Naming and Cognitive Control:
Observing Cognitive Performance During Word Retrieval Across Monolinguals and Bilinguals

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Introduction

- Speakers must choose the most appropriate words for the concepts they want to express, but this process of lexical selection can become difficult in the face of competition from lexical competitors or from attentional distraction.
- In this study, we used a picture naming task with different types of distractors to investigate how bilinguals deal with conflict. Lexical conflict was introduced using object-name distractors. Attentional conflict was introduced using color-word distractors.
- Bilinguals tend to be slower than monolinguals on picture naming tasks (e.g., Ivanova & Costa, 2008), but they exhibit more efficient cognitive control systems than monolinguals (e.g., Bialystok, Craik, & Luk, 2008; Morales et al., 2015).
- It is not clear what the source of the bilingual cognitive advantage is. The Adaptive Control Hypothesis states that different language situations require different types of control, and speakers adapt their control according to the contextual demands (Green & Abutalebi, 2013).
- To investigate this, we compared two groups with bilingual exposure in early childhood: heritage speakers and overhearers. Heritage speakers were proficient in their heritage language and English. Overhearers were only proficient in English, though they may still be able to comprehend their heritage language.
- If speaking two languages improves cognitive control, heritage speakers should show less interference than overhearers and monolinguals. But if bilingual exposure and comprehension is key, then both heritage speakers and overhearers should perform better than monolinguals.

Research Question

1. Do speakers experience lexical and attentional conflict in this paradigm?
2. Does previous language experience influence how people deal with lexical and attentional conflict during word retrieval?

Participants

Group	N	Age - Mean & Range (yrs)	Gender	English Acquisition Age - Mean & Range (yrs)	Average English Proficiency - Mean & Range
Heritage Speakers	37	19.24, 18 - 26	9m; 28f	2.58, 0 - 6	9.26, 7 - 10
Monolinguals	38	18.97, 18 - 22	18m; 20f	1.51, 0 - 4	9.30, 7 - 10
Overhearers	31	19.48, 18 - 25	10m; 21f	2.29, 1 - 6	9.40, 7.75 - 10

Methods

- **Picture Naming Task:** 288 colored line drawings. Each picture was preceded by one of the following distractor words: a semantically related or unrelated object name, the target object name, the target color name or a different color, or a series of X's. Pictures were presented in four blocks: Blocks 1 and 4 had color and control distractors and Blocks 2 and 3 contained object distractors. Each trial started with a cue instructing the participant to name either the object's name or its color. The cue was object-naming on 80% of the trials in each block and color-naming on 20% of the trials.

- **Language History Questionnaire:** Assessed a participants' linguistic background. Included questions of daily language exposure, familial language use factors, as well as self-reported proficiency.

Analysis

- Only object-naming trials were analyzed.
- For response times, we excluded trials for triggers of response time were inaccurate such answers that were inaccurate, as well as trials < 300 ms and > 5000 ms.
- Participants were classified into three separate groups: Heritage Speakers (hs), Monolinguals (ml), and Overhearers (oh).

Results

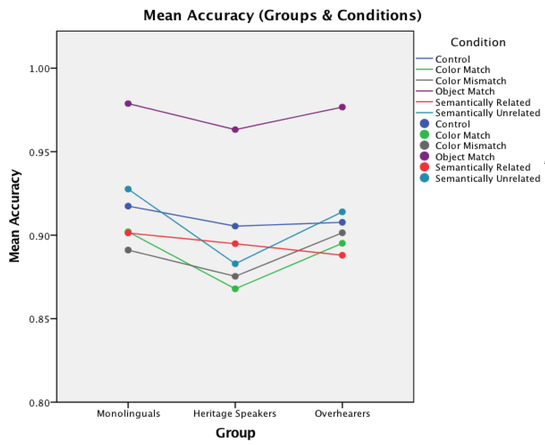
Conflict Types

- Participants responded fastest and with the highest accuracy when presented with object match distractors.
- Participants were slowest on object mismatch (whether semantically related or unrelated) ($p < 0.001$).
- Color-word distractors did not differ from the control condition.

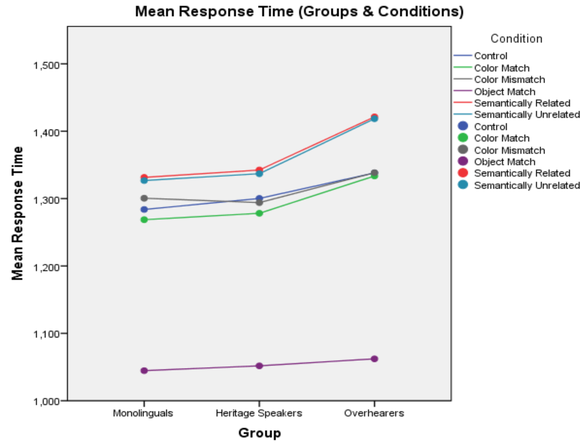
Group comparisons

- Monolinguals were fastest to name the pictures, overhearers were slowest, and heritage speakers were in between. These differences were not significant ($p = 0.735$).
- Unlike our predictions, there were no significant differences in how the three groups responded to the different types of distractors ($p = 0.401$).

Accuracy for Groups by Condition



Response Time for Groups by Condition



Conclusions

- Results replicate previous studies showing that bilinguals tend to be numerically slower on lexical retrieval tasks. Although they are functionally monolingual, overhearers were more like bilinguals in speed of naming. However, none of the group differences were statistically significant.
- Unlike previous studies showing that semantically related distractors interfered more than semantically unrelated distractors (Schriefers, Meyer, & Levelt, 1990), we found that semantically related and unrelated distractors interfered to a similar degree. However, they interfered more than color distractors, suggesting that lexical interference is more problematic than attentional interference.

References & Acknowledgments

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We thank Pilar Raygoza, Andrea Rios, Bilal Rana, Miguel Miramontes, Evelyn Gámez, Kiselle Mangalindan, and Yasmeen Sheikh for help with stimulus preparation, participant testing, and data entry.

Funding for this project was provided to E.H. by the University of California Chancellor's Postdoctoral Fellowship and a National Science Foundation Postdoctoral Fellowship.