Bilingual Advantage?

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COGS 4780

Bilingual Advantage

- A relatively new and popular claim that being bilingual provides an overarching cognitive advantage
  - Specifically via the mechanism of **cognitive control**

- Learning two languages often results in bilinguals having language systems that can mix and interact and interfere
  - In order to effectively use just one language system, it requires executive function to suppress the other == cognitive control

- Cognitive control is relevant in many processes, so the claim goes like this:
  - Bilingualism → better cognitive control for language → better cognitive control in general

Bilingual Advantage

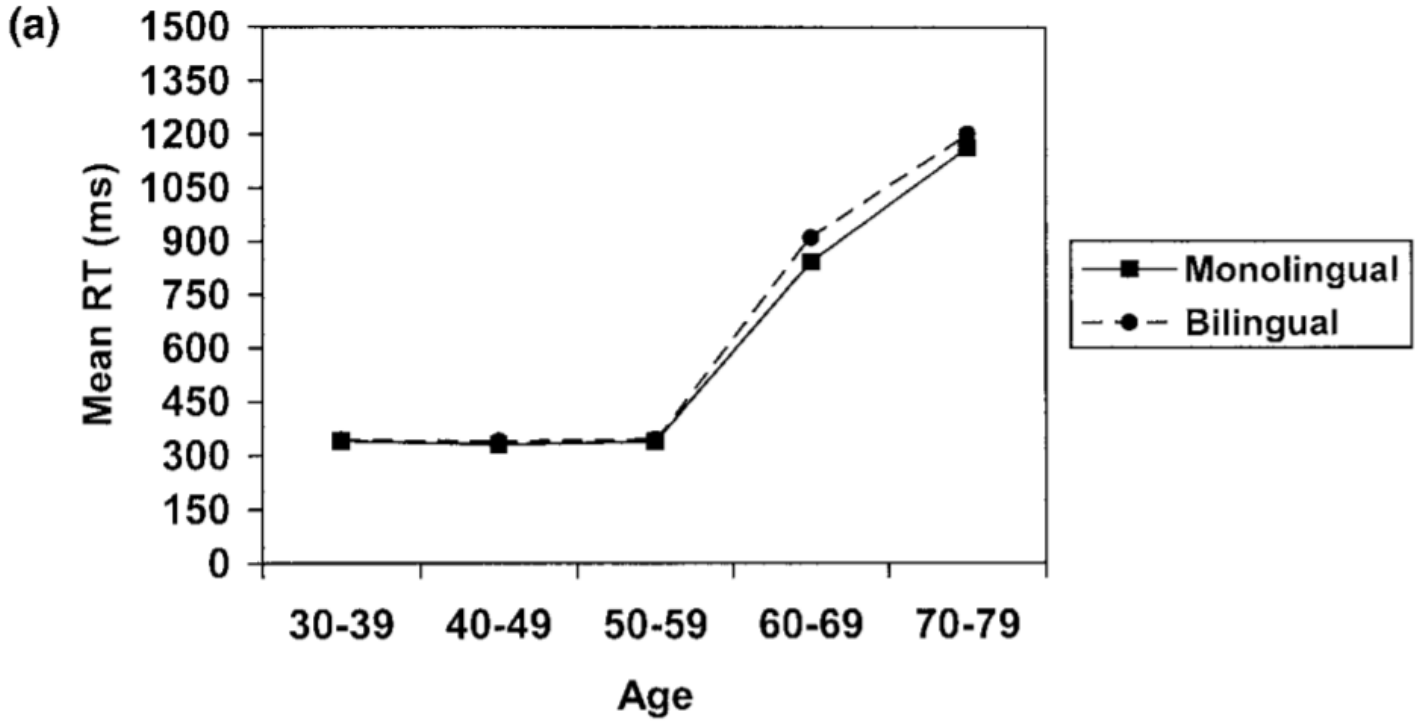
- 7 month olds tested in an “A not B task” (Kovacs & Mehler 2009)
  - Shown an object hidden in one location, then watch it moved to another location
  - In order to detect the object in its new location, need to suppress knowledge of the first location (cognitive control)
- Monolingual children don’t reliably succeed until ~18 months
- 7 month olds who had been exposed to 2 languages were significantly better than 7 month olds who had only been exposed to 1 language

Bilingual Advantage

- “7-month-old infants, raised with 2 languages from birth, display improved cognitive control abilities compared with matched monolinguals… Bilingual infants rapidly suppressed their looks to the first location and learned the new response. These findings show that processing representations from 2 languages leads to a domain-general enhancement of the cognitive control system well before the onset of speech.”

