**Background**

- Stop-nasal sequences are illegal in Korean; stop is nasalized.
  - e.g., Kukmul → kun+jmul ‘soup’
- Nasalization may also occur in English stop-nasal sequences.
  - e.g., jacknife → dʒenaijpi
- But, in English voiced stop-nasal sequences Korean L2 learners were more likely to epenthesize a vowel, even though voicing is not contrastive in Korean.
  - e.g., magnet → maginet
- Hwang 2010
  - Insertion of vowels after voiced stops is an effect of misperception—since in Korean voiced stops occur only intervocally as an allophone of voiceless obstruents.
- Categorization and discrimination of items on continua from no vowel to a full vowel

**Perception Grammar**

Boersma and Hamann’s (2009) model

- **Cue constraints**
  - *[burst]C(r)/ = an auditory release burst should not be perceived as a phonological consonant in coda
  - *[C(r)/] = no auditory cue should be perceived as a phonological vowel i
  - *[j]V = silence should not be perceived as nasal

  \[
  \begin{array}{ccc}
  \text{Language} & \text{English} & \text{Korean} \\
  \text{Stop} & \text{Bar} & \text{Nasal} \\
  \end{array}
  \]

- **Structural Constraints**
  - SYLCON = no rising sonority over syllable boundary

  \[
  \text{a.}\, \text{[pʰikʰɨnik]}\rightarrow\text{[pʰikʰɨnik]}\]  
  \[
  \text{b.}\, \text{[pʰikʰɨnik]}\rightarrow\text{[pʰikʰɨnik]}\]

  \[
  \text{c.}\, \text{[pʰikʰɨnik]}\rightarrow\text{[pʰikʰɨnik]}\]

  \[
  \text{However, this analysis}
  \]

  \[
  \text{(1) is not supported by the experimental results that voiced stop-nasal sequences were significantly more likely to be perceived with an illusory vowel than were voiceless stop-nasal sequences.}
  \]

  \[
  \text{(2) predicts that English words that violate SYLCON should be adapted with an inserted vowel, which is not the case:}
  \]

  \[
  \text{e.g. online [oilən] [onənən] [onənən]} \]

  Stanley [stʰɛnɪ] [stʰɛnɾɪ] [stʰɛnɾɪ]

  Hamlet [ɛmɨlit] [ɛmɨlit] [ɛmɨlit]

  (data from the National Academy of the Korean Language 2001)

**Revised analysis**

(1) What determines perceptual vowel insertion in large part is the release burst of the consonant, regardless of context (that is, whether the consonant appears pre-consonantly or word finally).

(2) The reason why ‘picnic’ is mapped to [pʰikʰɨnic] could also be simply that variation exists in the auditory forms available to listeners.

<table>
<thead>
<tr>
<th>Dominant</th>
<th>Less Dominant</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pacman</td>
<td>/pʰikʰɨmn/ (282000)</td>
</tr>
<tr>
<td>jacknife</td>
<td>/səkʰinai/p(183500)</td>
</tr>
<tr>
<td>sickness</td>
<td>/sɨtʰɛnl̪i/ (2150000)</td>
</tr>
<tr>
<td>Chapman</td>
<td>/ʃəpməni/ (4100)</td>
</tr>
<tr>
<td>b.</td>
<td>/sɪnkln/ (11900)</td>
</tr>
<tr>
<td>picnic</td>
<td>/pʰikʰɨnk/ (681000)</td>
</tr>
</tbody>
</table>

(3) Cue constraint that prohibits voiced coda

- *[]V = voice should not be perceived as a phonological consonant in coda (adapted from Boersma and Hamann 2009)

  \[
  \begin{array}{ccc}
  \text{Language} & \text{English} & \text{Korean} \\
  \text{Stop} & \text{Bar} & \text{Nasal} \\
  \end{array}
  \]

(4) This constraint is used to account for vowel insertion only in word final position in B&H’s analysis.

**Native Language Filter in Perception**

(1) Contrastive feature based model (Brown, 1998):

- Perception is mediated by contrastive phonological features in NL.

(2) Acoustic cue interpretation model (Boersma & Hamann, 2009)

- All acoustic cues are available to listeners, but the interpretation of these cues is guided by the NL perception grammar, which may induce greater attention to particular cues.

- How does ‘voicing effect’ work in the perception grammar?

- Revised analysis

- Perceptual vowel insertion in large part is the release burst of the consonant, regardless of context (that is, whether the consonant appears pre-consonantly or word finally).

- The reason why ‘picnic’ is mapped to [pʰikʰɨnic] could also be simply that variation exists in the auditory forms available to listeners.

- This constraint is used to account for vowel insertion only in word final position in B&H’s analysis. But I argue that this constraint is sufficient to explain the pattern of vowel insertion between stop-nasal sequences as well as after a word-final stop.