Language & Cognition Lab

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Phonaesthemes

Frequency, and psychological reality

Sound Symbolism: Challenging the Arbitrariness of Language
Emory University
March 26,2010

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Arbitrariness of the sign

- Is the form of words arbitrary, given their meanings?

Phonaesthemes

- *gl-*

  glance, *glare*, *glass*, *glaucoma*, *glaze*, *gleam*, *glimmer*, *glimpse*, *glint*, *glisten*, *glitter*, *glow*, etc.

- *sn-*

  snack, *snarf*, *snarl*, *sneeze*, *sniff*, *sniffle*, *snicker*, *snog*, *snore*, *snorkle*, *snort*, *snot*, *snout*, *snuff*, etc.

- *-ap*

  clap, *flap*, *lap*, *rap*, *slap*, *snap*, *trap*, etc.

Non-arbitrariness of the sign 1

- Non-arbitrary relationship between particular forms and particular meanings

  sound symbolism, iconicity, universal motivation

Phonaesthemes can be iconic

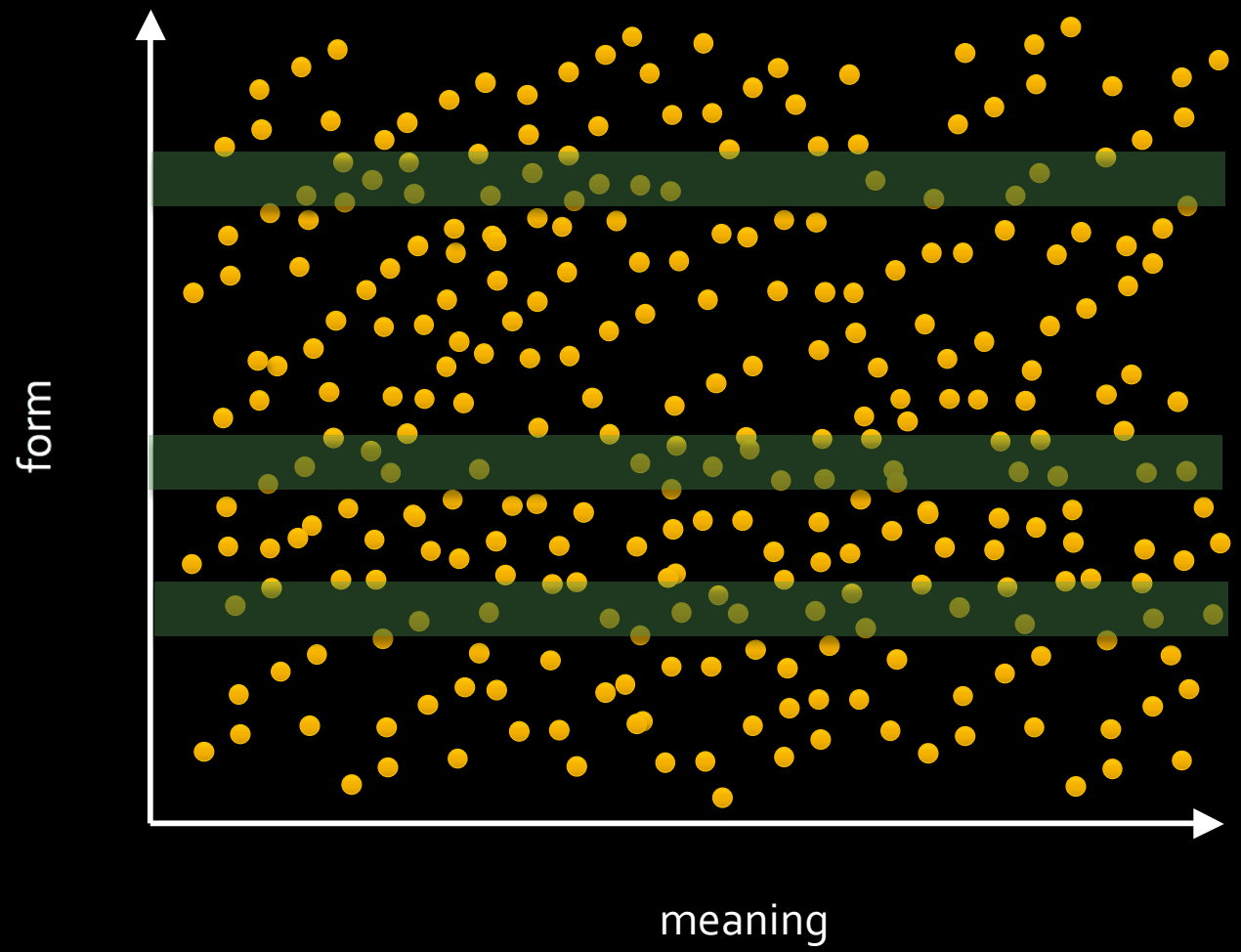
Phonaestheme	Meaning	Examples
sn-	MOUTH, NOSE	snicker, snore, snot, snout
wh-	PRODUCING NOISE	whisper, whine, whirr, wheeze
tr-	WALK	tread, tromp, trudge, trot
fl-	MOVE THROUGH THE AIR	fly, flail, flit, flit, fling
sw-	LONG, ARCING MOVEMENT	swing, sweep, swoop, swipe
cl-	HOLD TIGHTLY	cling, clasp, clamp, clutch
spr-	SPREADING OUT	spread, spray, sprawl, sprout
bl-	ROUND, EXPANDING	blimp, blob, bloat, bloom
st-	HARD, STRAIGHT	staff, stalk, stick, sturdy
gl-	LIGHT, VISION	glisten, gleam, glow, glaze

Non-arbitrariness of the sign 2

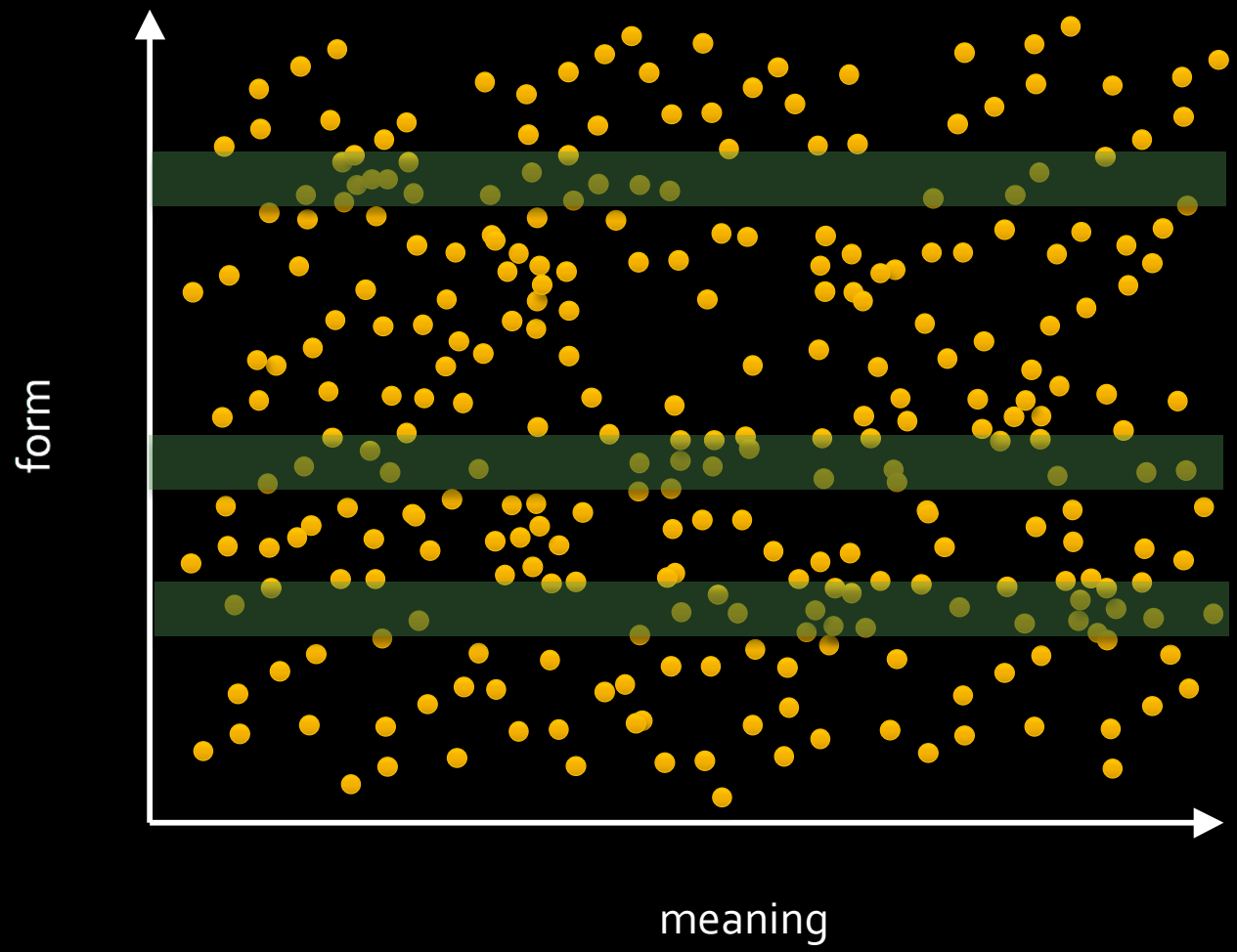
- Form-meaning relationship of a particular word is not arbitrary, given the form-meaning relationships in the rest of the language

  is there systematicity in the lexicon?

An unsystematic lexicon



A partially systematic lexicon



Phonaesthemes & systematicity

- We already know that the lexicon is systematic; complex words sharing morphemes share form and meaning
  - X-er, Y-ed, phon-Z
- But phonaesthemes are unlike (the usual conception of) morphemes because
  - They're non-compositional
    gl-int? sn-arl?
  - They're not really productive
    **gl-arl* and **sn-int*
- Is there sub-morphemic lexicon systematicity?

Phonaesthemes & systemicity

	LIGHT/VISION		NOSE/MOUTH	
	Types	Tokens	Types	Tokens
gl-	39%	60%	1%	0%
sn-	4%	1%	28%	19%

So what?