Bilingual Advantage

- Most of the research highlights and attention have been focused on the other end of the lifespan
- Bialystok et al. (2004) tested participants using the Simon Task



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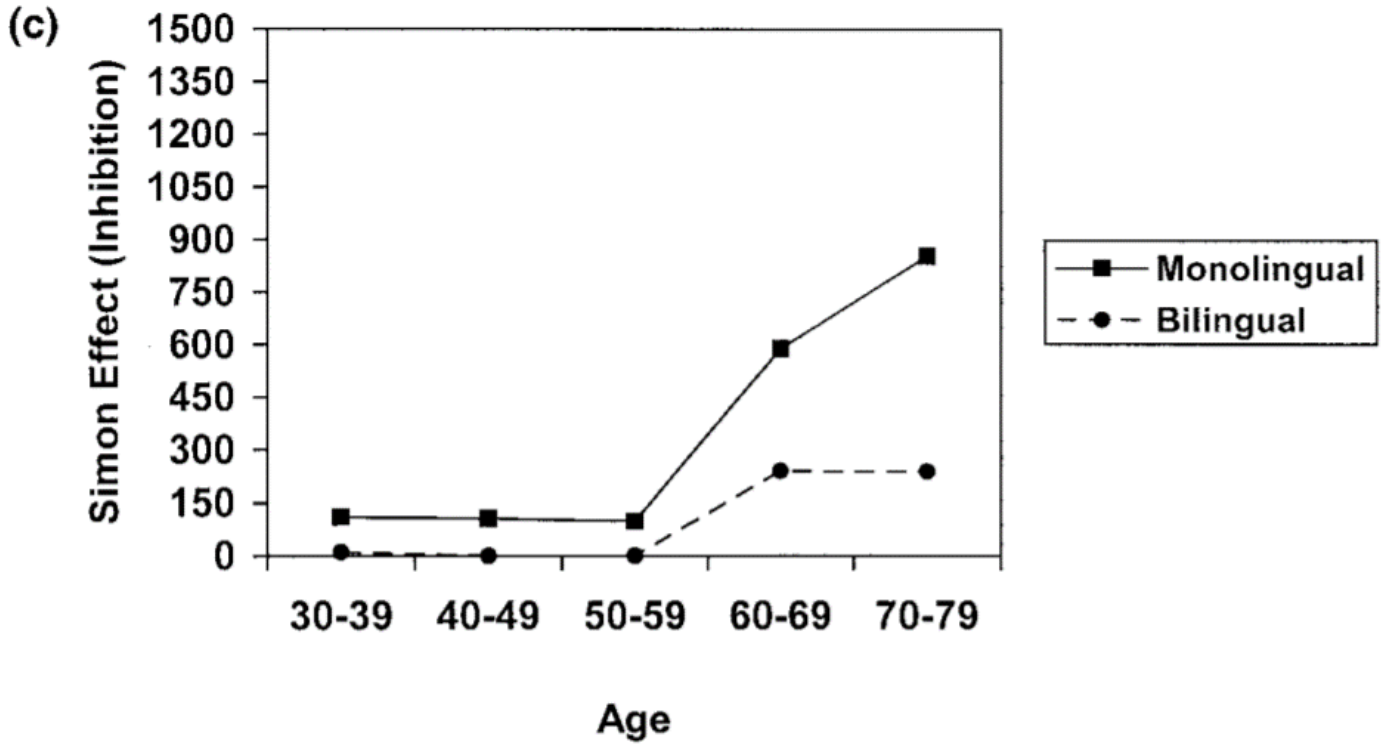


