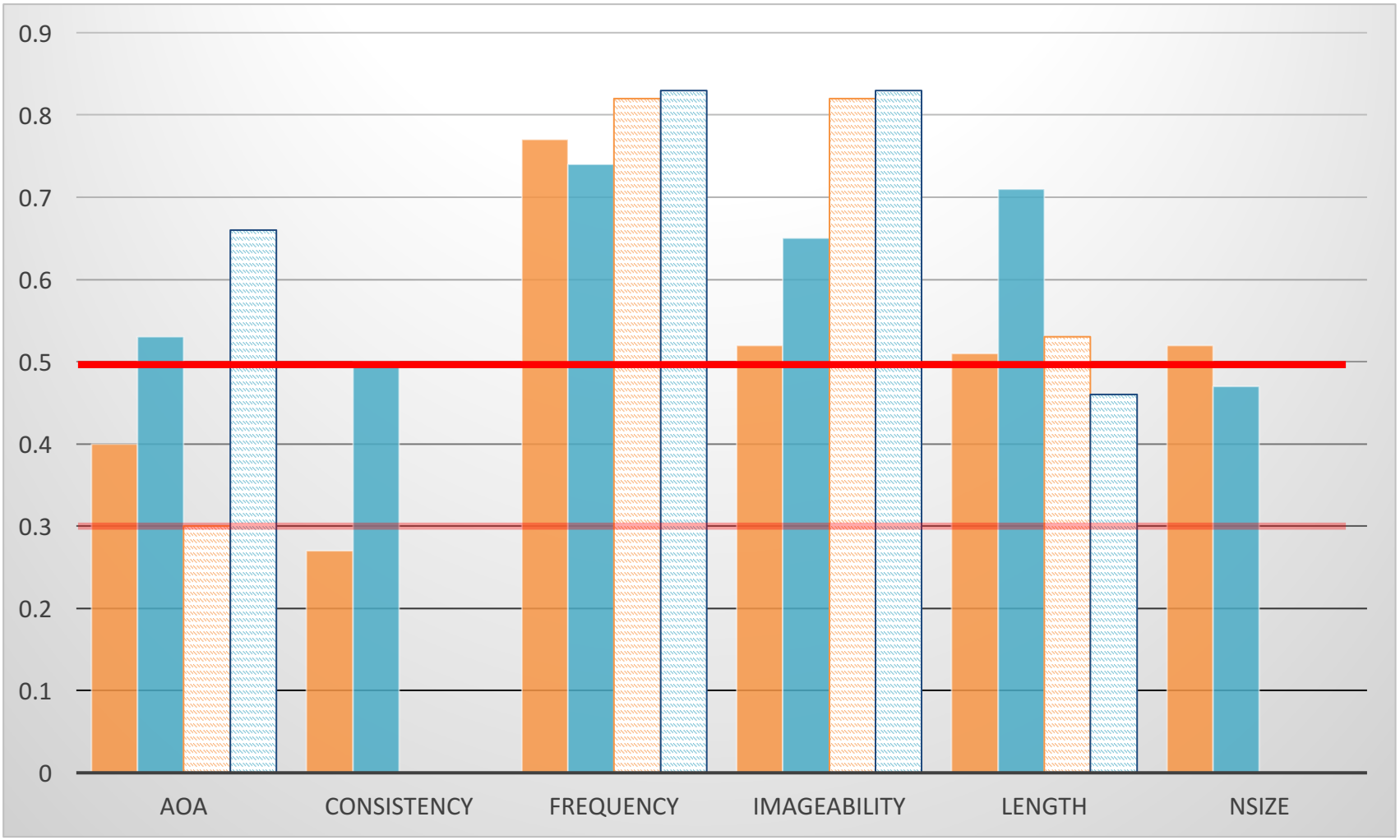

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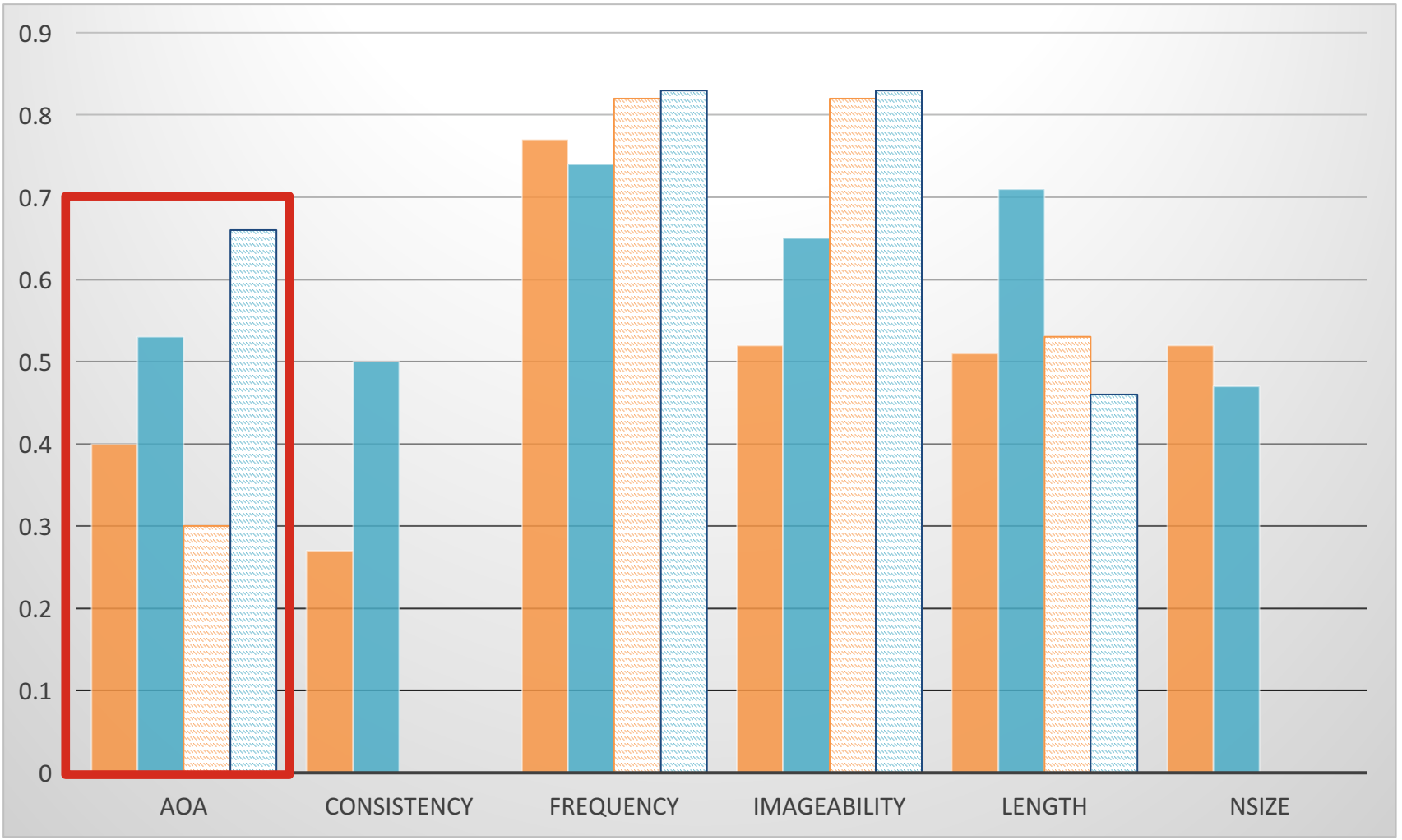