- The distribution facts are uncontroversial
  - Some phonaesthemes might display iconicity
  - The lexicon is partially systematic through phonaesthemes
- But they don't tell us anything about individual cognition
- Non-arbitrariness (of both types) might or might not reflect properties/processes of individual cognitive systems

Steps in the direction of cognition

- Neologism tasks (Hutchins 1998, Abelin 1999, Magnus 2000)
  - Production

    Given the definition: 'to scrape the black stuff off overdone toast', 39% of subjects make up neologisms that begin with *sk-* (Magnus 2000)
  - Perception

    Given pseudo-words beginning with *gl-*, 25% of subjects offer a meaning pertaining to 'LIGHT' (Magnus 2000)

Steps in the direction of cognition

- Neologism tasks have these properties
  - No correct answer
  - Untimed
  - Reflective
  - Direct
- Invites top-down processes, engagement of task-specific strategies

- We want a task with these properties
  - Correct answer
  - Timed
  - Reflexive
  - Indirect

Phonaesthemic priming

- Primed lexical decisions to words with phonaesthemes
  - Does seeing a word with a phonaestheme prime subsequently responding to another word also with that phonaestheme?
  - Does this priming differ from that of shared form or meaning (or both)
  - Does frequency make a difference?
  - How about iconicity?

Experiment 1*

- Lexical decision to written target following primes
- In other work, responses to targets (at 300 ms ISI)
  - Slower after phonologically related primes
  - Faster after semantically related primes
  - Even faster after morphologically related primes
- Morphological priming suggests that words sharing a morpheme have overlapping or related mental representations
- Are words with phonaesthemes like words with morphemes? That is, are phonaesthemes part of the representation of the mental lexicon?

*Bergen, B. 2004. The psychological reality of phonaesthemes. *Language, 80(2): 290-311.*

150 msec

PRIME

300 msec

TARGET

1000 msec

[like this]

PRIME

TARGET

[baseline condition]

FRILL

BARN

[form condition]

DRUID

DRIP

[meaning condition]

CORD

ROPE

[phonaestheme condition]

GLITTER

GLOW

[pseudo-phonaestheme condition]

CRONY

CROOK

[nonword trial condition]

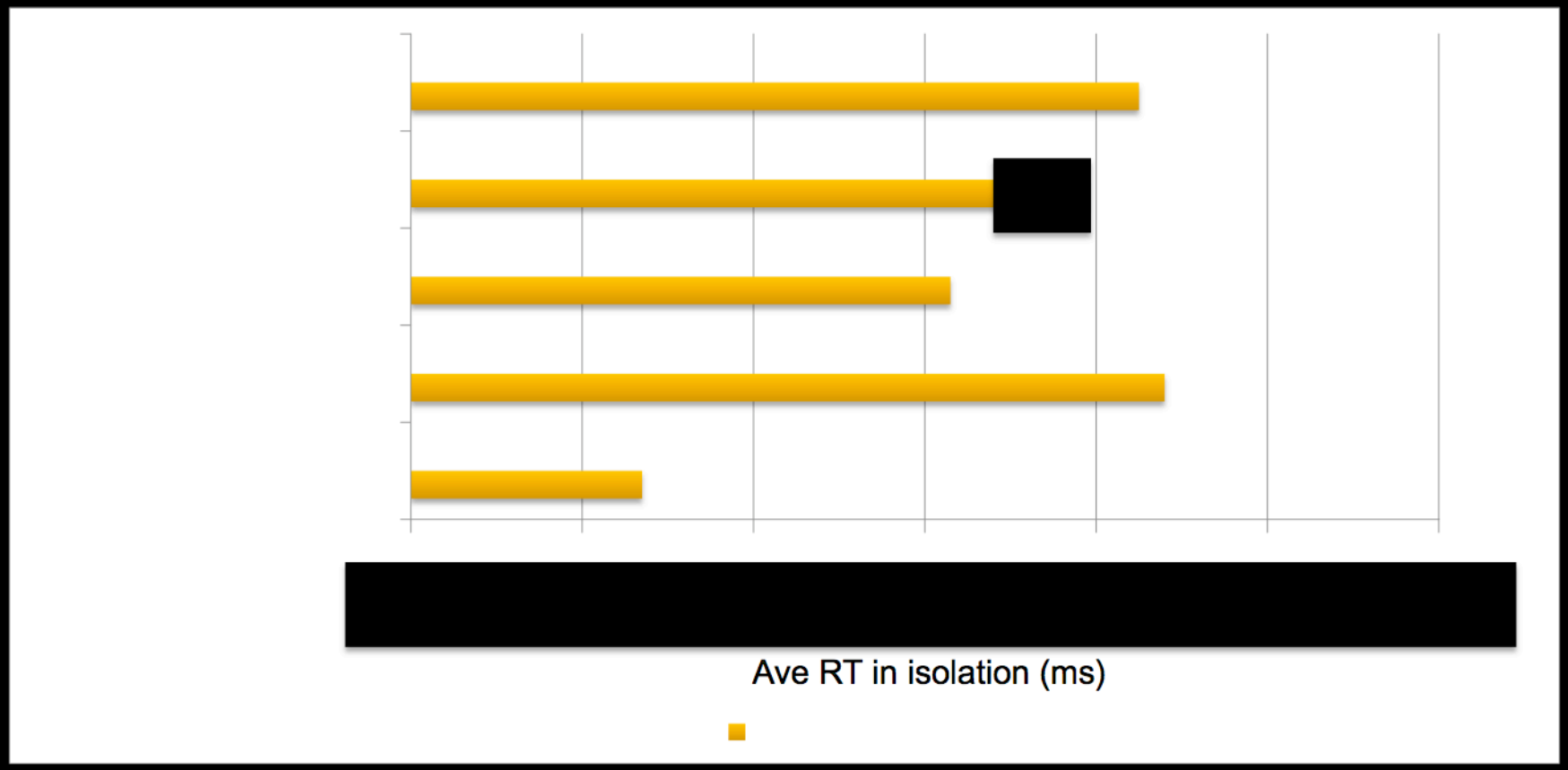
GLEAM

GLOR

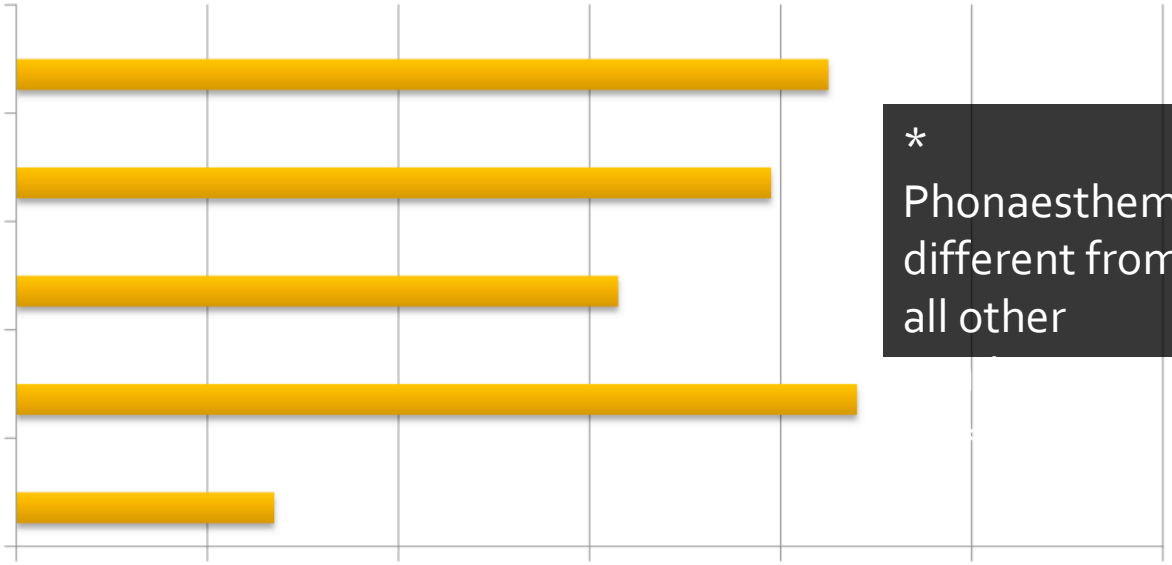
Method

- 10 trials in each of the 5 conditions per ppt
  - Baseline
  - Form
  - Meaning
  - Phonaestheme (all gl-, sn-, or sm-)
  - Pseudo-phonaestheme
- 50 non-word trials