Bilingual Advantage

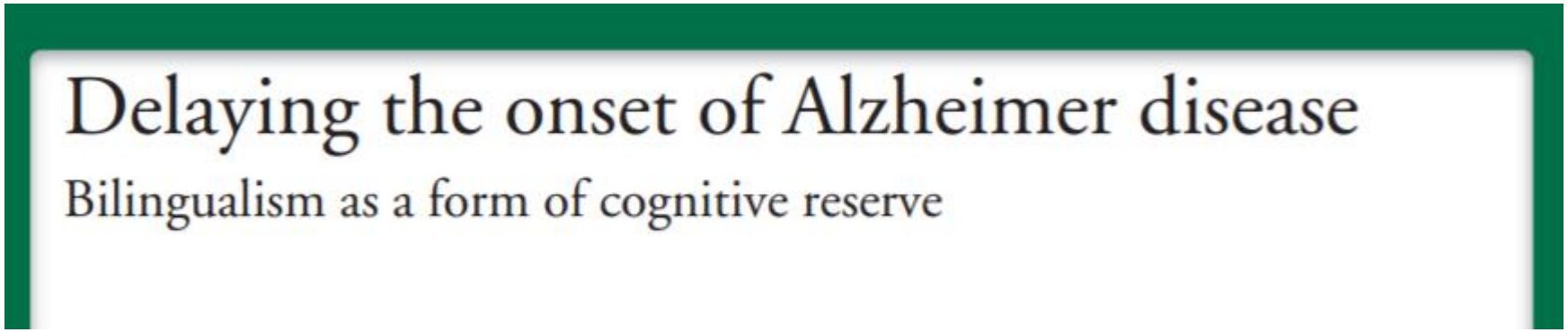
- Most of the research highlights and attention have been focused on the other end of the lifespan
- Bialystok et al. (2004) tested participants using the Simon Task
- No difference in control condition, significant difference in interference condition that grows with age

Bilingual Advantage

- “Three studies are reported that compared the performance of monolingual and bilingual middle-aged and older adults on the Simon task. Bilingualism was associated with smaller Simon effect costs for both age groups; bilingual participants also responded more rapidly to conditions that placed greater demands on working memory. In all cases the bilingual advantage was greater for older participants. It appears, therefore, that controlled processing is carried out more effectively by bilinguals and that bilingualism helps to offset age-related losses in certain executive processes.”

Bilingual Advantage

- Bialystok has argued for a bilingual advantage for cognitive control in aging
- Loss of cognitive control is one of the most severe symptoms of Alzheimer's
- → bilingualism can be an effective defense against Alzheimer's (Bialystok et al. 2007)



Bilingual Advantage

Cognitive Advantage in Bilingualism: An Example of Publication Bias?

Angela de Bruin[1], Barbara Treccani[2], and Sergio Della Sala[1,3]

[1]Human Cognitive Neuroscience, Psychology, University of Edinburgh; [2]Department of History, Human Sciences and Education, University of Sassari; and [3]Centre for Cognitive Ageing and Cognitive Epidemiology, Psychology, University of Edinburgh

Bilingual Advantage

- “The idea of a bilingual advantage may result from a publication bias favoring studies with positive results over studies with null or negative effects. To test this hypothesis, we looked at conference abstracts from 1999 to 2012 on the topic of bilingualism and executive control. We then determined which of the studies they reported were subsequently published. Studies with results fully supporting the bilingual-advantage theory were most likely to be published, followed by studies with mixed results. Studies challenging the bilingual advantage were published the least. This discrepancy was not due to differences in sample size, tests used, or statistical power.”

Bilingual Advantage

- Lehtonen et al. (2018) – **meta-analysis**

Bilingual Advantage

- Lehtonen et al. (2018) – **meta-analysis**
- Analyzed 152 studies with relevant data on cognitive control in bilingual vs. monolingual populations

