**Introduction**

- Speech planning involves selecting the appropriate words from the mental lexicon.
- Bilinguals must select the appropriate word based on both the semantic information and the intended language.
- Lexical competition engages regulatory mechanisms such as monitoring and inhibitory control (Shao et al., 2014), but the nature of these mechanisms is not well understood.
- Competition from both within-language and between-language competitors makes lexical selection for bilinguals more challenging than for monolinguals. This may require greater regulation for bilinguals.
- Bilinguals often show better performance than monolinguals on tasks measuring regulation in the form of cognitive control, conflict monitoring, and inhibition (Costa et al., 2009; Morales et al., 2015).
- Brain areas involved in non-linguistic cognitive control and language categorization are overlapping for bilinguals but distinct for monolinguals, suggesting a coupling between language and domain-general regulatory mechanisms for bilinguals (Coderre et al., 2015).
- The precise way that these regulatory mechanisms are engaged during language tasks is not clear, however.
- In the current study, we use a novel lexical retrieval paradigm designed to induce regulatory mechanisms such as proactive control, reactive control, and task switching.

**Research Questions**

**What are the conditions that induce conflict during word retrieval?**

**What type of regulation is involved when bilinguals retrieve words for speech?**

**Participants**

- 24 young adults, aged 18-40 (mean 20.3)
- Language make-up
  - 21 bilinguals (= self-rating of 4+ for two languages), 3 monolinguals
  - 15 heritage speakers, 6 bilinguals who learned English first
  - 11 learned English first, 13 learned another language first
- Language proficiency (self-rating on scale of 0-10)
  - English: mean 9.53 (range 8-10)
  - Other language (if bilingual): 6.60 (range 4.9-5)

**Methods**

**Tasks**

**Picture naming**
- 288 colored line drawings of objects
- Pictures preceded by a distractor word or string of X’s (6 types)
- Cued task-switching: 80% object-naming, 20% color-naming
- Attentional conflict: color distractors
- Lexical conflict: semantically related and unrelated distractors

**Distractor types:**

- Control Object match
- Object semantically related
- Object semantically unrelated
- Color match
- Color mismatch

**Measures (accuracy and response times)**

- Proactive control: Color distractors on object-naming trials vs control
- Reactive control: Object distractors on object-naming trials vs control

**AX Continuous Performance Task**

- Participants respond to each letter that appears on the screen.
- A “no” response is given for every letter unless it is a red X that was preceded (4 letters back) by a red A.
- 100 trials of 5 letters each.
  - 70% AX, 10% A/X, 10% BX, 10% BY (B/Y refer to any letter but A/X)

**Set Shifting (NIH Examiner Battery)**

- Participants match a shape according to color (red/blue) or shape (triangle/rectangle) based on a task cue
- 104 trials
- Measure: Shift score combines accuracy and response time

**Working memory (NIH Examiner Battery)**

- “Dot counting” - Participants count aloud the number of blue dots in an array that contains blue dots, green dots, and blue squares.
- Count must be remembered across a series of trials and then recalled.
- Series goes from 2 to 8 trials
- Measure: Total number correctly recalled in the right order

**Language History Questionnaire**

- Early childhood language exposure and use, current proficiency and use, code-switching habits, experience living abroad, etc.

**Results**

**Discussion**

- This picture naming design may be a useful way to tap into individuals’ ability to regulate attentional and lexical competition during lexical selection.
- Color distractors led to lower accuracy overall, especially for non-switch trials, perhaps reflecting task maintenance difficulty. Naming the object’s color instead of the name accounted for 24% of the errors on trials with color distractors, compared to 13% of errors on trials with object distractors.
- RTs for color distractors were faster than control trials, but only when switching from a color-naming trial. This may reflect efficient task-switching ability along with active suppression of the color distractor. Heritage speakers showed this pattern, but non-heritage speaker bilinguals and monolinguals tended to show interference costs for color distractors.
- The stronger the proficiency in a non-heritage language, the more accurate but slower subjects were in the face of lexical competition.

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