Hypothesized results



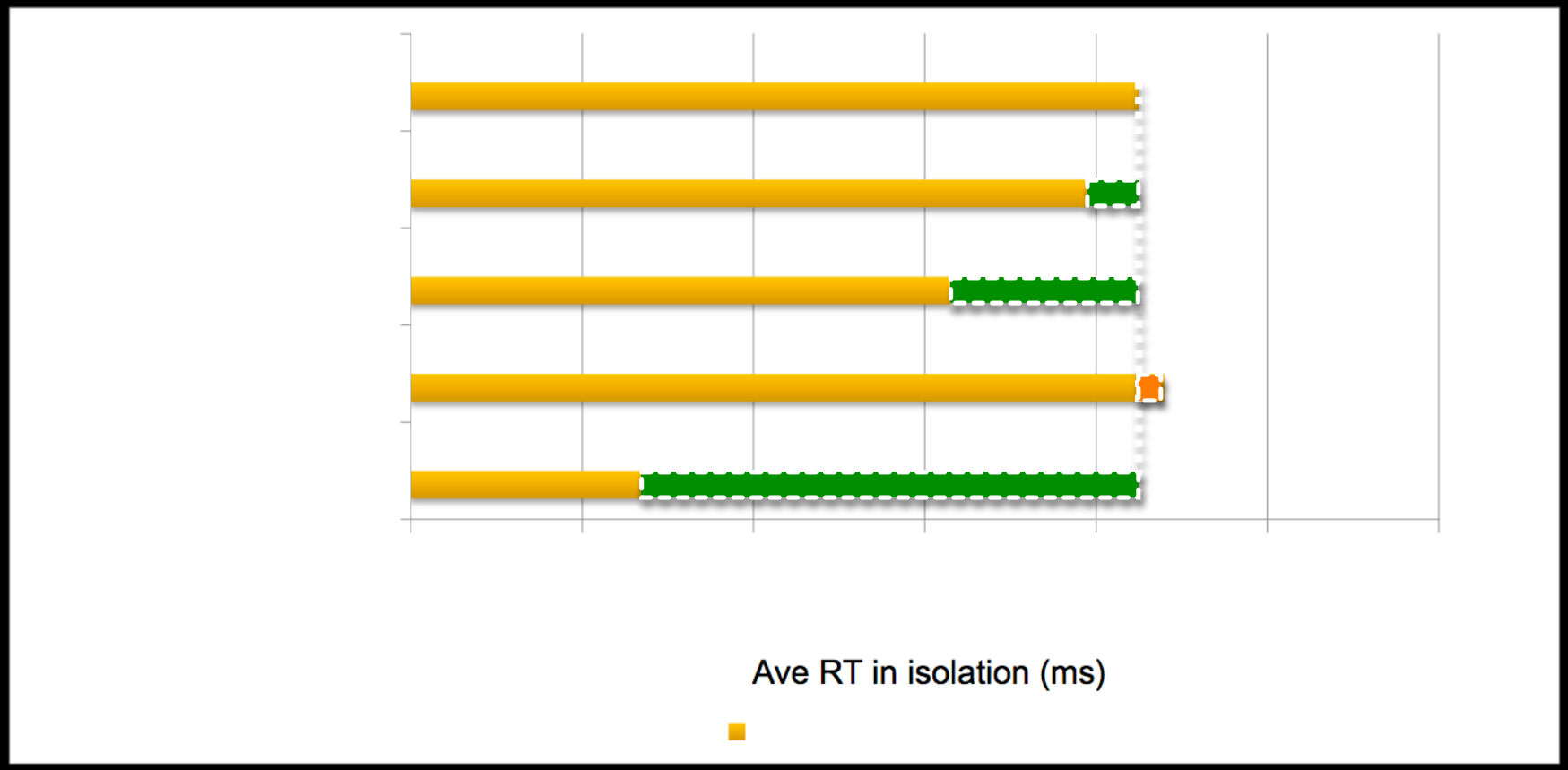
Results



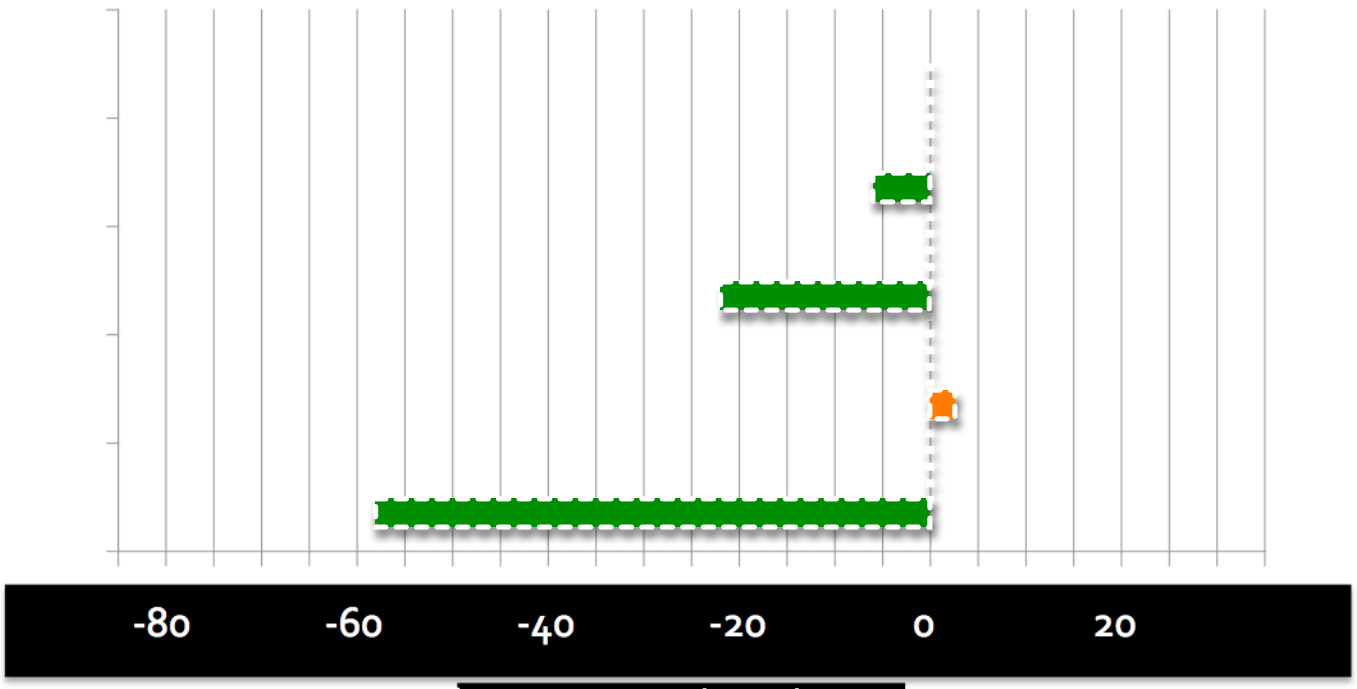
*
Phonaestheme different from all other

Ave RT in isolation (ms)