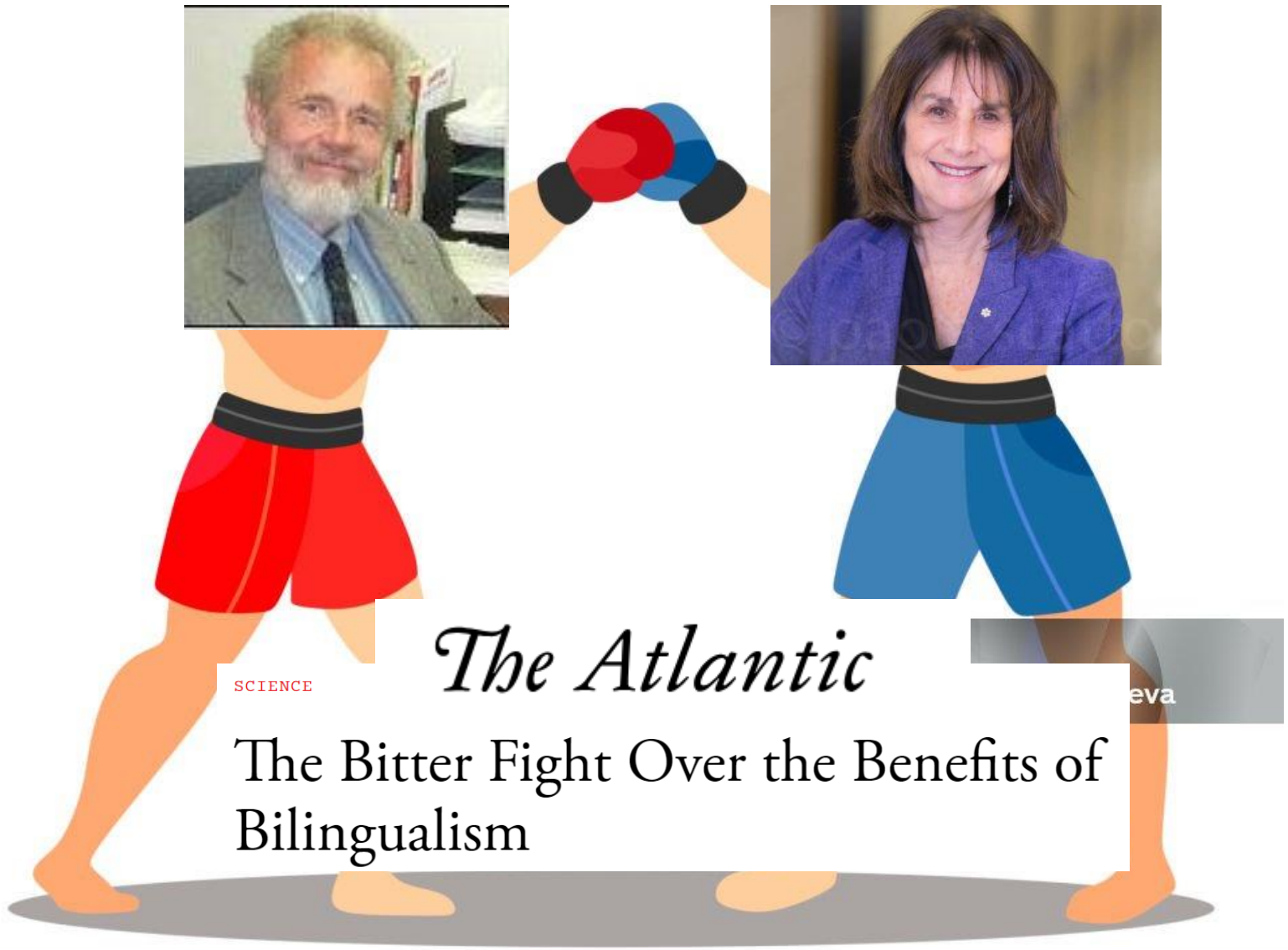
Bilingual Advantage

- “Here we synthesized comparisons of bilinguals’ and monolinguals’ performance in six executive domains using 891 effect sizes from 152 studies on adults. Before correcting estimates for observed publication bias, our 9 analyses revealed a very small bilingual advantage for inhibition, shifting, and working memory, but not for monitoring or attention. No evidence for a bilingual advantage remained after correcting for bias… Moreover, moderator analyses did not support theoretical presuppositions concerning the bilingual advantage. We conclude that the available evidence does not provide systematic support for the widely held notion that bilingualism is associated with benefits in cognitive control functions in adults.”

Bilingual Advantage

There is no coherent evidence for a bilingual advantage in executive processing

Kenneth R. Paap *, Zachary I. Greenberg



SCIENCE

The Atlantic

The Bitter Fight Over the Benefits of Bilingualism

Bilingual Advantage

- In many cultural contexts, bilingualism may correlate with other social factors (e.g., access to education, travel)
  - In some countries, immigration policies are strict and immigrants need proof of eduction, high-level work skills, financial assets, etc.
    - Sometimes the opposite in other countries
- In a Simon Task experiment that matched the bilingual and monolingual groups in socioeconomic status observed no difference between the two groups (Morton & Harper 2007)

Complicated picture

- Executive function itself is multi-faceted
  - Which means it's very difficult to directly tap into *cognitive control* itself
- Bilingualism is also multi-faceted
  - A massive and varied range of experiences
- Both correlated with other factors as well

- Maybe none of the theories have been defined clearly enough for us to actually be able to assess them (de Bruin et al., 2021)