Intelligibility and Comprehensibility in Real Time: The Neuro- and Psycholinguistics of the L2 Parser

John Archibald, University of Victoria

The Intelligibility Metric: Word Level

• Intelligibility (Levis, 2005; Munro & Derwing, 1995) is often defined functionally as successful identification (by the listener) of the intended word spoken by a NNS.
• I argue that it should also be viewed as a measure of psycholinguistic parsing, and neurolinguistic activation.

What Makes a Word Intelligible?

1. matching acoustic input to abstract units (phonemes; feet)
2. activating words consistent with those phonological categories

Spoken Word Recognition

Cohorts and Phantom Competitors
(Marslen-Wilson, 1985; Broersma & Cutler, 2007)

Phoneme Uncertainty (Gwilliams, 2018)

• at word beginning, uncertainty AND lexical frequency weight candidates
• later in word, activation is weighted by frequency alone
• implications for L2 speech

MEG Studies (Gwilliams, 2017)
- phonological ambiguity: 50ms
- lexical commitment: 300-450ms
• parallel computation balances trade-off between speed and accuracy

Poeppel & Idsardi: Hypthesize & Test

Persian/Saudi Illusory Vowels

• unlike Japanese & BP subjects, Persian (and Saudi) subjects accurately perceive English sC sequences as being [s]-initial, not vowel-initial.

The Parser

• The parser’s job is to assign hierarchical structure to the speech stream (Archibald, 2004).
• the parser operates L → R

Persian/Saudi Illusory Vowels

• unlike Japanese & BP subjects, Persian (and Saudi) subjects accurately perceive English sC sequences as being [s]-initial, not vowel-initial.

Intelligibility/Parsability: Syllables

• via redeployment (Archibald, 2006) the English sC onset is intelligible to Persian (but not Japanese) ears because the string can be parsed. (Archibald & Yousefi, 2018; Almehaid, 2018)

Intelligibility/Parsability: Stress

• Isaacs & Trofimovich (2012) showed stress errors impede comprehensibility in English listeners.
• Weber (2013) showed certain stress errors affect intelligibility for German listeners (with both German & English input); wrong foot better than wrong syllable within a foot

Pedagogic Implications

Left-edge uncertainty (word & syllable) more costly.
Right edge: epenthesis >> deletion

Conclusion

There is no universal intelligibility based on the signal alone; mediated by parsing.