Results

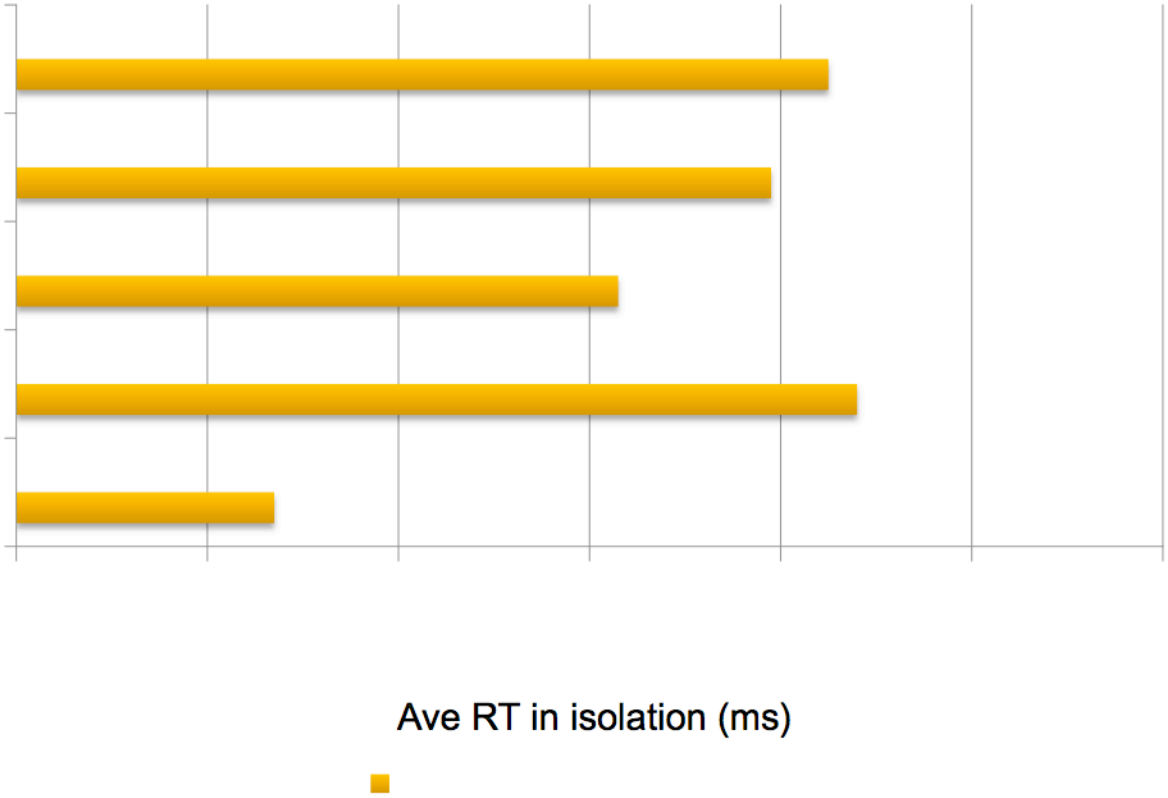


Results



ect size (n – baseline) i

Results



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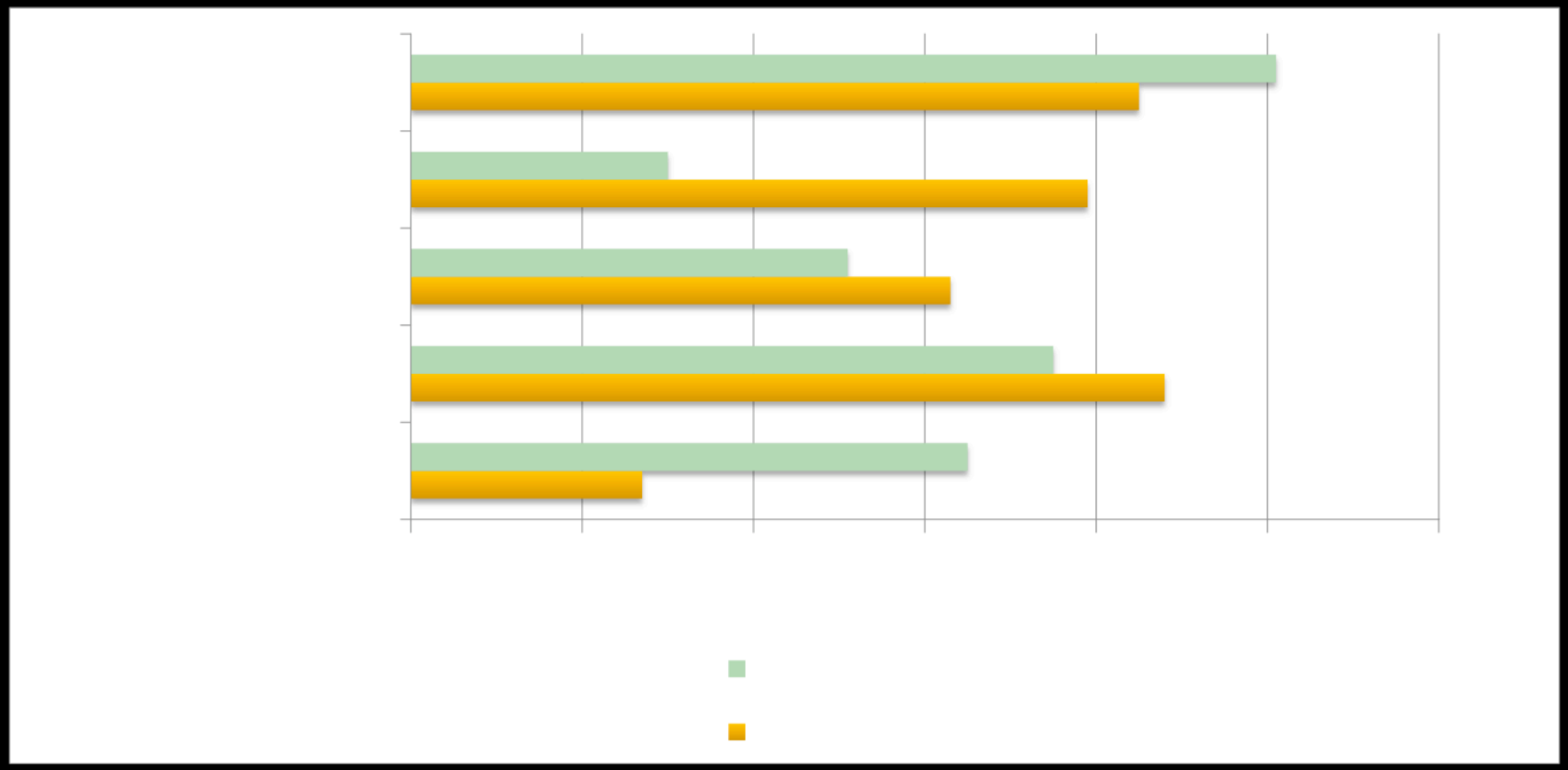

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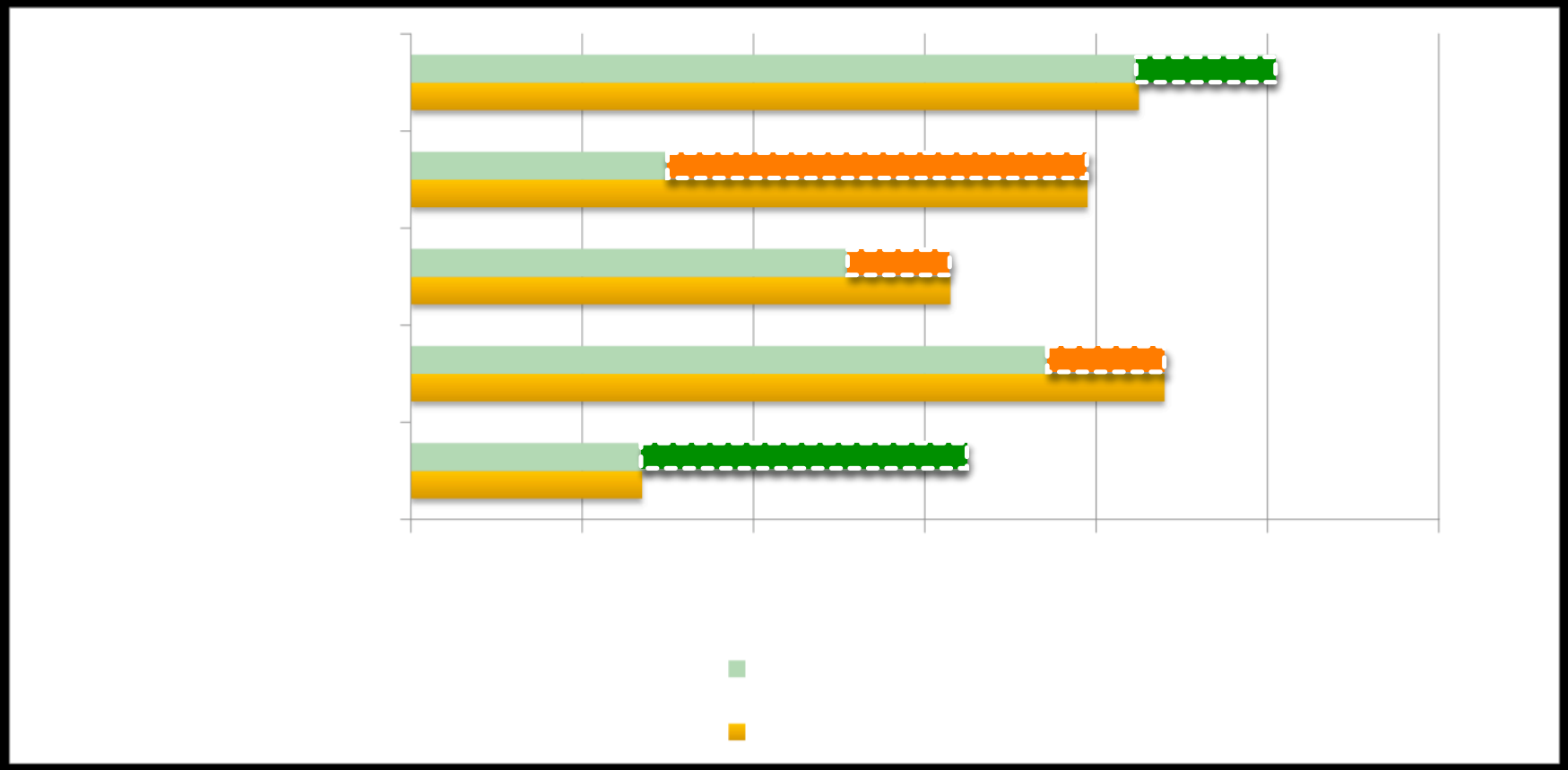
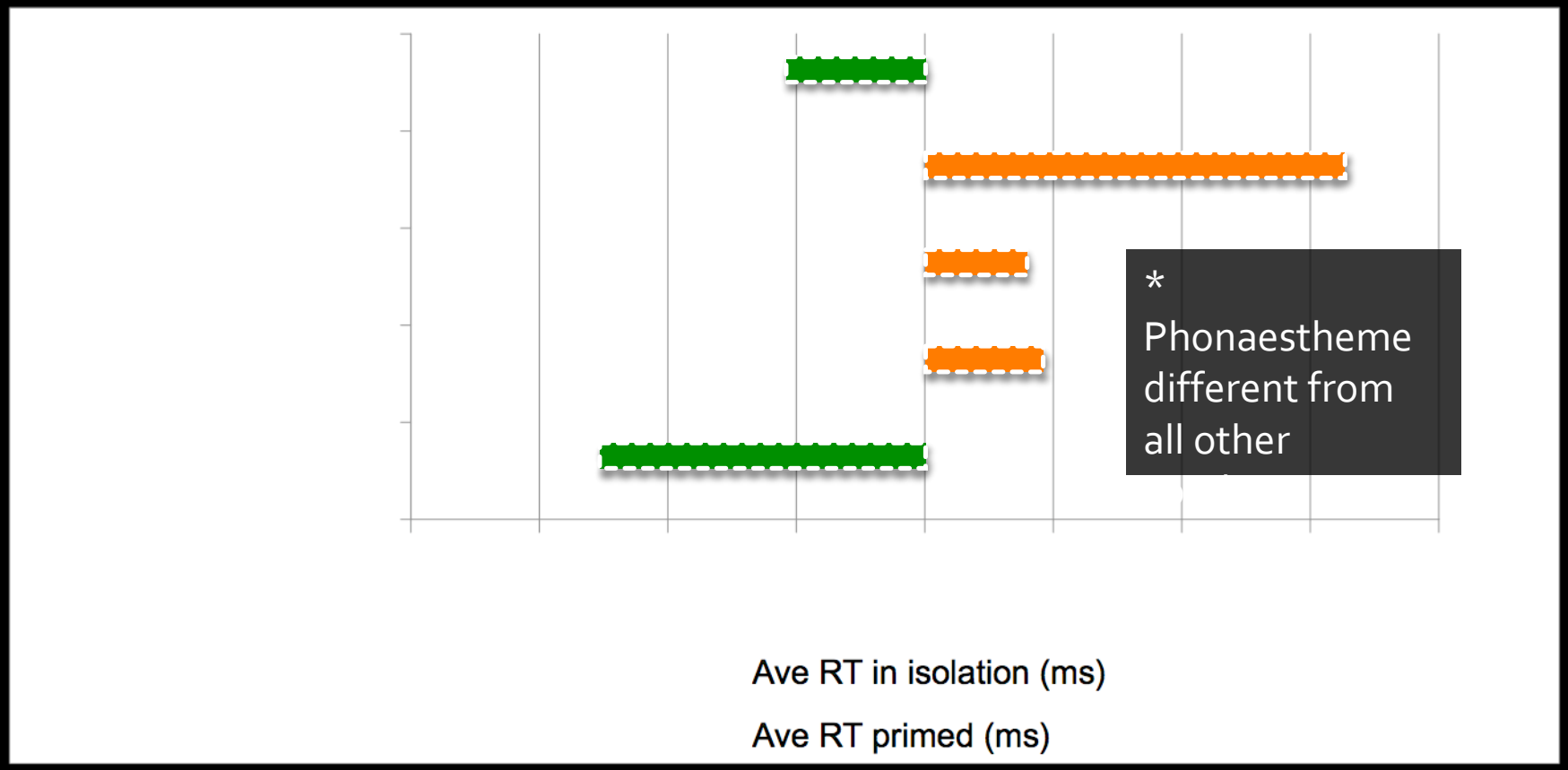
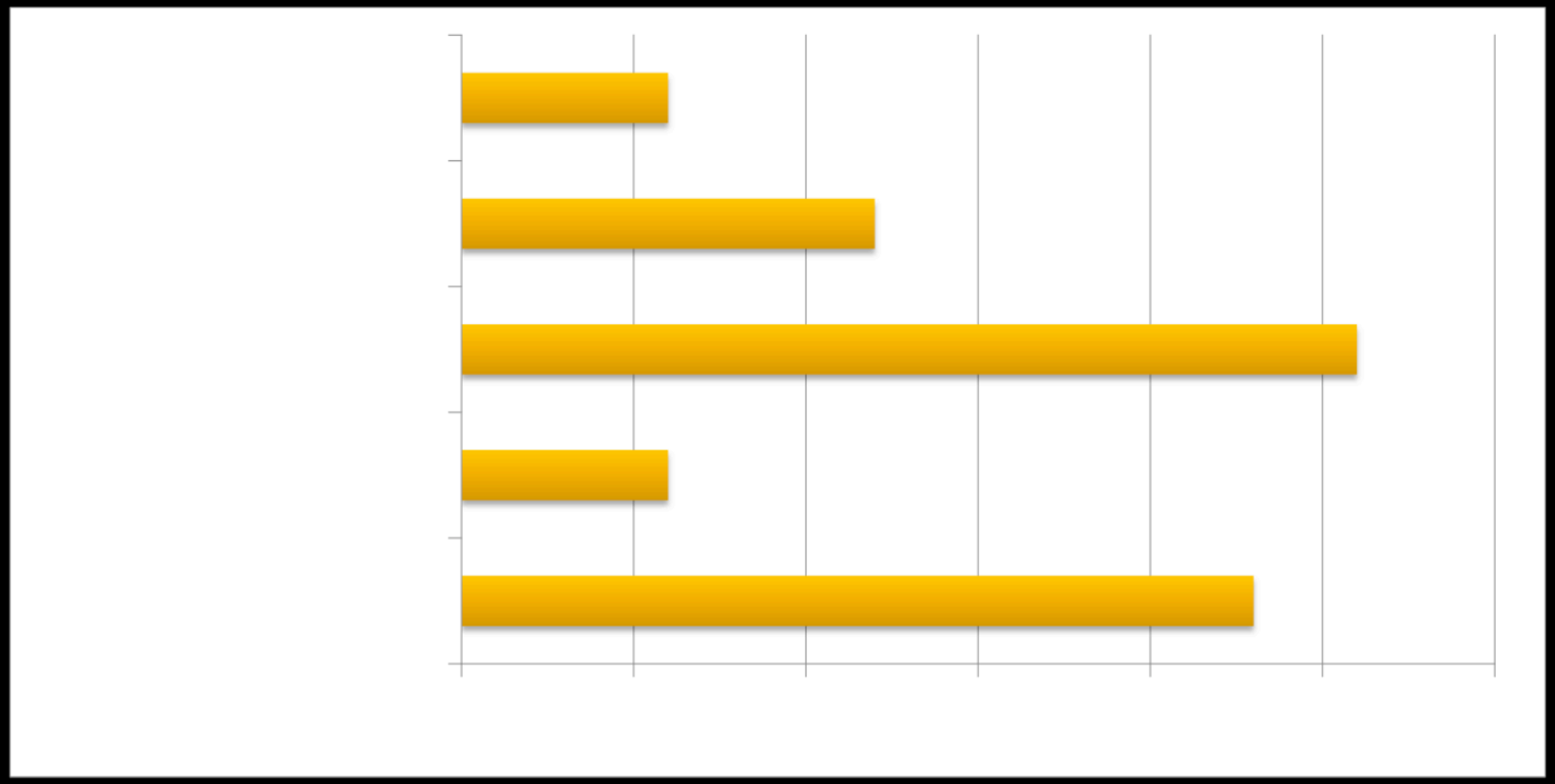


