

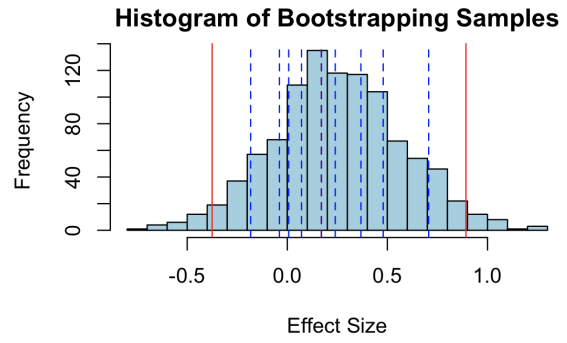
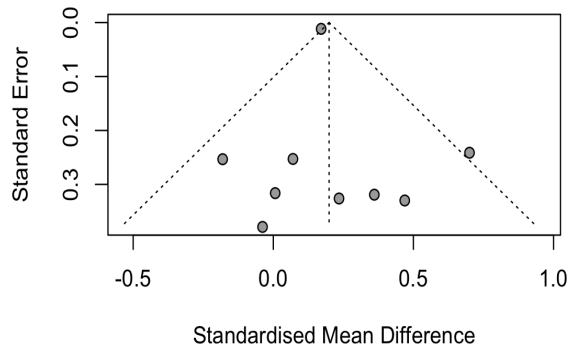
## Even Simultaneous Bilinguals Do Not Quite Reach Monolingual Levels of Proficiency in Syntax

This study focused on the debate whether bilingualism is “Two Monolinguals in One Brain” hypothesis. A strong version of the “Two Monolinguals” hypothesis predicts that bilinguals can achieve monolingual-level proficiency in either/both of their languages. Recently, Bylund et al (2020) presented evidence that monolinguals and simultaneous bilinguals were indistinguishable in **syntactic proficiency**, arguing prior significant results were because simultaneous bilinguals are not tested in their primary language.

We first conducted a **meta-analysis**. We identified 9 experiments that compared broad syntactic proficiency of monolinguals to that of simultaneous bilinguals. A funnel plot indicated that differences in results across studies were consistent with statistical noise (Fig. 1, left). We confirmed this finding through a **Monte Carlo simulation**. We also re-analyzed a large dataset (N = 115,020, Hartshorne et al., 2018) to explicitly compare English syntactic proficiency of monolingual English speakers (N=107,125) to that of simultaneous bilingual adults whose primary language was (N=7,383) or was not (N=512) English. Monolinguals significantly outperformed both groups of bilinguals (respectively:  $t(515.6) = 9.0446^{***}$ ;  $t(8,401.50) = 12.60^{***}$ ).

Contrary to Bylund et al. (2020), the analyses provide converging evidence that simultaneous bilinguals do not reach the same level of proficiency as monolinguals, even in their primary language. The null results in some prior studies were likely due to low statistical power. However, while the strong Two Monolinguals hypothesis is disconfirmed, it is remarkable that simultaneous bilinguals are *nearly* two monolinguals in the same brain.

(246 words)



**Figure 1.** **Left:** Funnel Plot of Meta-analysis. Note that the point at the top of the funnel is from HTP data. **Right:** Bootstrapping analysis, simulating re-running Giguere et al. (2020). The red lines indicate the 95% confidence interval, and the blue dashed lines indicate individual studies in meta-analysis.