Costs and Cues in Code-switched Lexical Access

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Code-switching (CS) – common bilingual practice of alternating between 2 languages in a conversation

- Is perceiving a spoken code-switch costly?
- Do bilingual listeners use phonetic (prosodic) cues to anticipate a code-switch?

Prosody: Mandarin (tone), English (intonation)

- Perceiving a code-switch is costly
- Bilingual listeners use anticipatory phonetic cues

Experiments:

1. Concept monitoring (CM) – behavioral measure

   Linear mixed effects regression for log-transformed reaction time:
   - Fixed effects: Language*Splice*Position
   - Random slopes for Subject and Item

   Hypotheses

   - Perceiving a code-switch is costly
   - Bilingual listeners use anticipatory phonetic cues

2. Eye tracking (ET) – online measure

   Growth curve analysis + orthogonal polynomials
   - Treats time as continuous variable
   - Captures shape of time course of participants’ fixations toward pictures

   Concept monitoring (CM) results

   - Predicts longer reaction times for:
     - Code-switches (p = 0.0595) → processing cost
     - Sentence-medial words (p < 0.001) → position of target word matters
     - Splice, interactions not significant → listeners do not seem to use cues

   Eye tracking (ET) results

   - Fewer looks to target in:
     - code-switched trials (p < 0.001) → processing cost
     - spliced, code-switched, medial trials (p = 0.002) → absence of cues hinders listener (when target sentence-medial)

   More looks to Mandarin competitor in:

   - code-switched trials (p < 0.001), when target is not spliced (p = 0.0478) → presence of cues activates congruent language competitors

   More looks to English competitor in:

   - Spliced trials (p = 0.0512) → absence of (Mandarin code-switch) cues biases listener toward English

Method:

42 participants (35F/7M, 18-31 yrs) – proficient Mandarin-English bilinguals, habitual code-switchers

Procedure: Screening (proficiency), picture familiarization task, experiments (counterbalanced + participants run on List 1 or 2) w/ randomized trial order

Speaker: proficient L1 Mandarin-L2 English bilingual (21, F), habitual code-switcher

Visual stimuli: colored line drawings

Audio stimuli: English sentences (CM=48; ET=36); target word either English/CS; Natural/Spliced; Medial/Final

Splicing: if speakers produce cues and listeners use them in perception, then splicing the target should affect the perception process (i.e. spliced = no CS cues, not spliced = CS cues)

Conclusion:

- Costs
  Perceiving a code-switch is costly (CM); the target is less activated when it is a code-switch than when it is not (ET)

- Cues
  Behavioral results do not show listeners using cues (CM), but the online measure reveals anticipatory phonetic cues are incorporated during lexical access, though they do not overcome switch cost / are not integrated fast enough (ET)

Future directions:

- Acoustic analysis
- Linguistic experience + perception; language dominance + activation

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