



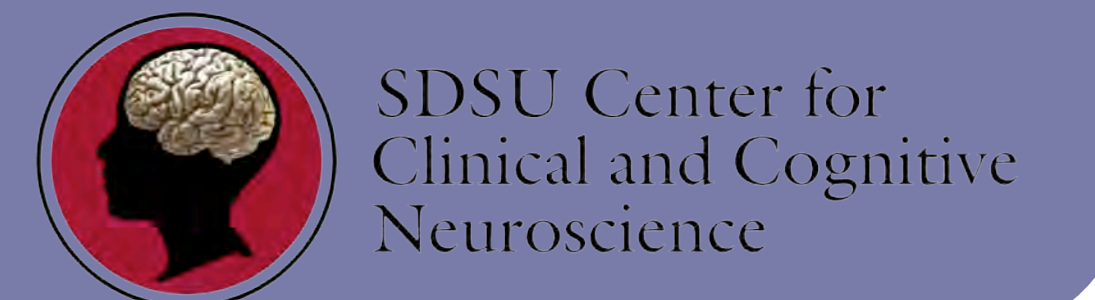
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Co-Thought Gesture in Bimodal Bilinguals

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Introduction

Recent work has shown that hearing ASL-English bilinguals produce more iconic co-speech gestures compared to nonsigners, and they produce ASL signs when speaking to sign naïve interlocutors (Casey & Emmorey, 2009). Here we ask whether knowledge of a sign language influences the production of “co-thought” gestures (Chu & Kita, 2011). We hypothesized that experience with sign language increases the production of co-thought gestures (as well as “co-thought” signs), which may improve memory for spatial environments compared to nonsigners.

Co-Thought Gesture

Gestures produced outside of a communicative context, produced for the speaker’s benefit, e.g., they are produced while thinking, rather than conversing, as a natural strategy for cognitively demanding tasks

Research Questions

1. Does co-thought gesture production boost spatial memory?
2. Does sign language experience increase co-thought gesture production?
3. How do signers’ and nonsigners’ gestures differ?
4. Do bimodal bilinguals produce co-thought signs?

Methods (Jamalian et al., 2012)

Participants are videotaped alone in a room, vocal responses
Asked to memorize six spatial descriptions (encoding)
10 true/false statements per description (retrieval)

Participants

22 Nonsignaling English speakers, 15 females, Age $M = 26.4$ $SD = 5.5$
21 Proficient ASL/Eng. hearing Bilinguals, 15 females, Age $M = 32.1$ $SD = 8.8$

Coding

How many gestures were produced?