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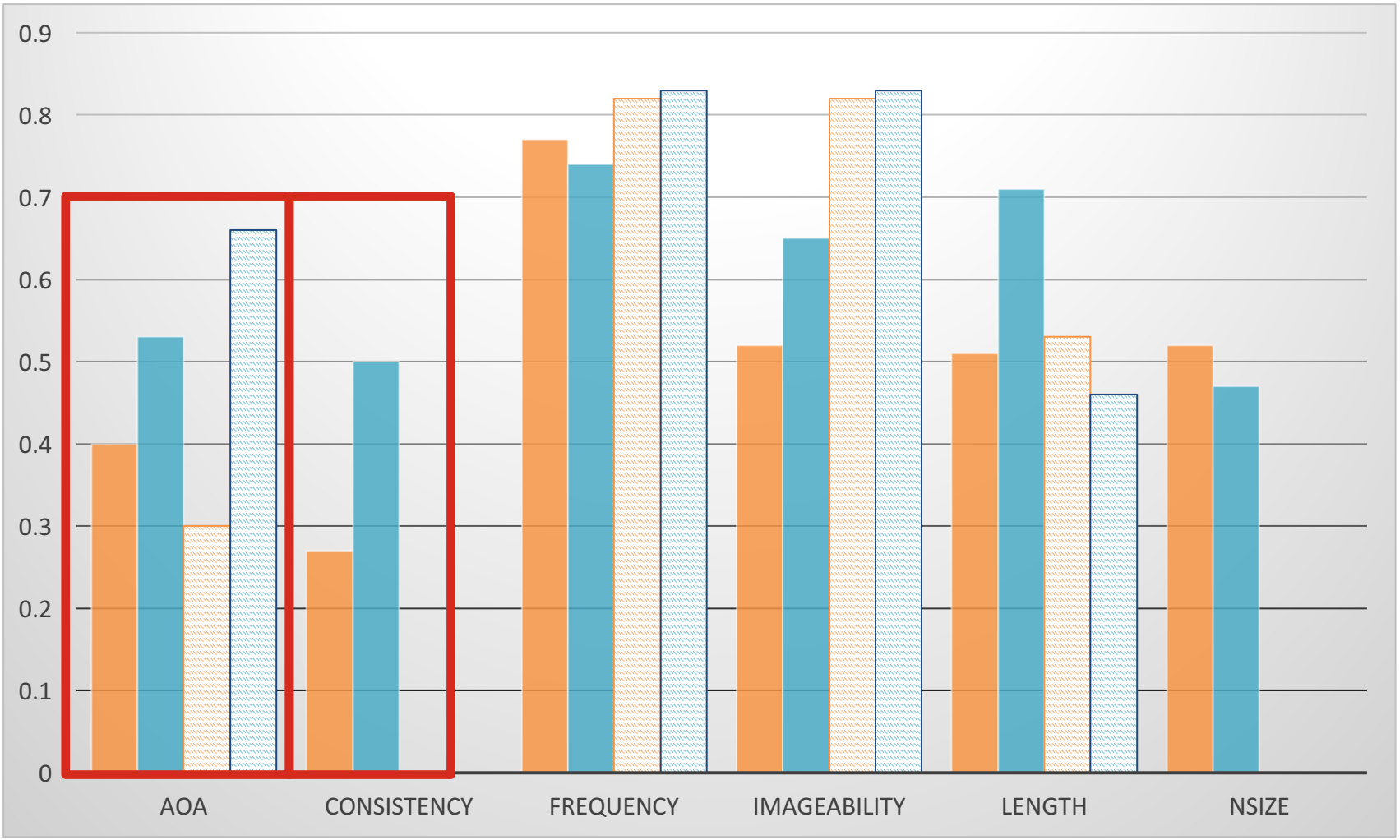

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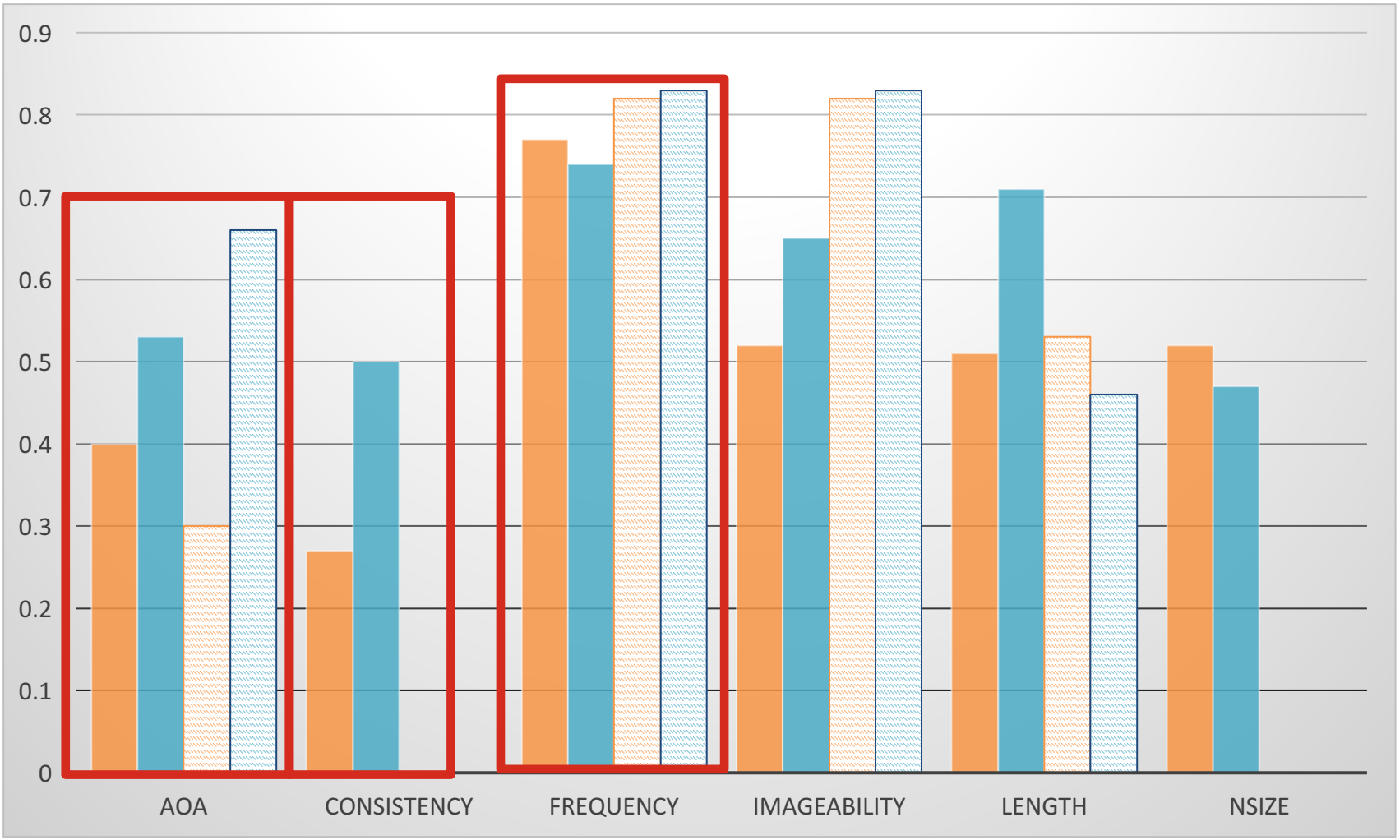

