

**The bilingual advantage debate: Moving toward different methods for verifying  
its existence**

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Paap, Johnson, and Sawi (2015) argue that bilingual cognitive advantages either do not exist, or are restricted to specific aspects of bilingualism, enhancing only specific components of executive functioning (EF). They also discuss publication bias and suggest that failure to match on demographic factors and to employ appropriate tests and baselines have resulted in a misrepresented view on the bilingual advantage. Here, would like to comment on some of their objections.

### **A representative overview of the bilingual advantage**

First of all, we want to point out that the overview of studies by Paap et al. (2015) is sometimes a bit selective, and hence, not entirely representative of the domain. For instance, they make a strong point that the bilingual advantage may originate from confounding variables between groups, but fail to acknowledge studies that do take into account the discussed confounding factors such as immigration status, both in EF (e.g. Costa, Hernández, & Sebastián-Galles, 2008) and dementia (e.g. Alladi et al., 2013; Woumans et al., 2015) research. There are even studies paying specific attention to demographic factors, such as cultural differences (e.g. Bialystok & Viswanathan, 2009; Yang, Yang, & Lust, 2011) and socioeconomic status (e.g. Ladas, Carroll, & Vivas, 2015). Importantly, all these reports documented a bilingual advantage of some sort.

So, the literature may indeed show biases, but both in favour of and against the bilingual advantage. In science, the most valid and representative synthesis of an effect is a solid meta-analysis. And, the recent meta-analysis by de Bruin, Treccani, and Della Sala (2015) showed that there is indeed publication bias of positive findings (like in any domain), but also that there is a significant bilingual advantage effect across studies. In our view, the current yes/no discussion between believers and non-believers does not do justice to this meta-analysis result.

## **Procuring evidence from longitudinal designs**

Because group comparisons may never exclude the possibility of confounds with absolute certainty, we also believe that it is time to move away from the traditional cross-sectional approach and, instead, turn to longitudinal designs where bilingualism becomes a variable over time.

A recent, rare longitudinal study by Bak, Nissan, Allerhand, and Deary (2014) showed that bilinguals performed significantly better than predicted from their baseline intelligence scores, with strongest effects on general intelligence and reading. Hereby, this study suggests a positive effect of bilingualism on later-life cognition and it also tackles the reverse causality issue. Remarkably, we (Woumans, Surmont, Struys, & Duyck, submitted to *Language Learning*) also obtained similar effects of bilingualism on cognitive development in a longitudinal study with children. We recruited native French speaking kindergarten children, half of which were to become bilingual through a second language (L2) immersion primary school programme. At baseline, the two groups were both monolinguals and performed equally on tests of first language (L1) semantic verbal fluency, cognitive control (measured through a version of the Simon task), and fluid intelligence (measured by Ravens Coloured Progressive Matrices). Mean intelligence scores were around the 50<sup>th</sup> percentile. One school year later, both groups were tested again with the same test battery. Although no group effects became apparent for cognitive control or L1 verbal fluency, there was a difference between groups for intelligence scores. Specifically, the group that had become bilingual showed a significant increase of 17 percentile points, whereas the group that remained monolingual did not display this advantage.

These two crucial studies provide compelling evidence that bilingual advantages prevail, even when the bilinguals act as their own monolingual baseline

and when standardised tests (such as intelligence tests), rather than RT derivatives from cognitive control paradigms that are not designed to measure individual differences, are employed. As a result, they refute Paap et al.'s claim (2015) that bilingual advantages are obtained only when not appropriately controlling for demographic variables, or when using inadequate measures of cognitive functioning.

### **Investigating moderating factors**

Paap et al. (2015) list a number of studies that failed to find any cognitive consequence of bilingualism. Nevertheless, they acknowledge that perhaps specific aspects of bilingualism may still positively affect cognitive performance. We agree that the current yes/no debate between believers and non-believers is not very fruitful; the discussion should not be about whether the bilingual advantage exists or not, but about what factors moderate its manifestation.

One of the facets that has already been explored is language switching. Two studies that are not acknowledged by Paap et al. (2015) showed that both frequency (Verreyt, Woumans, Vandelanotte, Szmalec, & Duyck, in press) and proficiency (Woumans, Ceuleers, Van der Linden, Szmalec, & Duyck, in press) of switching induce cognitive benefits. The latter study also demonstrated a correlation between language switching proficiency and cognitive conflict resolution in one specific group of bilinguals (i.e. balanced bilinguals), but not in others (i.e. unbalanced bilinguals and interpreters), hereby substantiating that it is language switching practice – which occurs most often in balanced bilinguals – that leads to better cognitive control.

So, to conclude, the literature has shown that there are reliable and valid demonstrations of a bilingual cognitive advantage (de Bruin et al., 2015). Therefore, we believe that our field would benefit from moving away from the current yes/no

debate. Instead, we should investigate what factors moderate the manifestation of a bilingual advantage, preferably using longitudinal designs and thoroughly normed measures of individual cognitive differences.

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