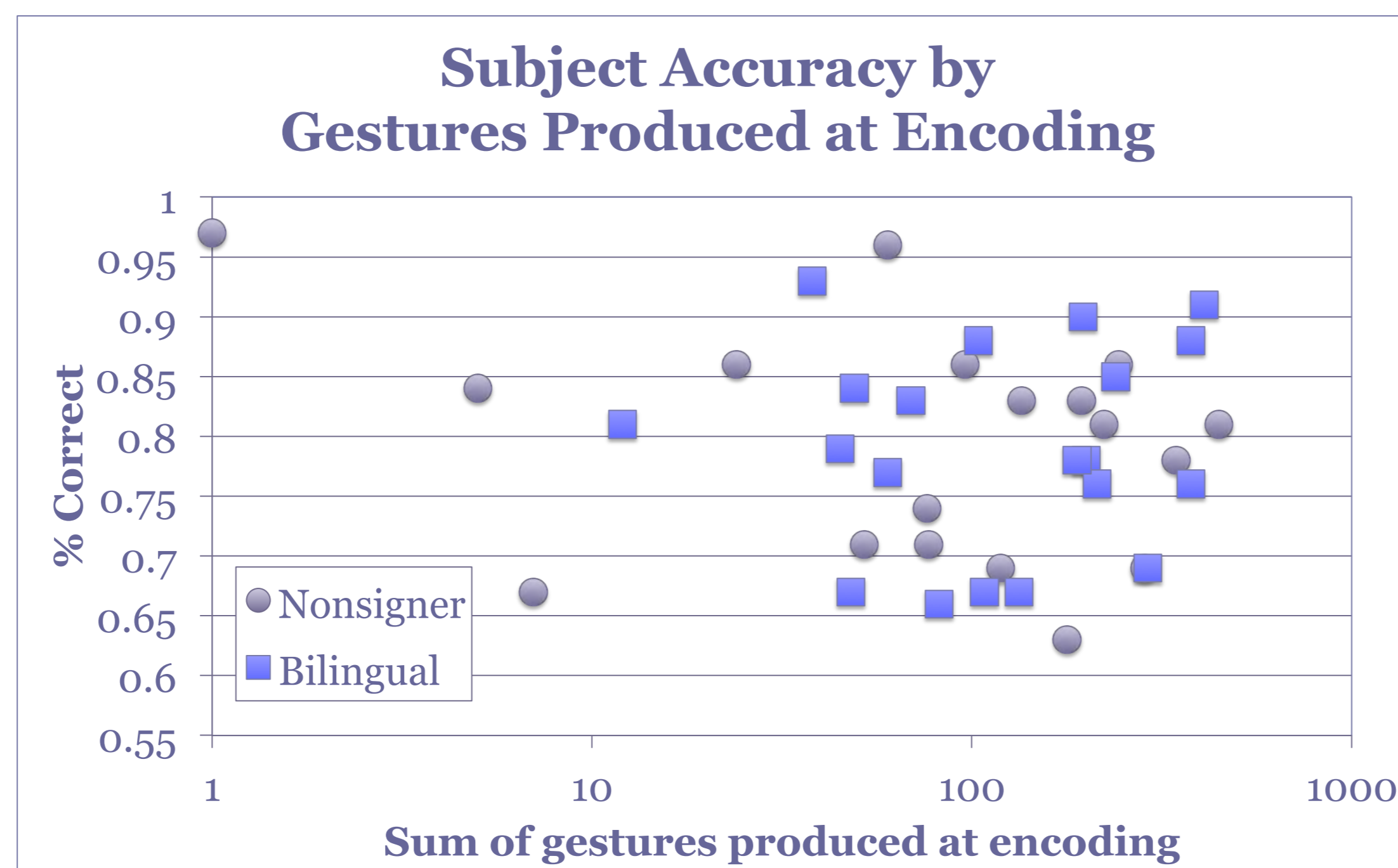
- Landmark – Stable point in space
- Path – Trajectory
- Two Handed
- Signs



Results: Gesture

1) No correlation between gesture production and spatial memory performance for either group.