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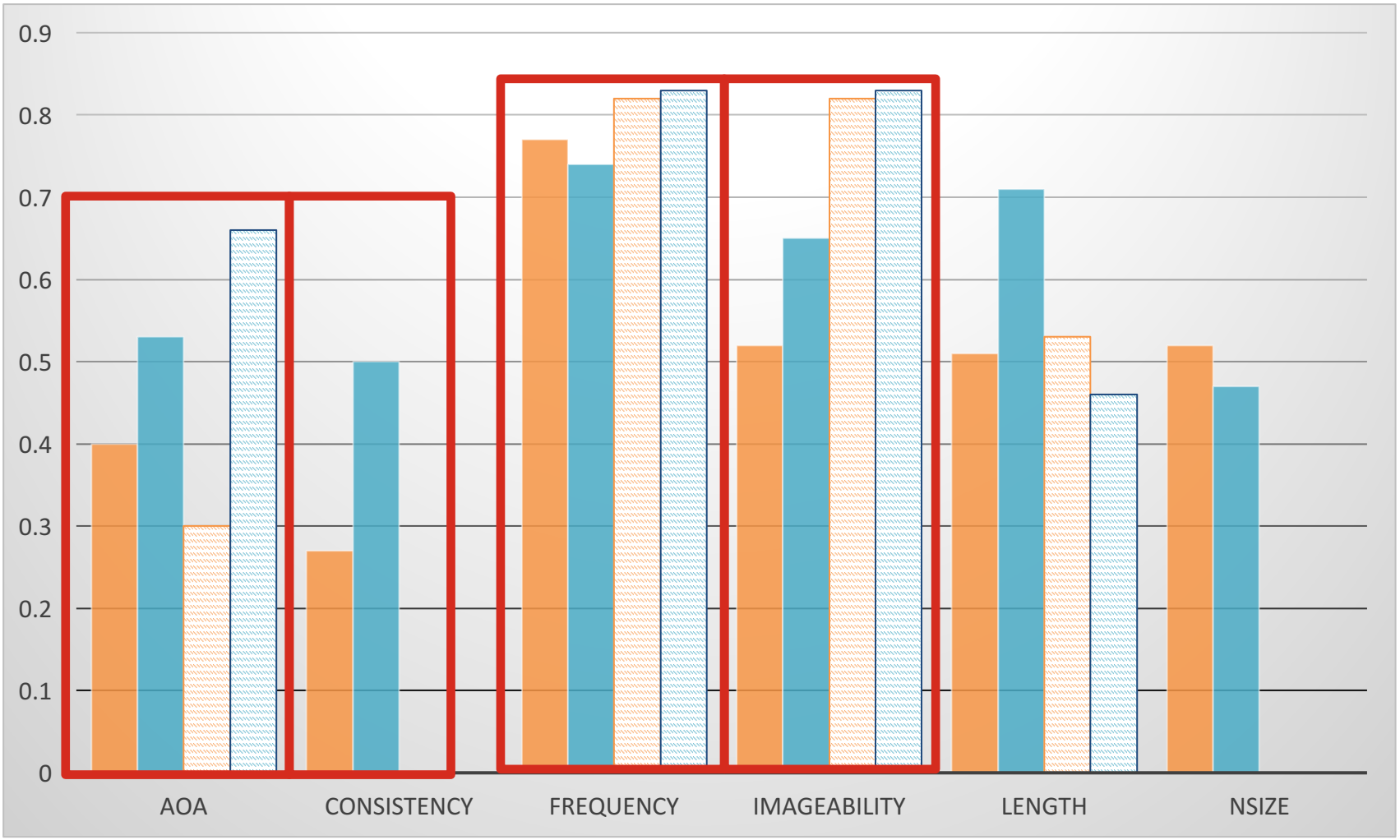

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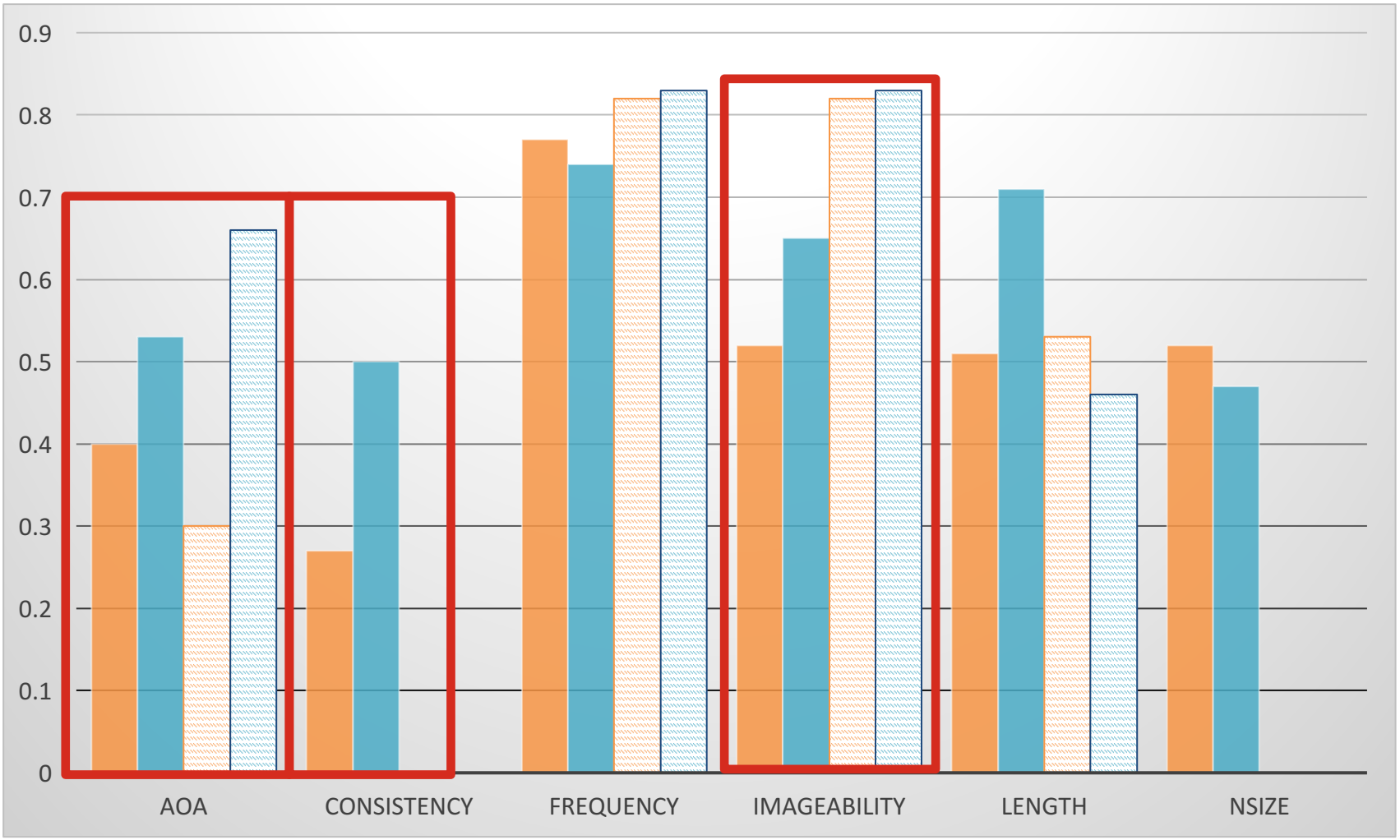