Results


*
Phonaestheme different from all other
Ave RT in isolation (ms)
Ave RT primed (ms)

Results



Mean LSA similarity between primes and targets

Discussion

- Words sharing phonaesthemes prime each other, similarly to words sharing morphemes
- This is not the product of form or meaning overlap alone or in combination
- The mental lexicon is systematic through phonaesthemes, just as the distributional lexicon is
- Frequency appears to play a role (the difference between phonaesthemes and pseudo-phonaesthemes)

Motivation to keep digging

- The effect would be more convincing if it used the same target words across conditions
- What's the the relationship between frequency and phonaesthemic priming?
- Does iconicity play a role in mental representations of words with phonaesthemes?

Experiment 2*

- Used 10 different sets of 6 words each with purported phonaesthemes
- Manipulated conditions within items and ppts, so each target presented in 4 conditions
  - Baseline
  - Meaning
  - Form
  - Phonaestheme

*Current collaborative work with `Oiwi Parker-Jones, Oxford

Stimuli

Phonaestheme	Meaning	Examples
sn-	MOUTH, NOSE	snicker, snore, snot, snout
wh-	PRODUCING NOISE	whisper, whine, whirr, wheeze
tr-	WALK	tread, tromp, trudge, trot
fl-	MOVE THROUGH THE AIR	fly, flail, flit, flit, fling
sw-	LONG, ARCING MOVEMENT	swing, sweep, swoop, swipe
cl-	HOLD TIGHTLY	cling, clasp, clamp, clutch
spr-	SPREADING OUT	spread, spray, sprawl, sprout
bl-	ROUND, EXPANDING	blimp, blob, bloat, bloom
st-	HARD, STRAIGHT	staff, stalk, stick, sturdy
gl-	LIGHT, VISION	glisten, gleam, glow, glaze

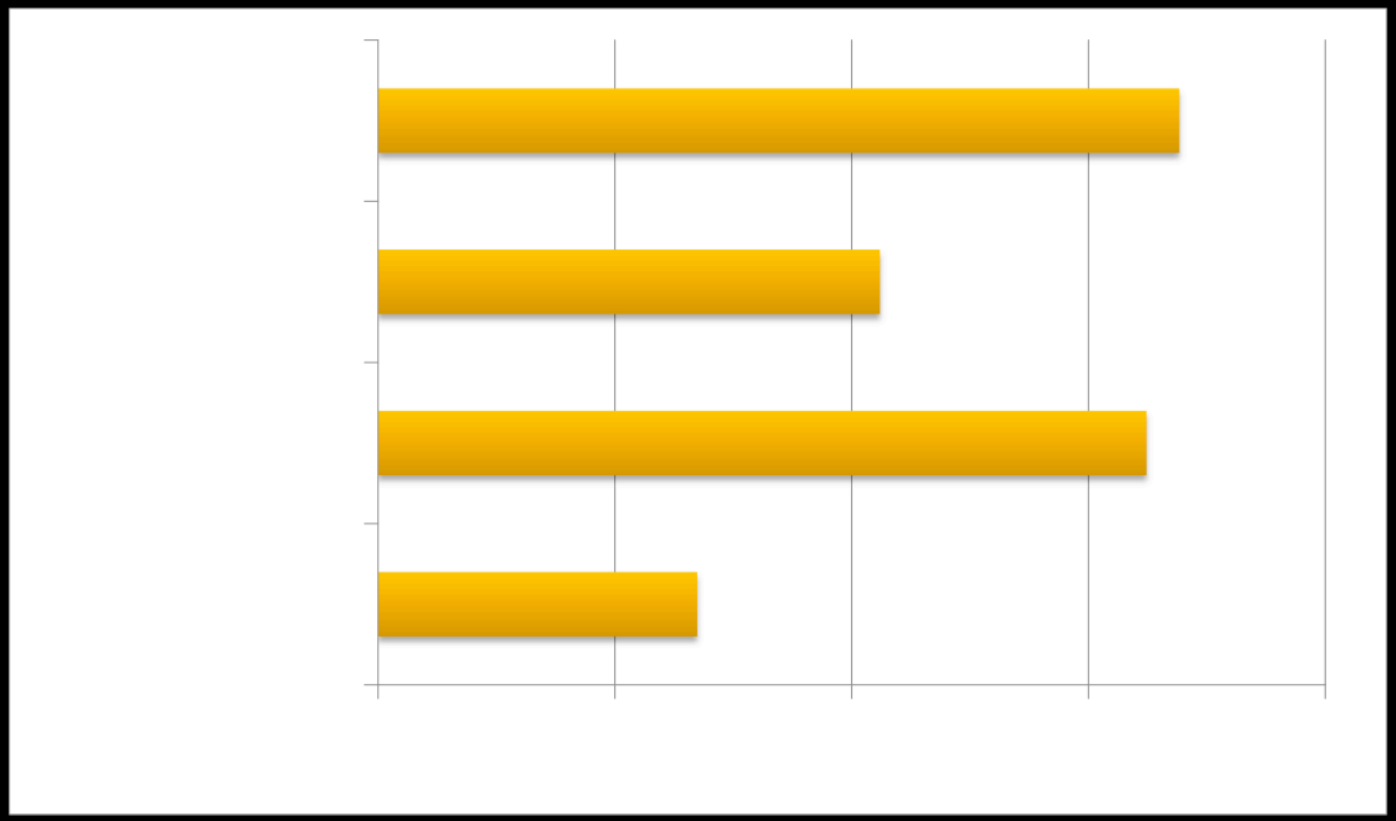
Method

- For instance, cl-
  - Targets (and primes in phonaestheme condition): *cling, clasp, clench, claw, clutch, clamp*
  - Baseline prime: a random word from one of the other 9 phonaestheme sets (sw-, fl-, gl-, sw-, etc.)
  - Meaning prime: *hold*
  - Form prime: *clean*
- Primes matched for length and frequency across conditions