Nonsigners: $r(21) = -0.23$, $p = 0.32$
Signers: $r(22) = 0.1$, $p = 0.652$

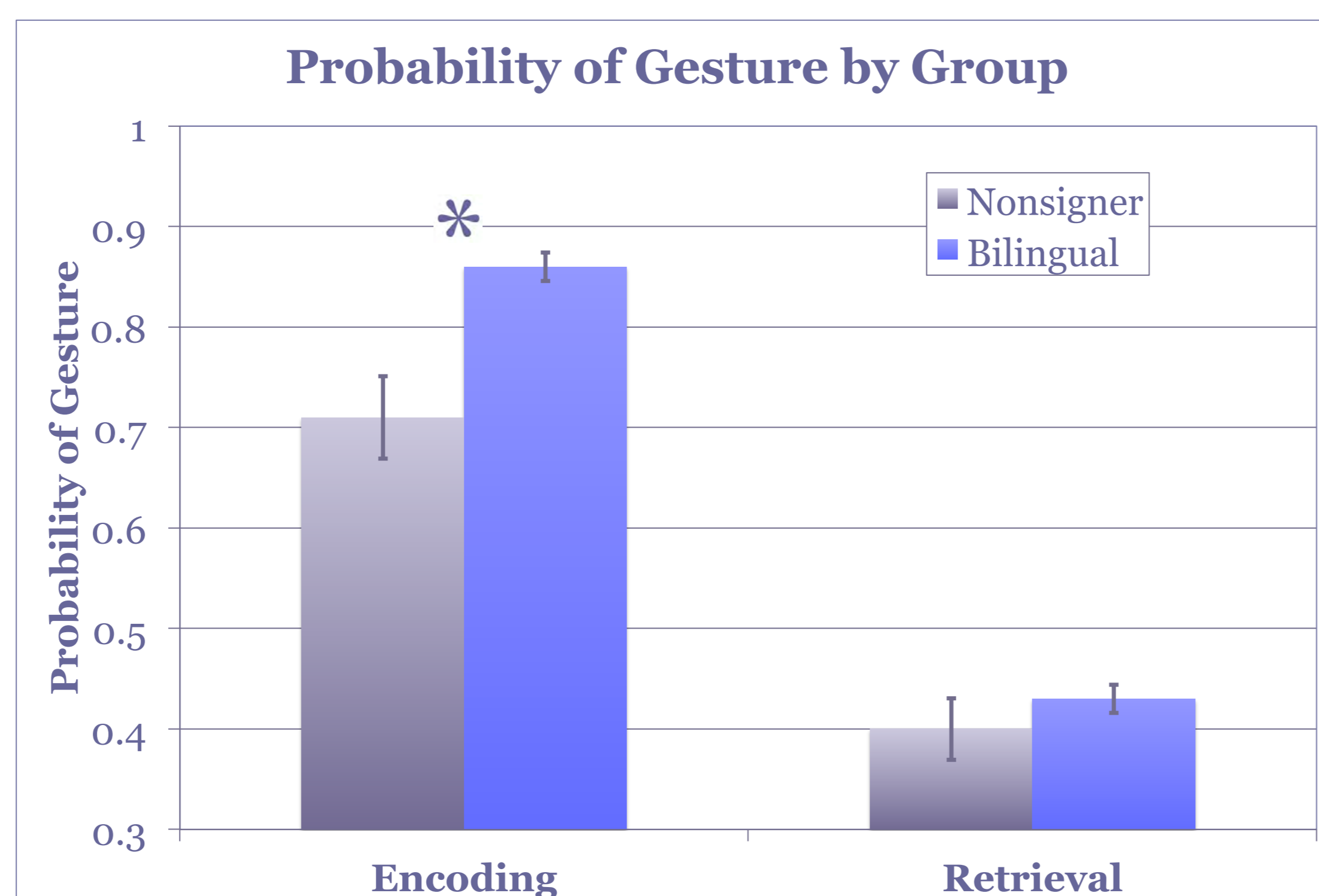


2) Bilinguals were more likely to gesture at encoding compared to nonsigners

$F(1,251) = 8.79$ $p = 0.003$

2) Bilinguals were marginally more likely to gesture at retrieval compared to nonsigners

$F(1,2447) = 2.77$ $p = 0.096$



3) Groups show equivalent landmark and path gestures.