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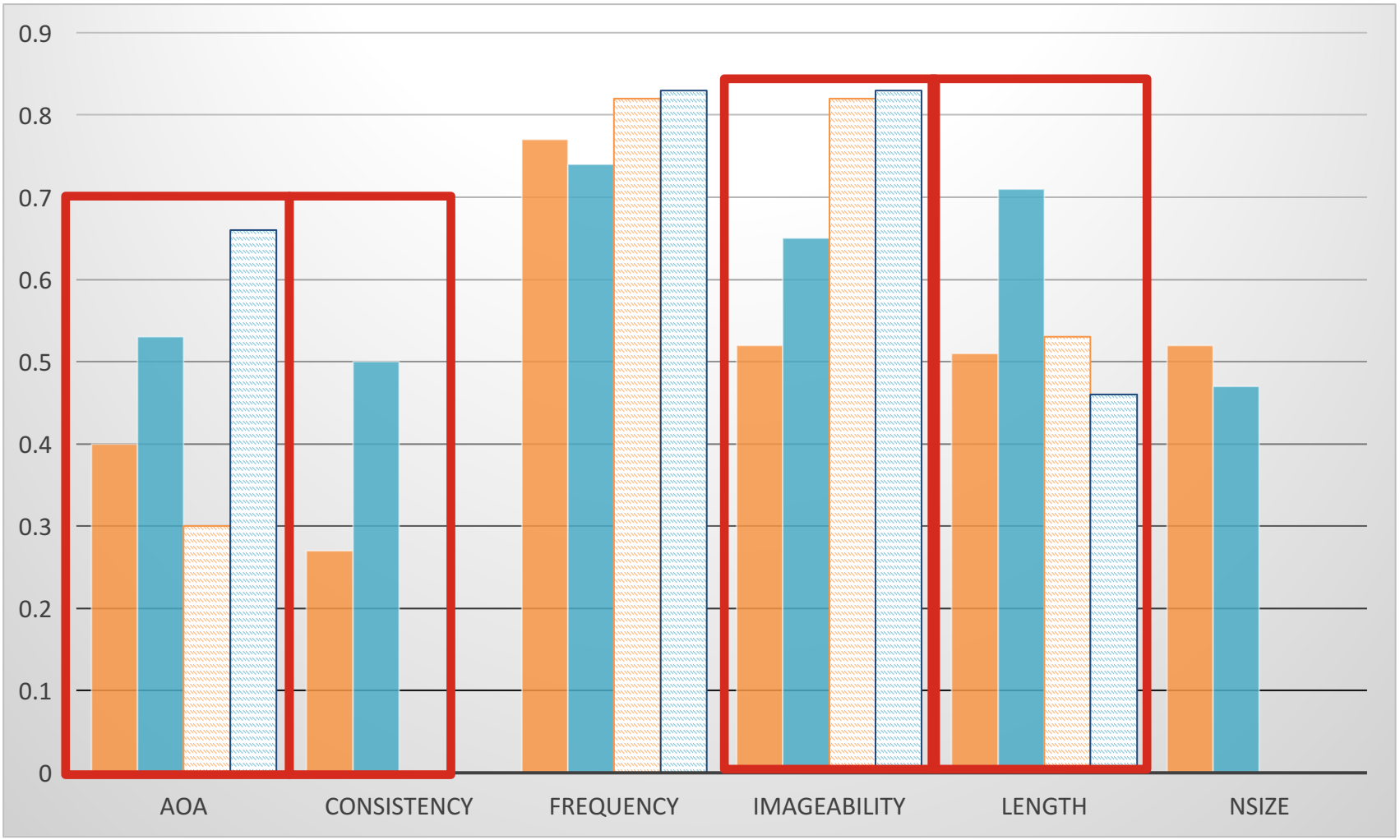
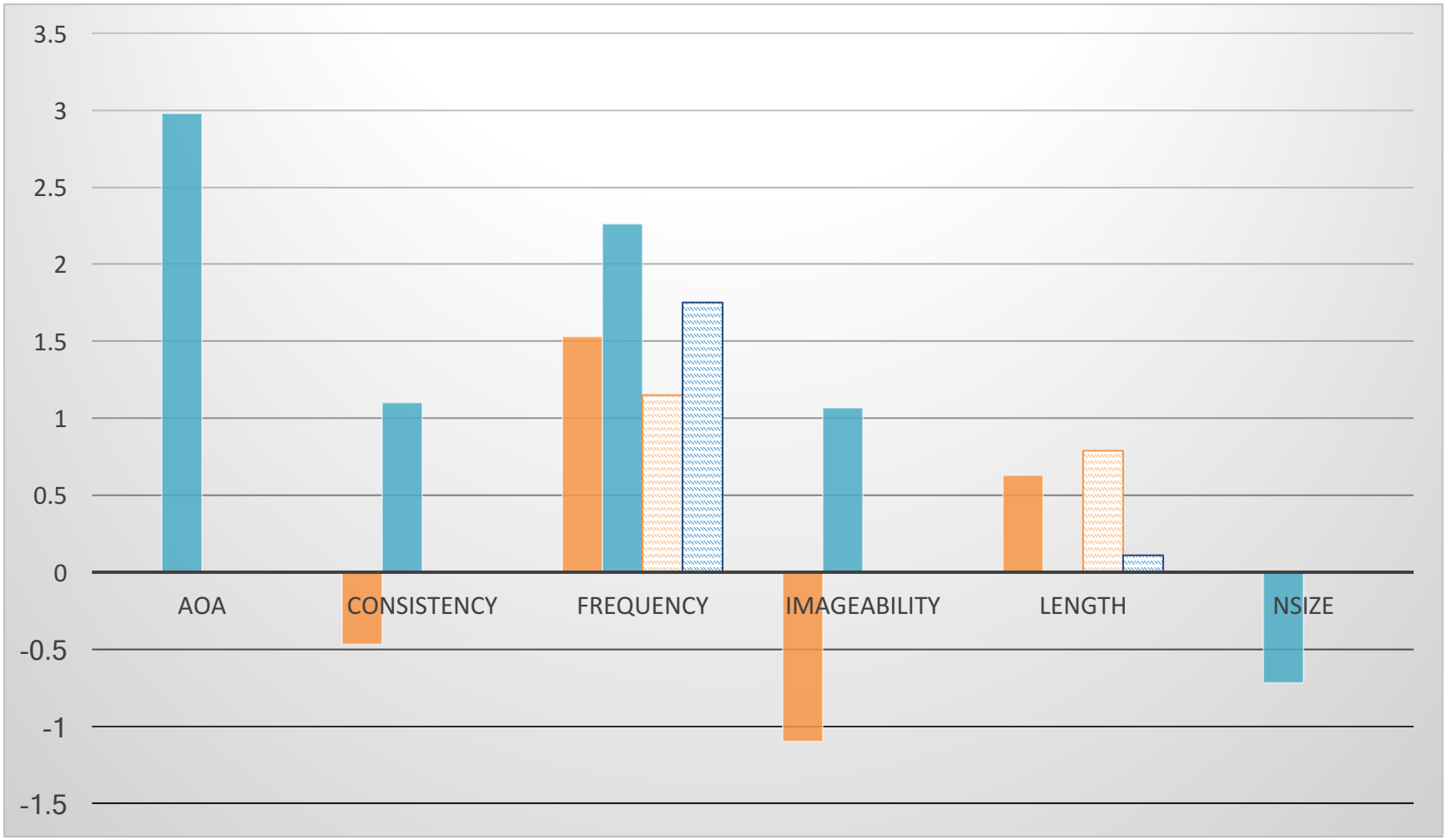


Word-level effect sizes: Accuracy (log OR)



