When Meaning Permeates Form: Iconicity Effects in British Sign Language

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Words are Arbitrary

- Words are (mostly) arbitrary-- there is no link between the form of a word and it’s meaning

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Words are Arbitrary

<table>
<thead>
<tr>
<th>small</th>
<th>little</th>
<th>tiny</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning linked to arbitrary forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to distinguish</td>
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</table>

<table>
<thead>
<tr>
<th>small</th>
<th>smell</th>
<th>smull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning linked to non-random forms</td>
<td></td>
<td></td>
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<tr>
<td>Difficult to distinguish</td>
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- Arbitrariness allows for maximum discrimination between words allowing for larger lexica to develop (Monaghan & Christiansen 2006, Gasser 2004)

Signs are iconic

- Iconicity is the transparent relationship between meaning and form

- Sign Languages use iconicity much more than spoken languages

- If arbitrariness is so useful, why are so many words in signed languages iconic?
What are the consequences for language processing when mappings between meaning and form are iconic?

- Subjects faster to respond when iconic features of a sign are highlighted in a preceding picture
- Iconic links between sign and meaning DO affect processing

**Picture-Sign Matching in ASL**

Thompson, Vinson, Vigliocco, (2009) JEP:LMC

- **CANDLE (salient picture)**
- **CANDLE (non-salient picture)**

- Subjects faster to respond when iconic features of a sign are highlighted in a preceding picture
- Iconic links between sign and meaning DO affect processing

At which level(s) of representation does iconicity play a role?

- **Level of Meaning**: iconicity affects only tasks where meaning is relevant
- **General Level**: iconicity affects language processing everywhere (even when meaning is not relevant to the task)

**Experiment 1: Handshape Decision Task**

<table>
<thead>
<tr>
<th>ICONIC</th>
<th>NON-ICONIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURVED</td>
<td>BELT, BATTERY</td>
</tr>
<tr>
<td>STRAIGHT</td>
<td>CRY, BROWN</td>
</tr>
</tbody>
</table>
Method

Materials
162 video clips of BSL lexical signs normed for iconicity, age of acquisition, and familiarity (Vinson, Cormier, Denmark, Schembri, Vigliocco, 2008)

Subjects
25 BSL signers
- 13 native signers
- 12 non-native signers (BSL after age 2)

Task
Does the sign have a straight/curved handshape?

Analyses

• Mixed, crossed random effects models for both subjects and items

• Dependent measure:
Signer Response Times

• Predictors:
  - Non-signer Response Times* (n=15, perceptual factors)
  - Bent vs. Straight handshape
  - AoA
  - Familiarity
  - Group (native, non-native)
  - Iconicity

Taking other factors into account to what extent does iconicity predict performance?

Results: Iconicity affects Response Times

Handshape decisions are significantly slower for iconic signs

Summary: Experiment One

• When signs are iconic, handshape judgments are more difficult as a result

• Iconicity effects are not due to specific (meaning-related) task
Hypothesis: Iconicity encoded in signs results in faster more automatic activation of meaning.

Automatic access to meaning makes phonological decisions not related to that meaning more difficult.

If correct: Automatic activation of meaning will speed phonological decisions directly related to that meaning.

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**Experiment 2: Movement Decision Task**

<table>
<thead>
<tr>
<th>ICONIC</th>
<th>NON-ICONIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP</td>
<td>AEROPLANE</td>
</tr>
<tr>
<td>DOWN</td>
<td>CRY</td>
</tr>
<tr>
<td></td>
<td>AFTERNOON</td>
</tr>
</tbody>
</table>

**Method**

- **Materials**
  - 108 video clips of BSL lexical signs normed for iconicity and familiarity
  - 54 with a single upward motion/54 a single downward motion
  - Balanced for iconicity, familiarity, concrete or abstract meaning, and noun or verb, big or small movement

- **Subjects**
  - 20 BSL signers
  - 9 native signers
  - 11 non-native signers (BSL after age 2)

- **Task**
  - Does the sign have an upwards/downwards movement?

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**Analyses**

- **Mixed, crossed random effects models for both subjects and items**
- **Dependent measures:**
  - Signers Response Times
- **Predictors:**
  - Non-signer Response Times (n=14, perceptual factors)
  - Upwards vs. downwards movement
  - Familiarity
  - Group (native, non-native)
  - Iconicity

Taking other factors into account to what extent does iconicity predict performance?
Movement Decision Results:
Iconicity speeds Response Times

Follow up: Experiment 2b
Handshape Decision

Using the same items as in Experiment 2 will we see a repetition of slowed Response Times?

Experiment 2b: Handshape Decision Results
Iconicity again slows Response Times

Summary: Experiment Two
More automatic access to meaning makes:
• Decisions not related to the meaning more difficult/slower
• Decisions related to the meaning easier/faster

Can automatic activation of meaning speed straightforward lexical access?
Experiment 3: Picture Naming

- 421 Pictures
- So far: analyzed data for 102 signs
- With AoA, Familiarity, & Iconicity ratings
- Subjects = 17

Experiment 3: Results Naming

- General speed up effect for iconic signs when naming pictures
- \( p = .015 \)

Conclusions

- Iconicity effects arise from automatic activation of meaning (even when meaning is not required)
- Iconicity affects language processing at all levels

Broad Conclusions

- Iconicity may be just as important as arbitrariness in using and learning language
- Arbitrariness and Iconicity are not mutually exclusive and both may play an important role in processing
- Arbitrariness may aid effective communication (by phonologically distinguishing similar meanings) while iconicity may provide links between language and the real world