Frequency

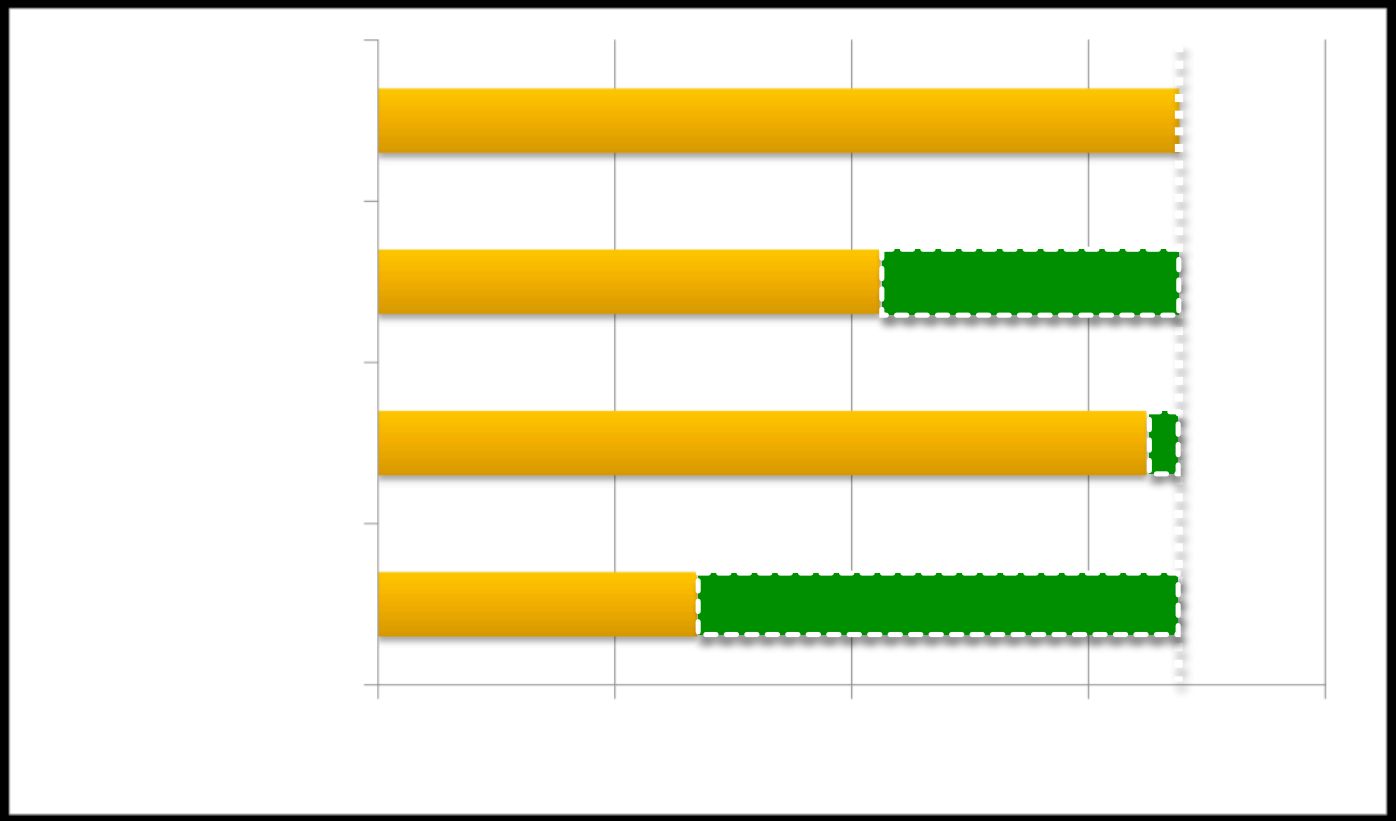
- If frequency matters, then it could be
  - Type frequency
  - Type cue validity
  - Token frequency
  - Token cue validity