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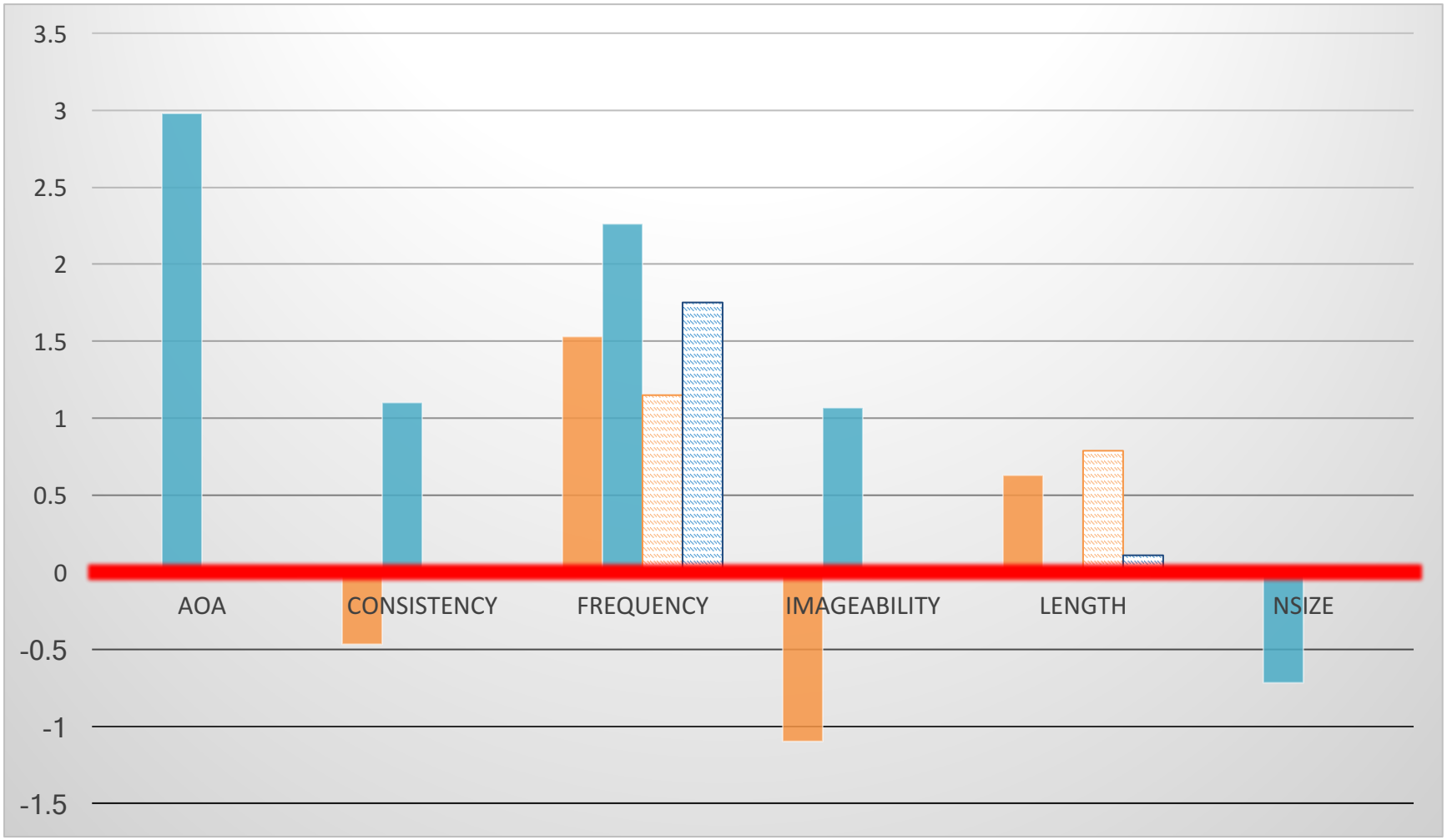