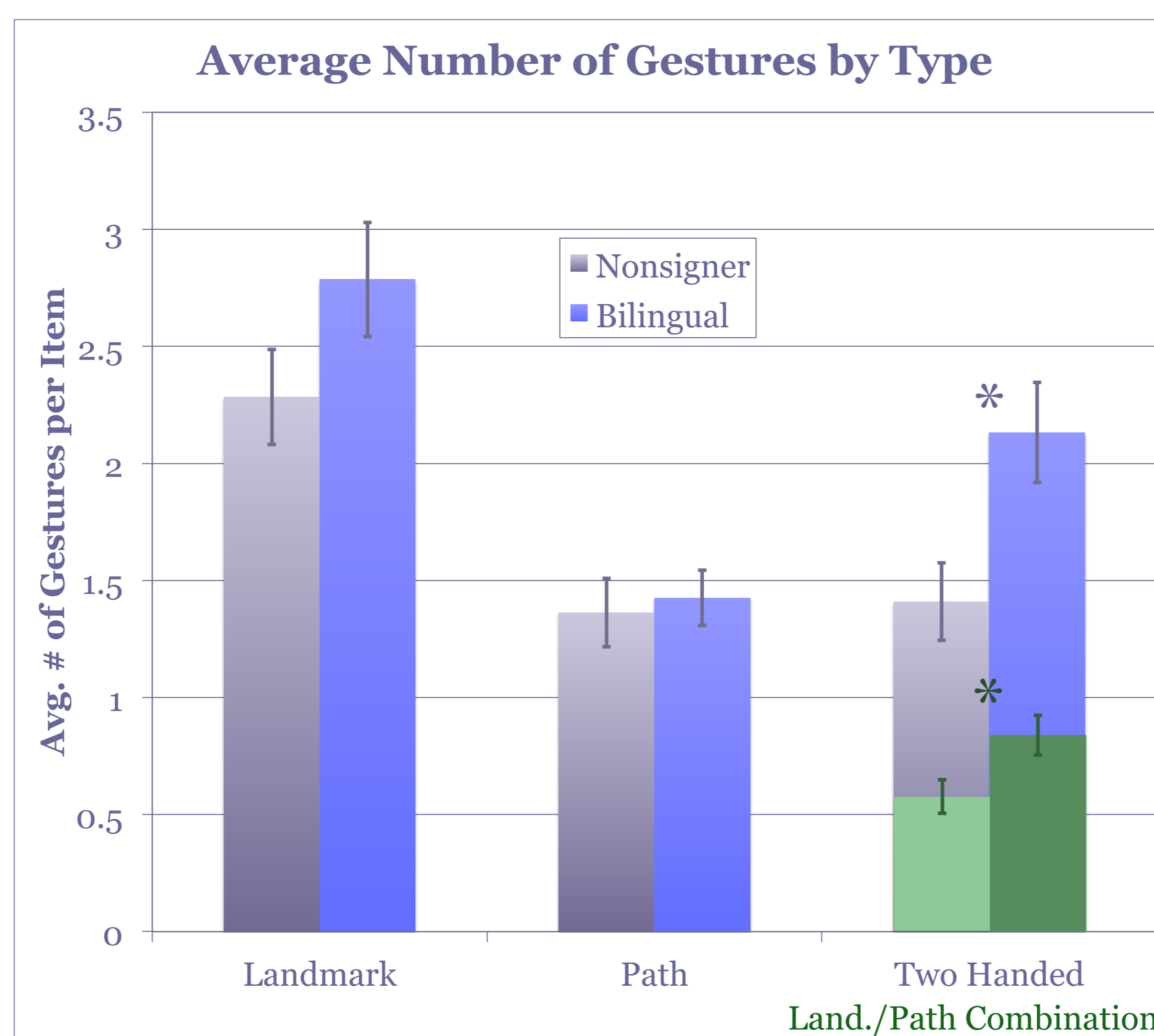
3) Bilinguals produced more two-handed gestures than nonsigners, including two-handed landmark and path combinations.

Two-handed:

$F(1,2698) = 7.037$ $p = 0.008$

Landmark/Path Combinations:

$F(1,2701) = 5.476$ $p = 0.019$

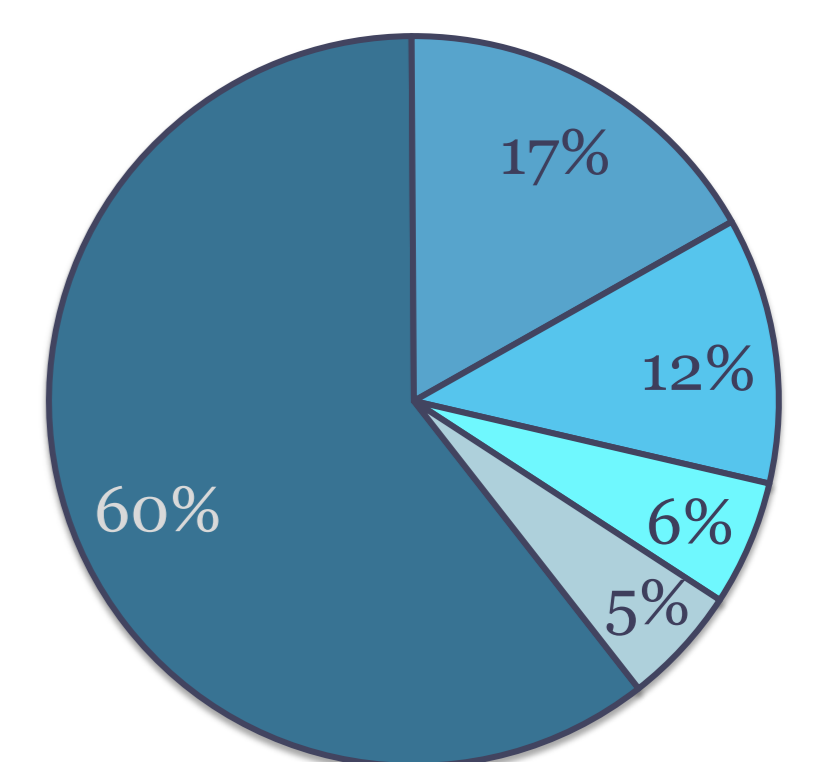


Results: Sign

4) Many bilinguals (41%) produced at least one ASL sign (range = 1 to 409 signs). The signs were primarily lexical or fingerspelled nouns that labeled landmarks. Sign production did not increase spatial memory accuracy.