Results



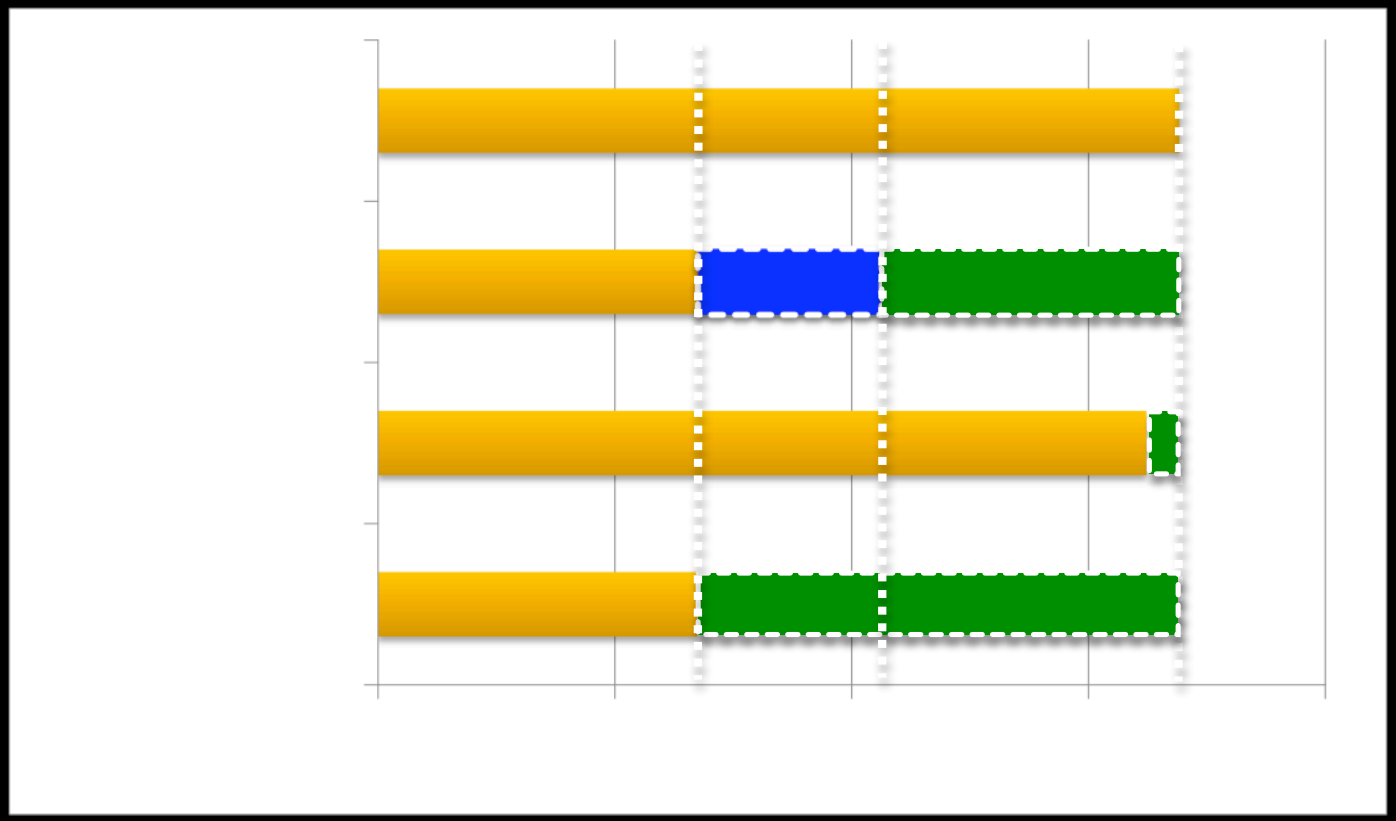
Average RT

Results



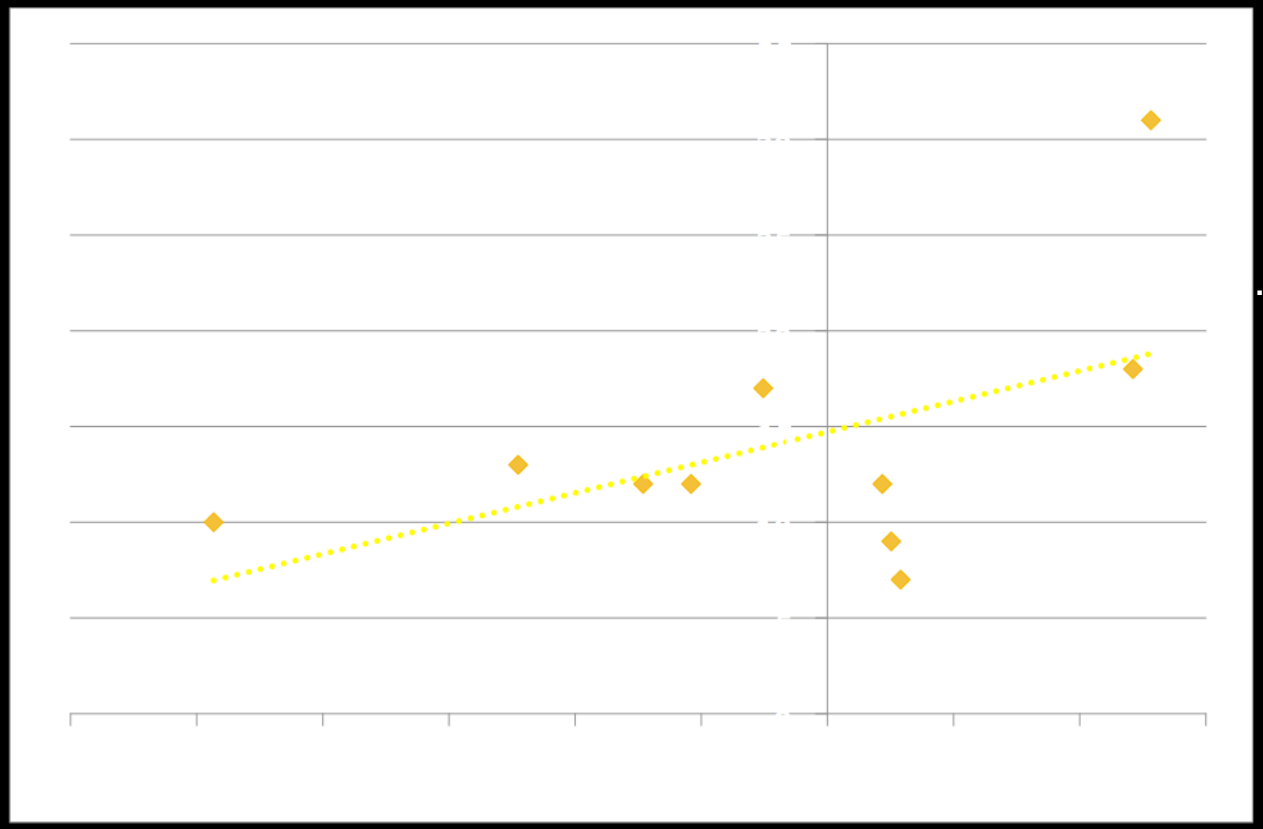
Average RT

Results



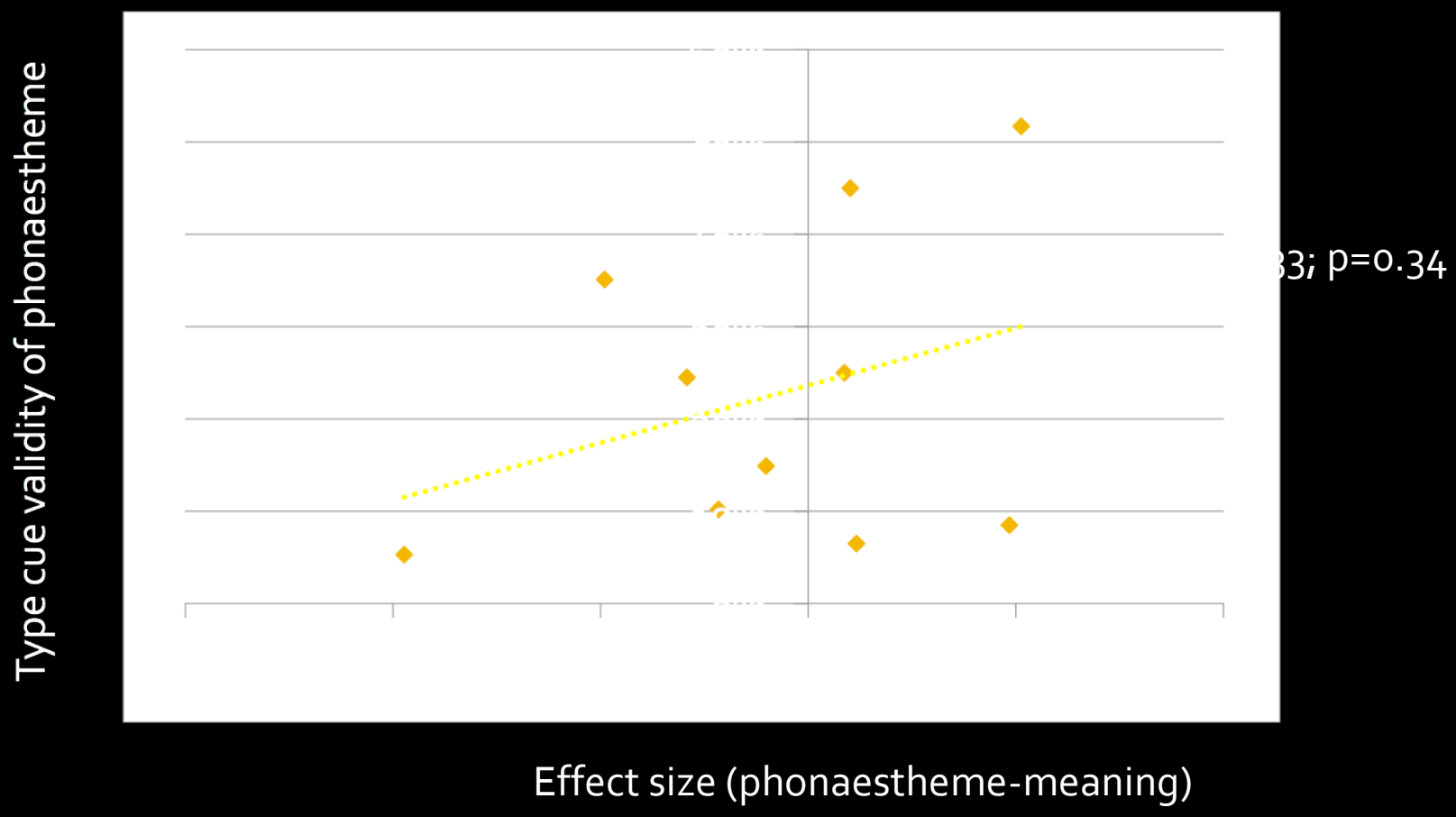
Average RT

Type frequency



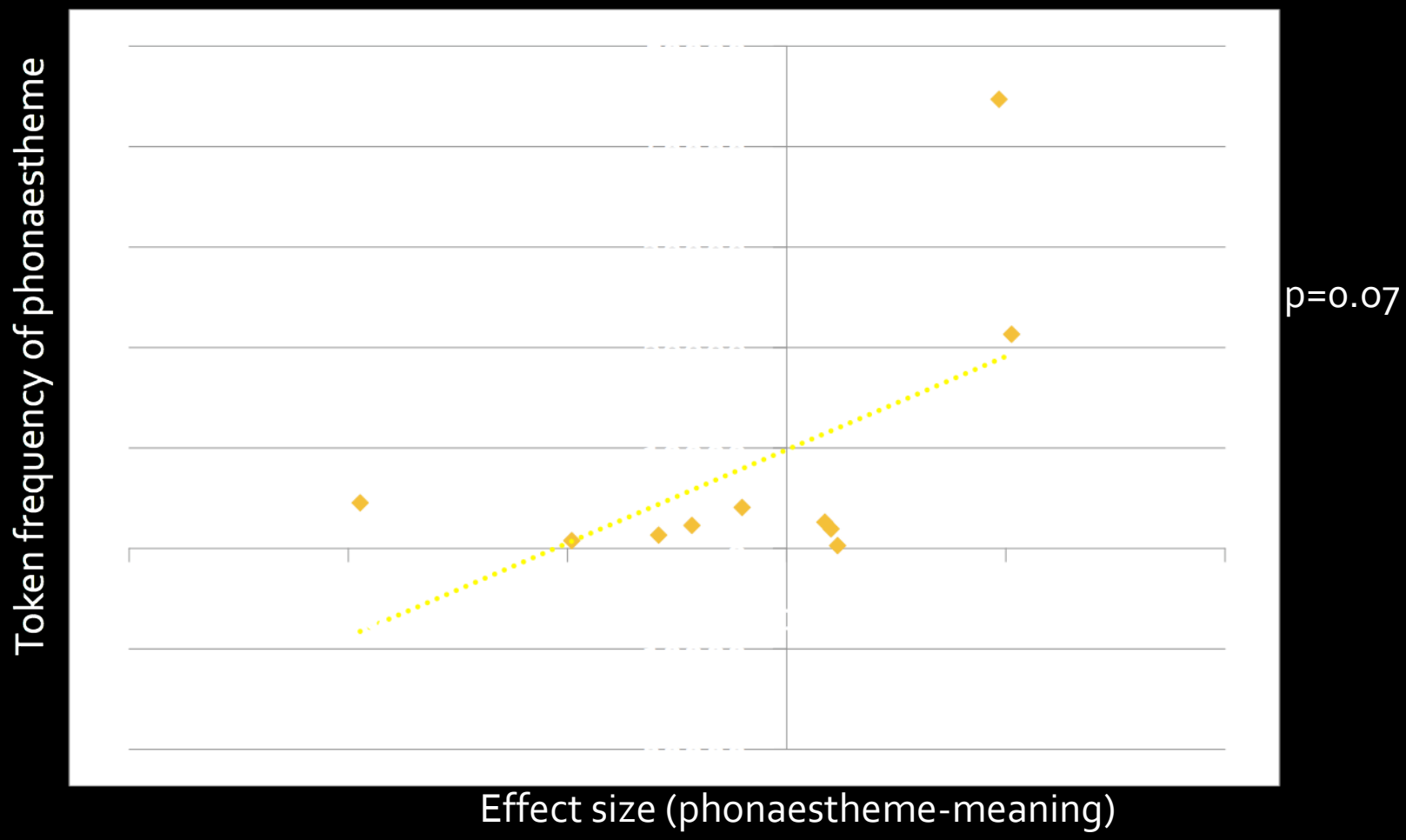
.52; p=0.12

Type cue validity



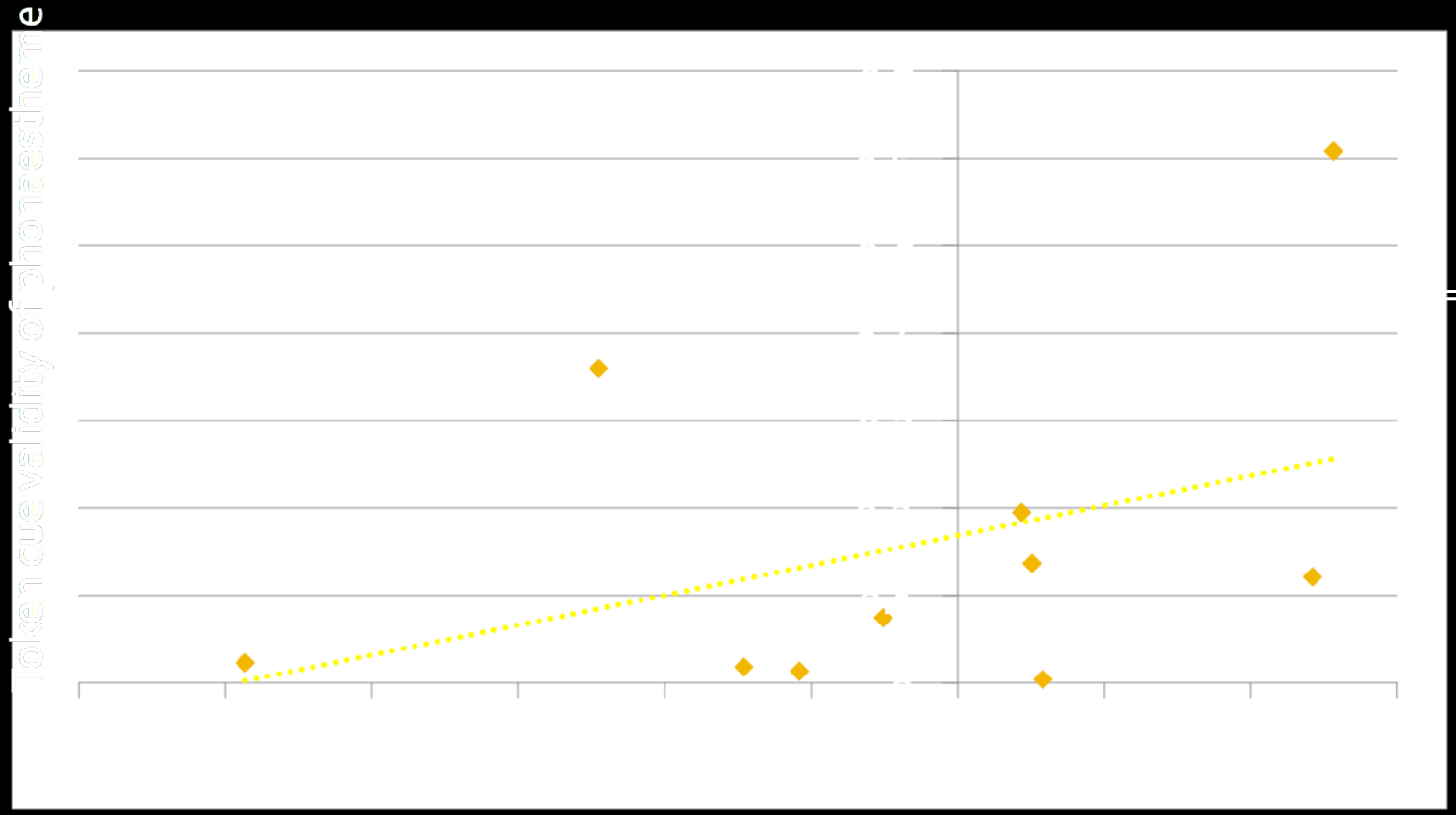
33; p=0.34

Token frequency



p=0.07

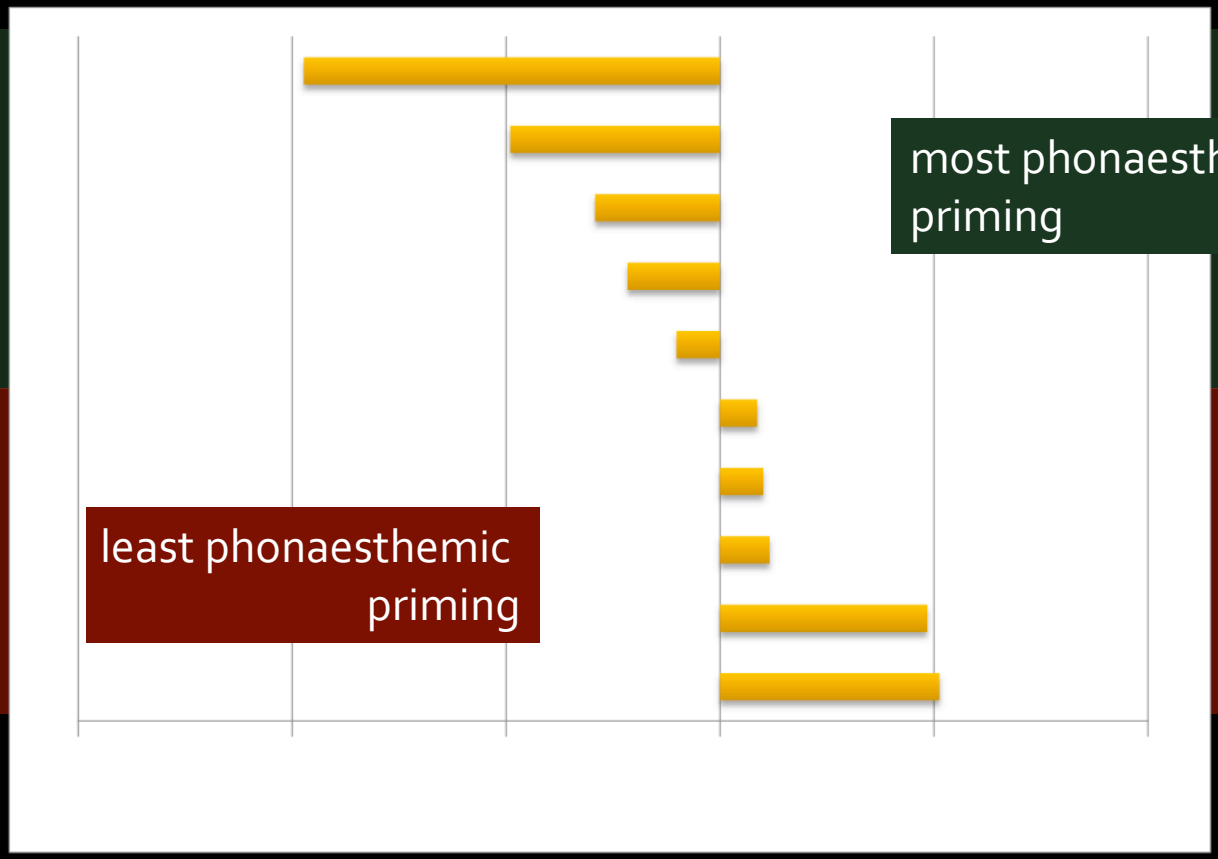
Token cue validity



=0.26

Effect size (phonaestheme-meaning)

If not frequency, then iconicity?



Effect size (phonaestheme-meaning)

Iconicity?

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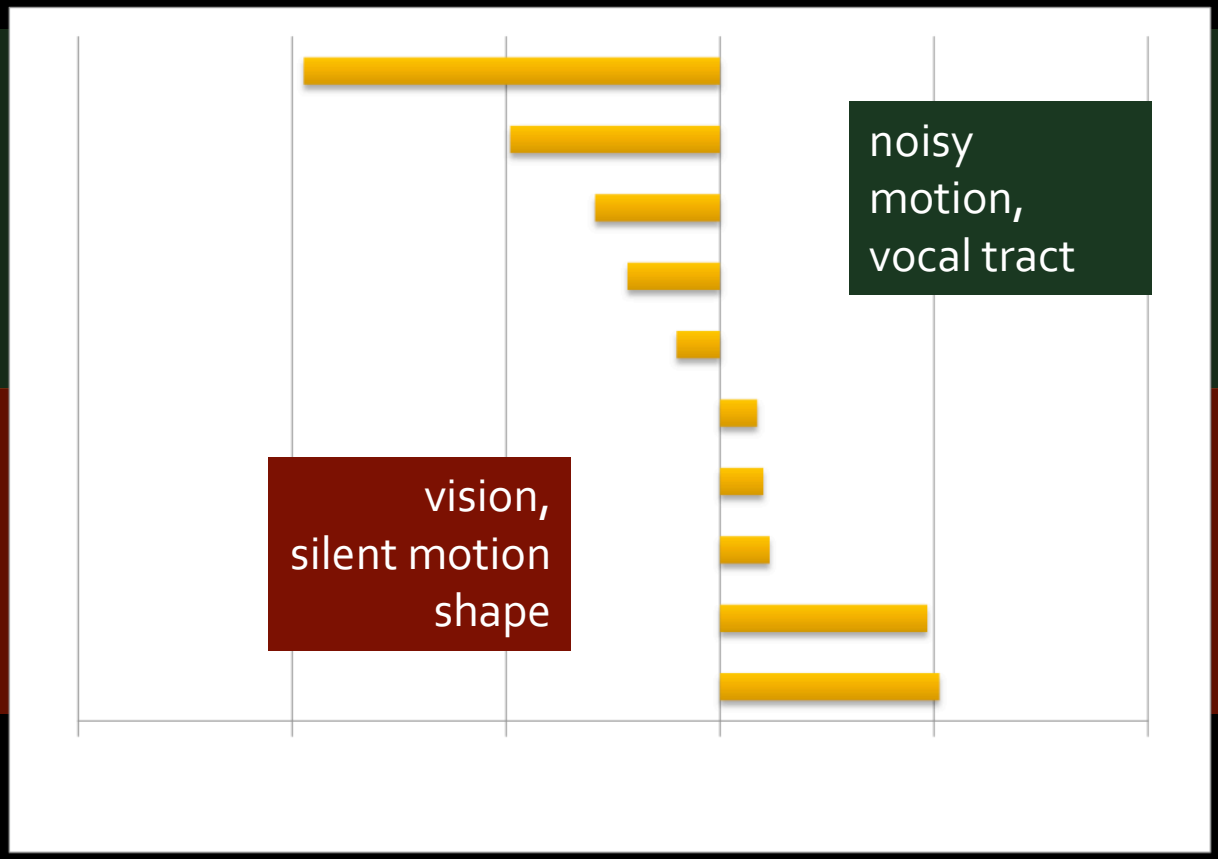
bl-	ROUND, EXPANDING	blimp, blob, bloat, bloom
st-	HARD, STRAIGHT	staff, stalk, stick, sturdy
gl-	LIGHT, VISION	glisten, gleam, glow, glaze

What's left?



Effect size (phonaestheme-meaning)

Discussion

- Frequency may play a broad role in how phonaesthemes are realized in the mental lexicon, but is not a good predictor of phonaesthemic priming
- Iconicity (sound symbolism) may be a better predictor of phonaesthemic priming, and may be brought to bear even on speeded lexical decisions

Conclusions

- Phonaesthemes are a place where the sign is non-arbitrary in two ways
  - They might display iconicity
  - They systematize the lexicon
- They systematize mental representations of words and affect low-level lexical processing