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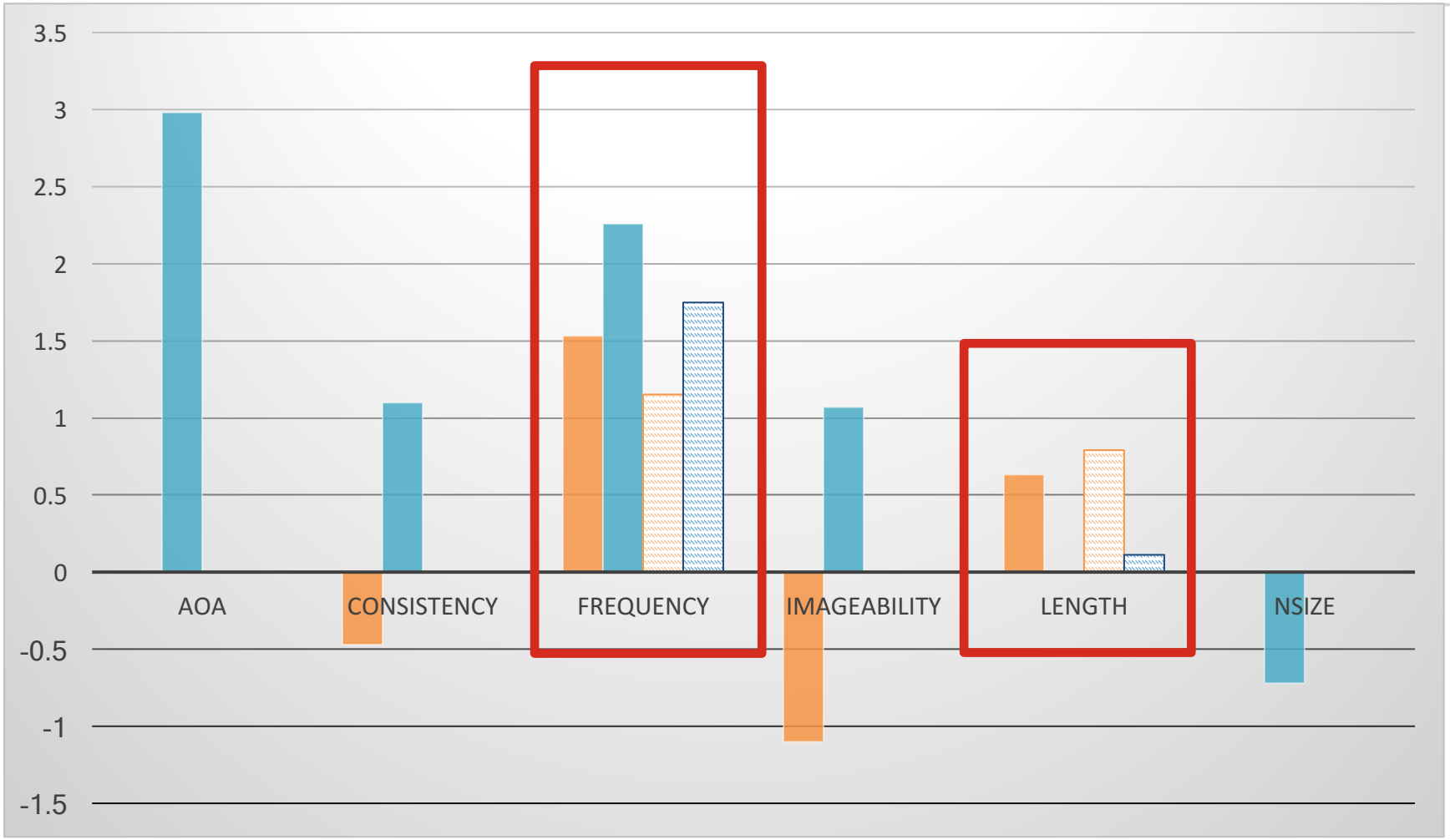
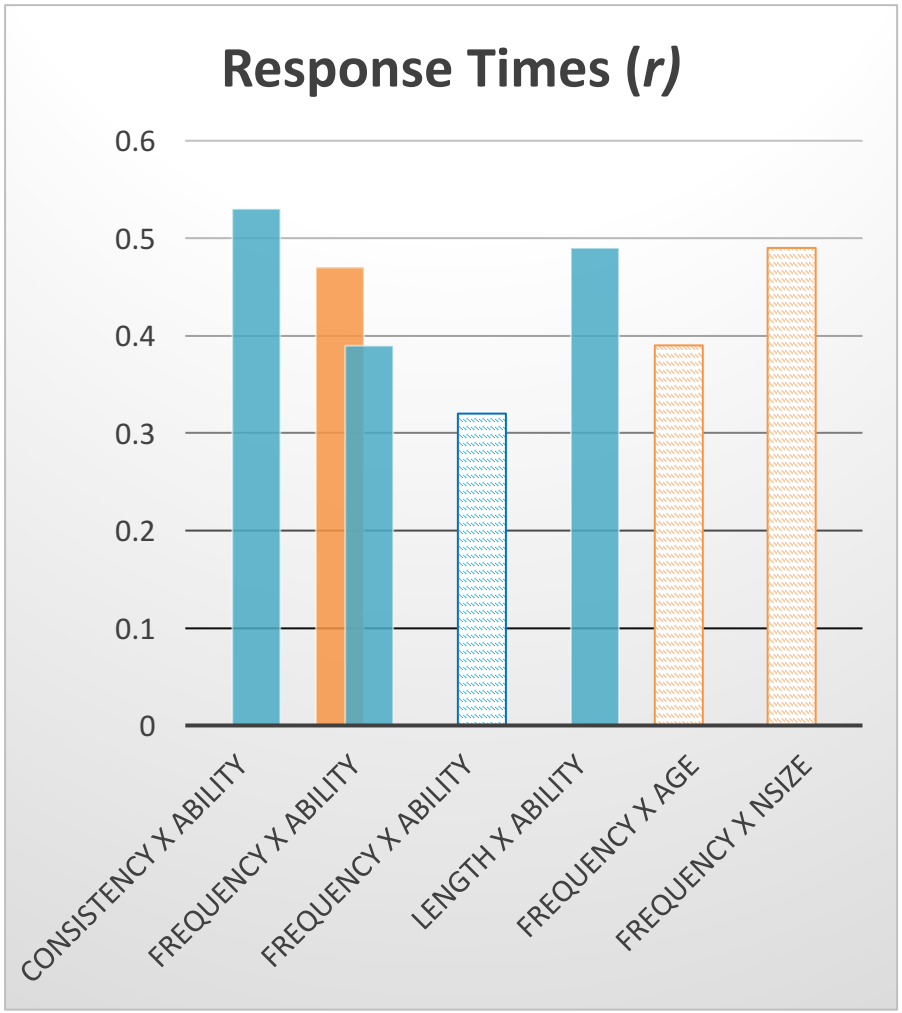
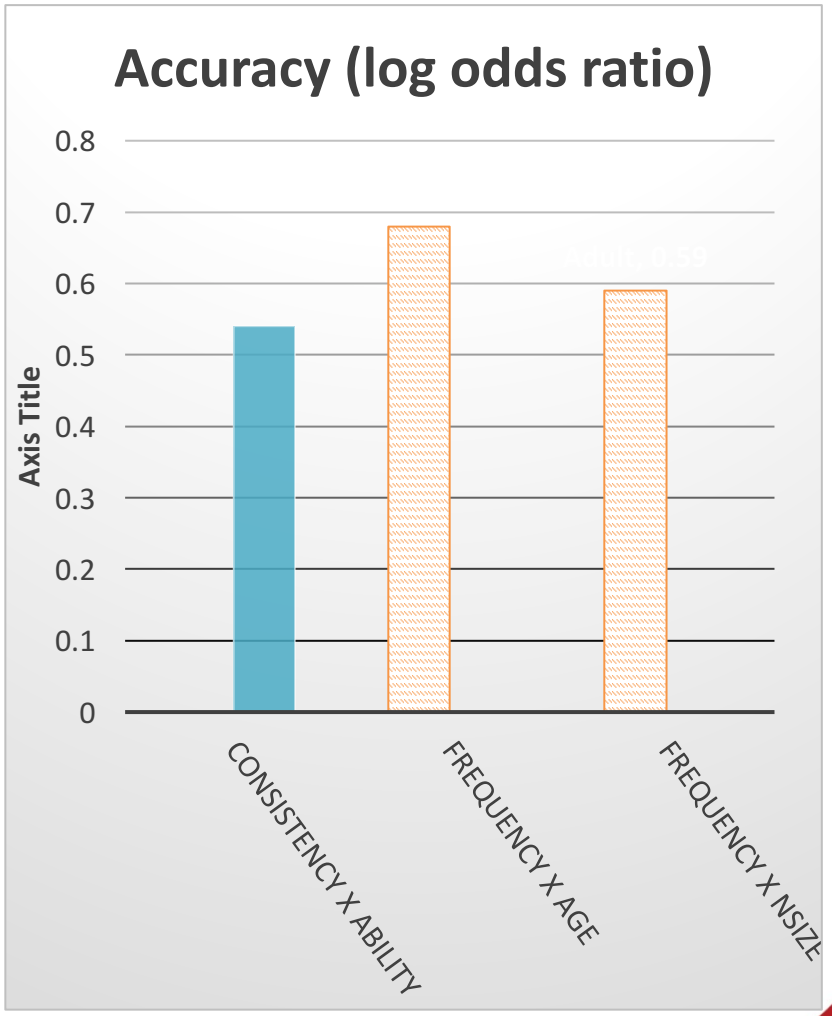
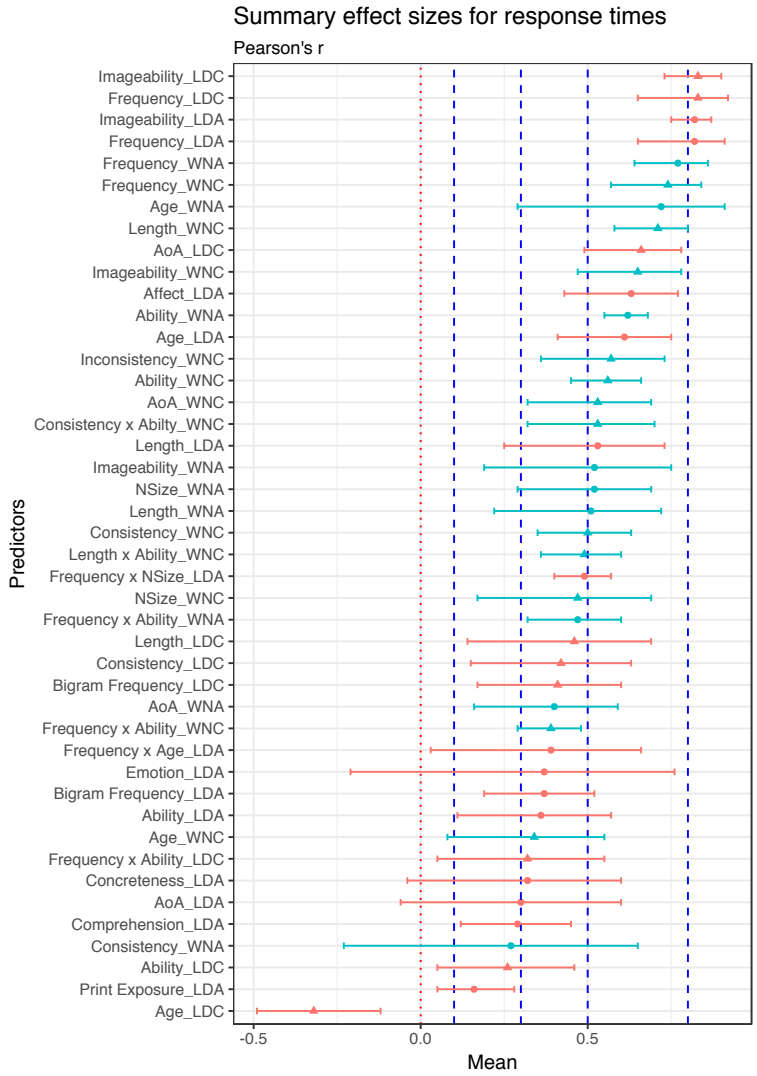