Co-Thought Signs by Type

- Label
- Spatial
- Cardinal
- Verb
- Other

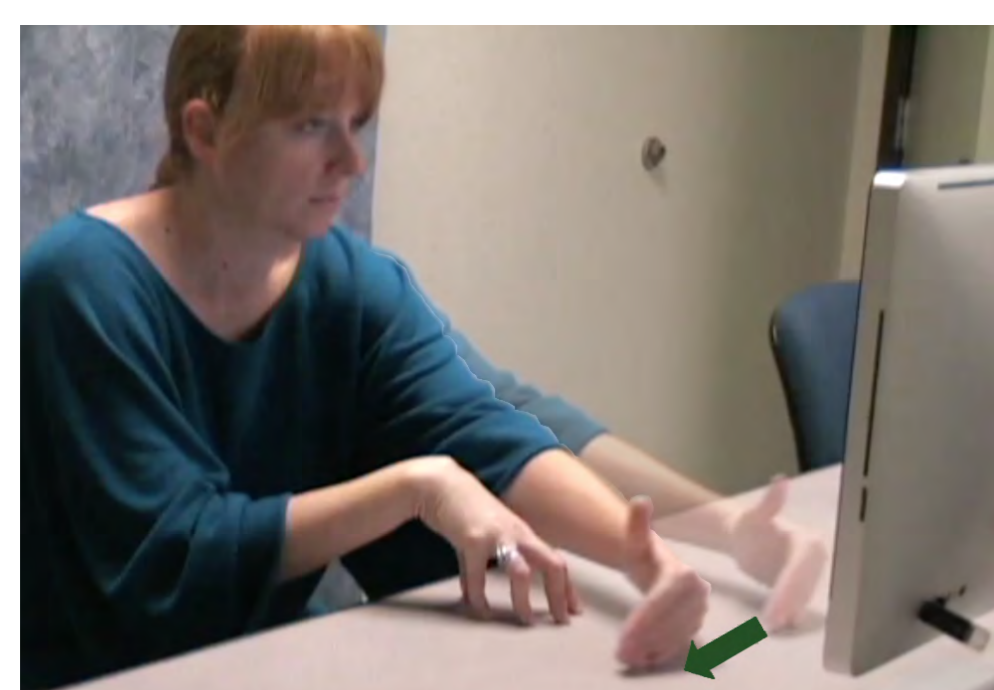


Discussion

- 1) Counter to Jamalian et al. (2012), **gesture production did not improve spatial memory** for either group.
 - May be due to differences in age or spatial ability
- 2) **Bimodal bilinguals were more likely to gesture** at encoding (while reading the spatial descriptions) compared to non-signers.
 - This suggests sign language experience promotes gestures production.
- 3) **Bimodal bilinguals produced more two-handed gestures** than non-signers, including more two-handed landmark and path combinations.
 - This difference may be related to the use of two-handed classifier constructions in ASL.
- 4) **Co-thought sign:**
 - Indicates that, for bilinguals, sign language is always active.
 - Further, this study is the first to demonstrate that bimodal bilinguals produce co-thought signs, as well as co-thought gestures.

Future directions:

- Compare gesture permitted and prohibited groups, in line with previous work by Chu & Kita (2011)
- Examine the role of bimodal bilingual gestures in other cognitive tasks, such as mental rotation.



References

- Casey, S., & Emmorey, K. (2009). Co-speech gesture in bimodal bilinguals. *Language and Cognitive Processes*, 24(2), 290–312.
 Chu, M., & Kita, S. (2011). The nature of gestures’ beneficial role in spatial problem solving. *Journal of Experimental Psychology: General*, 140(1), 102.
 Jamalian, A., Giardino, V., & Tversky, B. (2013). Gestures for Thinking. In *Proc. Of the Cognitive Science Society Meetings*.
 Kosslyn, S. M., Margolis, J. A., Barrett, A. M., Goldknopf, E. J., & Daly, P. F. (1990). Age differences in imagery abilities. *Child development*, 61(4), 995-1010.

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