Phonaesthemes
Frequency, and psychological reality

Sound Symbolism: Challenging the Arbitrariness of Language
Emory University
March 26, 2010
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Frequency, iconicity, and psychological reality

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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, snuffle, 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

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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

form

meaning
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

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<td>Types</td>
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<td><strong>gl-</strong></td>
<td>39%</td>
<td>60%</td>
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<td><strong>sn-</strong></td>
<td>4%</td>
<td>1%</td>
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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

  - **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
Phonaesthetic 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?
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?

[like this]

PRIME
TARGET
[baseline condition]

FRILL
BARN
[form condition]

DRUID
DRIP
[meaning condition]
[phonaesthesia 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

Ave RT in isolation (ms)
Phonaestheme different from all other conditions (p < 0.05)
Results

Ave RT in isolation (ms)
Results

Effect size (n – baseline) in msec
Results

Ave RT in isolation (ms)
Results
Results
Results

Phonaestheme different from all other conditions (p < 0.05)

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 relationship between frequency and phonaesthetic 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 ppt's, so each target presented in 4 conditions
  - Baseline
  - Meaning
  - Form
  - Phonaestheme

*Current collaborative work with ‘Oiwi Parker-Jones, Oxford
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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
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
Effect size (phonaestheme - meaning) $R=0.52; p=0.12$
Type cue validity

Effect size (phonaestheme-meaning)

$R = 0.33; p = 0.34$
Token frequency

Effect size (phonaestheme-meaning)

R=0.59; p=0.07
Effect size (phonaestheme-meaning)

$R = 0.40; p = 0.26$
Effect size (phonaesthesia-meaning)

If not frequency, then iconicity?
## Iconicity?

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What’s left?

Effect size (phonaestheme-meaning)

vision, silent motion, shape

noisy motion, vocal tract
Discussion

- Frequency may play a broad role in how phonaesthemes are realized in the mental lexicon, but is not a good predictor of phonaesthetic priming.
- Iconicity (sound symbolism) may be a better predictor of phonaesthetic priming, and may be brought to bear even on speeded lexical decisions.
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
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 phonaesthetic meaning by both raters
  - Type cue validity: \( \frac{12}{118} = 10.2\% \)
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 phonaesthetic 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 phonaesthetic meaning have a sum token frequency of 2,294

- **Token cue validity**: \( \frac{2,294}{174,183} = 0.013\% \)