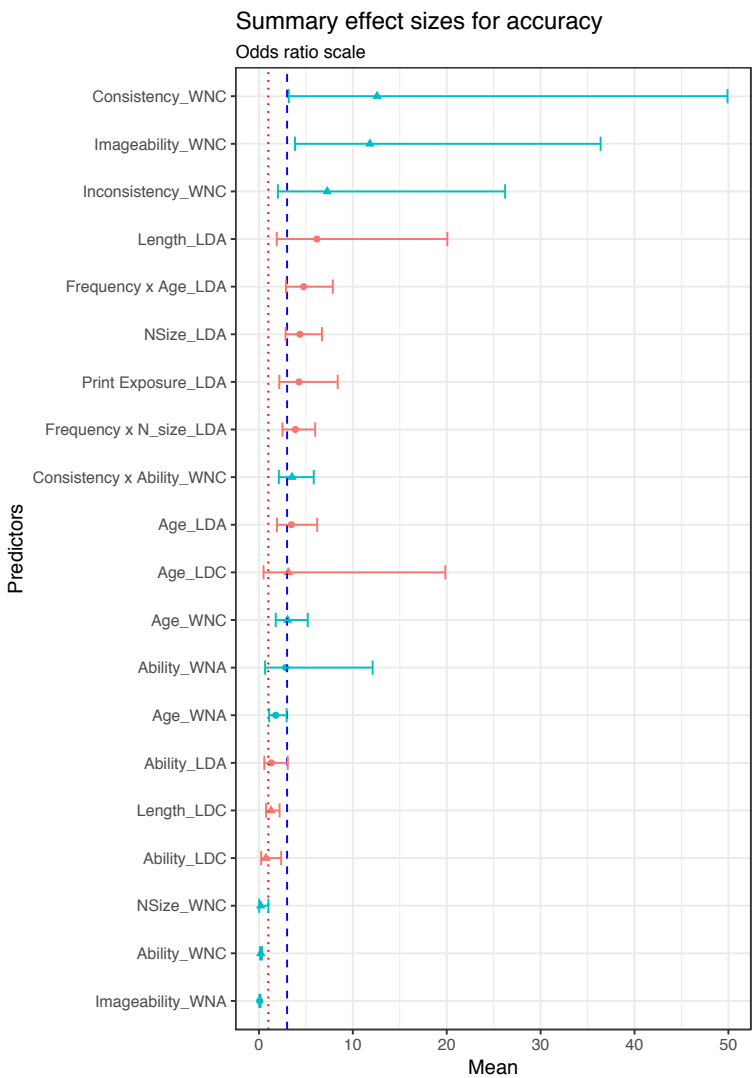
Interaction effect sizes



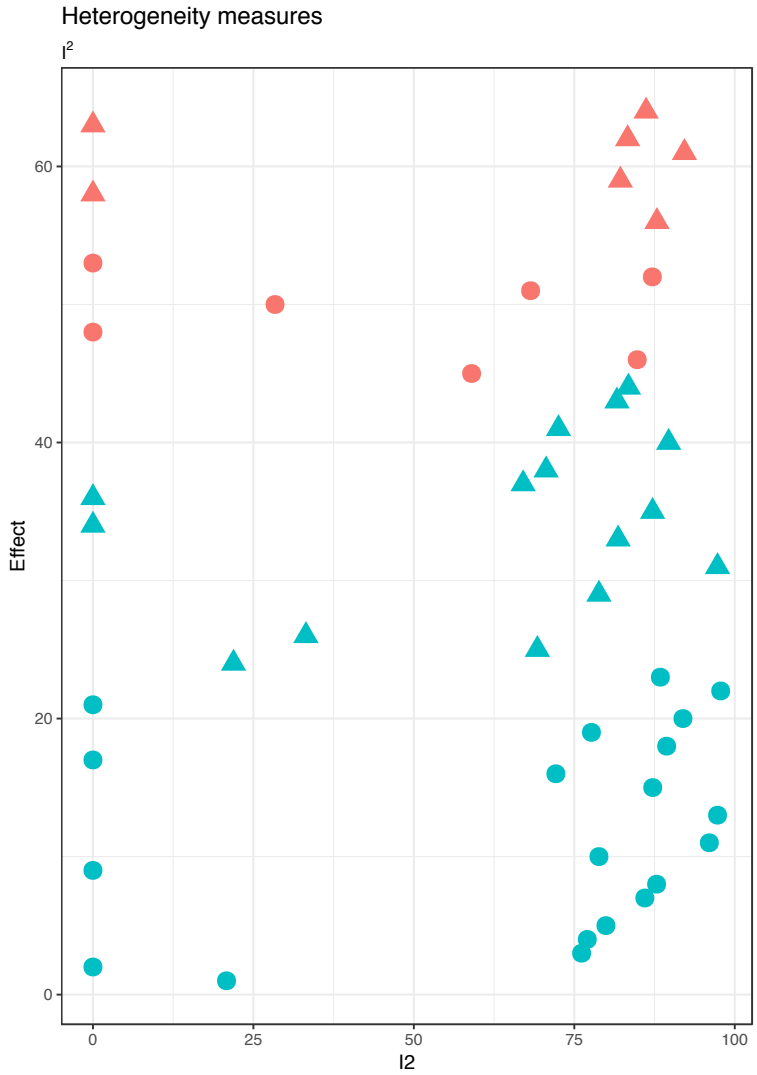


Effect size ranges are ‘embarrassingly large’





Model diagnostics: Heterogeneity - I^2



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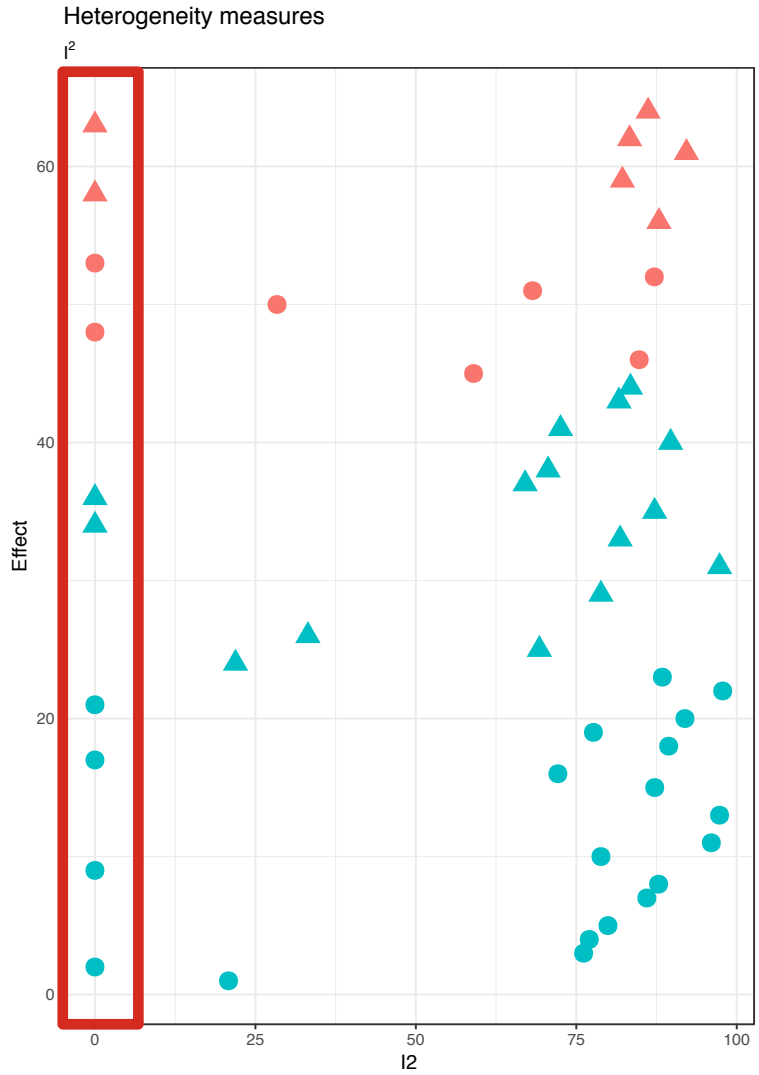