- There are similar phenomena across languages (Japanese mimetics, Austronesian roots, etc.); iconicity and lexicon systematicity appear to be design features of language

Thank you

Frequency

- Extracted all words (955) starting with the ten onsets from the Oxford American Thesaurus of Current English
- 2 raters made independent yes/no phonaestheme judgments for each word – did it share the purported meaning for the relevant phonaestheme?
- 95.3% agreement, Cohen's kappa = 0.84, which is "almost perfect agreement" (Landis & Koch, 1977)
- Of 955 words, 141 (14.7%) were judged by both raters to share the purported phonaestheme meaning.

Type measures

- Type frequency
  - number of words with a given onset judged by both raters to share the relevant phonaesthemic meaning
- Cue validity
  - number of such words / total word types with the same onset

Type measures - example

- 118 words with cl- onset
  - *Type frequency:* 12 words judged to have phonaesthemic meaning by both raters
  - *Type cue validity*: 12/118 = 10.2%

Token measures

- Took the raw frequency of each word with each onset from the BNC (part-of-speech tagged)
- Token frequency
  - for each onset, number of tokens of words judged as sharing the phonaesthemic meaning
- Token cue validity
  - token frequency / token frequency of all words sharing the onset

Token measures - example

- *Token frequency*: the 12 cl- words judged to share the phonaesthemic meaning have a sum token frequency of 2,294
- *Token cue validity*: *2,294/174,183 = 0.013%*