Masked onset priming in Korean: Evidence for syllable- and phoneme-level effects

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Masked Onset Priming Effect (MOPE)

- Naming is faster when the target is preceded by a masked prime that has the same initial sound(s) (**basin-BORED** vs. **music-BORED**)
- This effect is
  - not found in lexical decision
  - not observed with rhyming prime-target pairs (**stake-BREAK**)
    → left-to-right serial process
  - obtained with regularly-spelled words (**MINT**), but not with irregularly-spelled words (**PINT**).

Locus of the MOPE

- **Grapheme-to-phoneme conversion (GPC) accounts**
  - lexical route: lexically-based retrieval of phonological form
  - nonlexical route: computes pronunciation through grapheme-phoneme correspondence rules, serially from left-to-right

→ *Forster & Davis (1991)*
- target determines whether pronunciation is lexically controlled
  Lexically controlled → NO MOPE
  Not lexically controlled → MOPE

→ *Coltheart & colleagues (DRC)* (Mousikou et al., 2010)
- prime engages the nonlexical route
- only the first letter of the masked prime is mapped onto its sound

- **Speech planning account** (e.g., Kinoshita & Woollams, 2002)
  - MOPE occurs after the GPC stage
  - serial nature of MOPE relates to segment-to-frame association

Korean Naming (Kim & Davis, 2002)

- ***hanja* targets → NO MOPE**
  - priming in identity (표–표) and homophone (강–표) conditions
  - no priming when *hangul* primes shared onset or onset+nucleus
- ***hangul* targets → MOPE, but not at the phoneme level**
  - priming in identity (결 – 결) and onset+nucleus (겨 – 결) conditions
  - no priming in the onset condition (개 – 결)

Problems for models of the MOPE

- **problem for GPC accounts**
  → no MOPE at the letter/phoneme level
  - MOPE should be obtained at the smallest unit over which GPC processes can operate
- **problem for DRC and speech planning accounts**
  → no MOPE for *hanja* targets
  - script properties of the target should not influence the MOPE

Why no (phoneme) MOPE in Korean?

- The letter level does not get mapped onto sound, only characters?
  - But then…
    … why do transposed letter effects indicate that *hangul* is fully decomposed by Korean readers (Lee & Taft, 2009)?
    … why was there no onset+nucleus priming for *hanja* targets?
- MOPE reflects speech planning, and the functional unit of production in Korean is not the phoneme?
  - But then…
    … why the disparity in the results for *hangul* and *hanja*?
- Both the lexical and nonlexical routes could have been used to assign pronunciation to *hangul* targets in Kim & Davis (2002). Could this have influenced the strength of the MOPE?
  → What if we force the nonlexical route with *hangul* nonwords?

Design and predictions

- 24 native Korean speakers
- Three list design

phoneme	*페추 – 피토*
syllable	*피추 – 피토*
unrelated	*카추 – 피토*

- If the GPC models are correct → phoneme-level MOPE
  - DRC → no difference between phoneme and syllable conditions
  - Forster & Davis → possible difference between these conditions
- If the speech planning model is correct
  → results should mirror Kim & Davis' (2002) *hanja* findings

Results

Prime type	Example	RT (ms)		Priming	%ER
Syllable	피추-피토	581	*	16 ***	5.99
Phoneme	페추-피토	588		9 *	6.34
ALD control	카추 피토	597			5.56

Discussion

- **MOPE at the phoneme/letter level**
  - supports the GPC accounts
- **MOPE at the syllable level**
  - significantly larger than the phoneme-level MOPE
  - challenge to the DRC account
- Forster & Davis model of the MOPE provides the most straightforward account of the Korean naming data (this study; Kim & Davis, 2002)
  - when target naming is lexically controlled (*hanja*)
    → NO MOPE
  - when target naming is not lexcially controlled (*hangul* nonwords)
    → MOPE
    - at the phoneme/letter-level (i.e., over the smallest unit of orthography-to-phonology computation)
    - larger priming with greater overlap (contra the DRC)

- **Why is this important?**

If the MOPE reflects grapheme-to-phoneme conversion...
...this effect has important implications for computational models of reading aloud (e.g., serial vs. parallel conversion)

If the MOPE relates to speech planning processes...
...this effect could be used to investigate issues related to production processes (e.g., Verdonschot et al., 2011).

References

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