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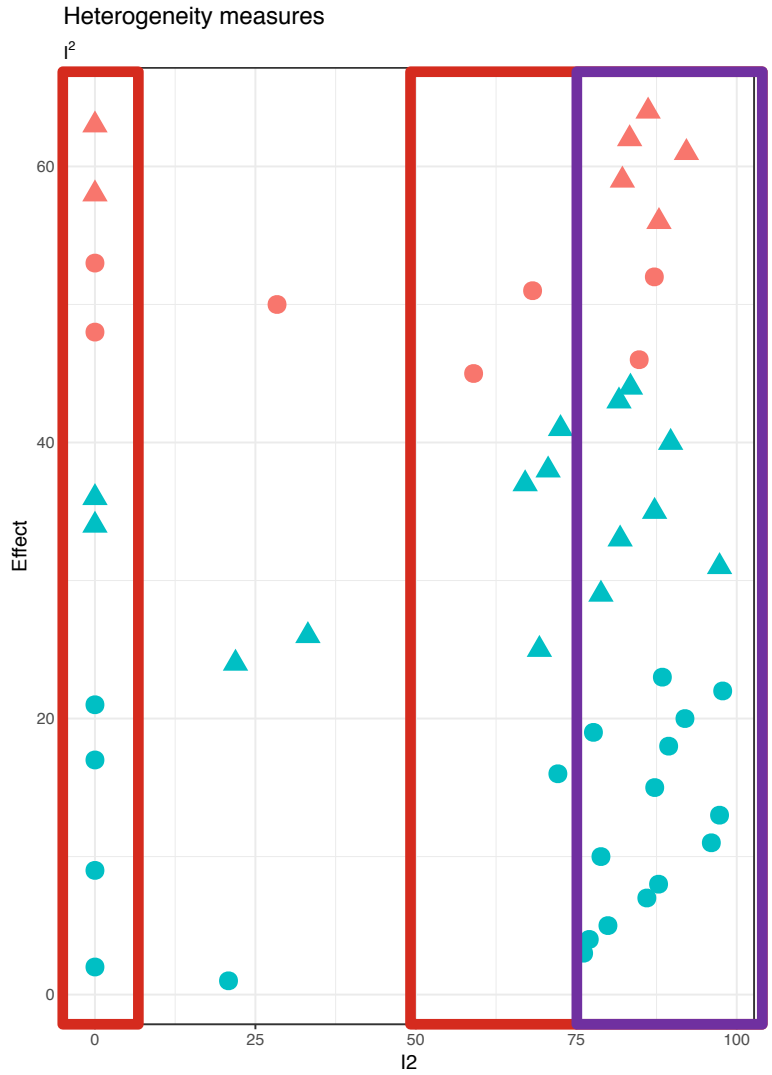

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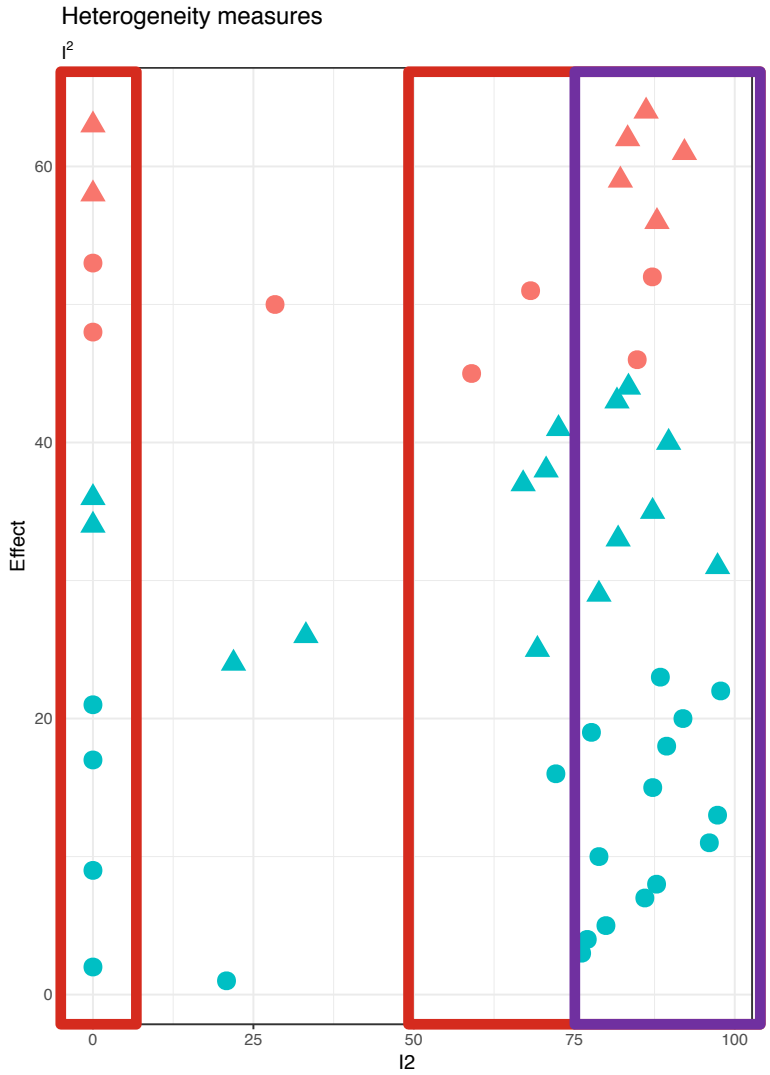

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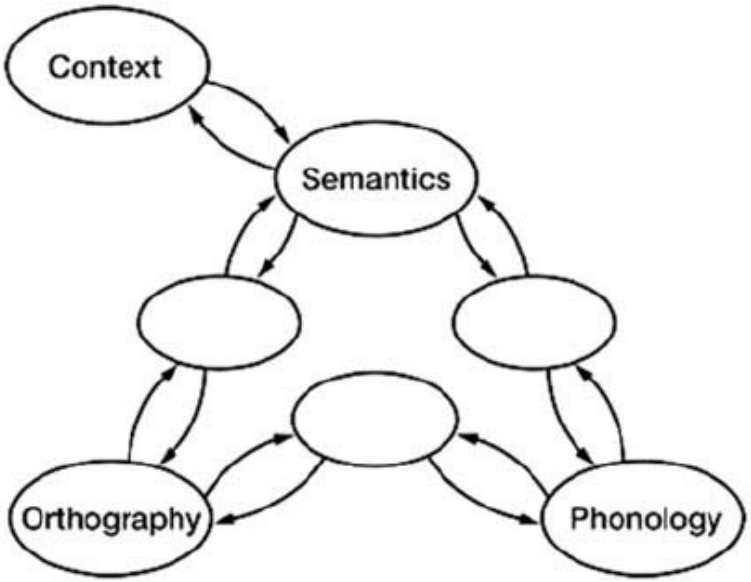
- Points at 0 are **interaction effect** I^2 values
- Greater proportion of effect sizes are in the **'high'** range
- Polarised values need more investigation taking **sampling error variance** into account

Model diagnostics: method of analysis

76% Mixed ANOVA

- Within-subjects analysis
  - assuming word-level effects are the same for all participants
- Aggregating outcome variables
- Factors are examined individually
  - manipulated stimuli
  - the cognitive model assumes parallel processes
  - appearance of absolute effects



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Simultaneous Regression

- Within-subjects analysis
  - varying intercepts & slopes for differences
- No aggregation – greater power
- Factors are examined at the same time
  - stimuli from relevant texts
  - reflecting the processes within the model
  - relative effects modelled together

Pool our resources

1. Replicate
    1. Within your own study AND

2. Join forces
    1. Same protocols
    2. Same stimuli
    3. Same analysis

3. Go long
    1. Look for causal interpretation rather than correlational for model processes and theory development

Thanks

Partners – local schools, colleges and residents

Quick note:

Bayesian Methods Day – Nottingham Trent University,
Friday 29 Sept – I can forward link to interested persons. ☺