

LANGUAGE, BILINGUALISM, AND EXECUTIVE FUNCTIONING IN EARLY DEVELOPMENT¹

J. BRUCE MORTON

*Department of Psychology
University of Western Ontario*

Summary.—Okanda, *et al.* (2010) reported new evidence concerning associations between language ability, bilingualism, and executive functioning early in development. The paper adds to a growing body of literature suggesting that bilingualism is associated with advantages in executive functioning generally, and the Dimensional Change Card Sort task in particular. However, as with all findings that hinge on between-group comparisons, there is a need to exercise caution before drawing firm conclusions about the effects of bilingualism on the development of executive control. Several lines of recent evidence are outlined that challenge key assumptions underlying the standard account of the bilingual advantage. Okanda, *et al.*'s findings are discussed in light of this evidence.

In their paper, "Language and cognitive shifting: evidence from young monolingual and bilingual children," Okanda, Moriguchi, and Itakura (2010) present interesting new evidence concerning the relationship between bilingualism, language, and executive control in early development. They report two key findings: first, that bilingual children and chronologically age-matched monolingual controls outperformed chronologically and verbally age-matched monolingual controls in an executive functioning task (Dimensional Change Card Sort, or DCCS; Zelazo, 2006); and second, that differences in verbal ability *across all participants* positively predicted DCCS performance. The latter finding is quite compelling, and the fact that the effect was statistically significant for the bilinguals but only marginally for the two monolingual groups is likely owing to the fact that each individual group analysis was based on a small subset of observations. The general trend was the same for all groups, and the association *for all participants* was very strong. The finding therefore seems quite secure.

The evidence concerning a possible bilingual advantage in cognitive control, however, should be interpreted with caution. While consistent with a substantial body of literature (Bialystok, 1999; Bialystok & Martin, 2004; Bialystok & Craik, 2010), this specific finding and others all hinge on between-group comparisons that are often rife with potential confounds (for discussion, see Morton & Harper, 2009). One obvious possibility in the

¹Address correspondence to J. Bruce Morton, Associate Professor, Department of Psychology, Graduate Programme in Neuroscience, University of Western Ontario, London, Ontario, Canada.

Okanda, *et al.* (2010) study is that their measure of verbal ability underestimated the true verbal (i.e., intellectual) abilities of the bilingual children, given that language proficiency in bilinguals typically lags behind that of their monolingual age-mates (Bialystok & Craik, 2010; Bialystok, Luk, Peets, & Yang, 2010). If so, then the appropriate monolingual comparison group would be the chronologically age-matched monolingual group (C monolinguals), rather than the chronologically and verbally age-matched monolinguals (the VC monolinguals). In this comparison, the bilingual advantage disappears.

Concerns about the veracity of these specific findings aside, larger questions about the origin of the bilingual advantage deserve consideration, especially given that an increasing number of research groups appear to find it. The standard interpretation is that experience producing utterances in one language provides the bilingual child with practice in inhibitory control, as these children need to constantly suppress words and phrases from their second language. These practice effects accrue in time and ultimately transfer to a variety of different executive tasks. This account is wanting in several key respects. First and foremost, it remains unclear whether executive functions are amenable to training. For example, a recent study involving over 11,000 participants found that while practicing executive functioning tasks led to small improvements on those same tasks, there were no transfer effects to related but different tasks (Owen, Hampshire, Grahn, Stenton, Dajani, Burns, *et al.*, 2010). Second, there is currently no evidence that the bilingual advantage in executive control increases as children grow older and accrue practice in suppressing words from their second language. In fact, the bilingual advantage is evident by 7 months of age, well before children have learned any words or phrases (Kovacs & Mehler, 2009). Finally, and perhaps most importantly, bilingual and monolingual children can differ in many ways beyond language status, including cultural background, socioeconomic status, and immigrant status (for discussion, see Morton & Harper, 2007). These “other factors” are not mere nuisance variables, but are themselves associated with individual differences in children’s executive function. Not surprisingly then, controlling for the influence of these other factors can significantly attenuate or even eliminate the bilingual advantage (Morton & Harper, 2007; Carlson & Choi, 2009). Future studies of the bilingual advantage, therefore, need to move beyond the mere documentation of its existence and begin to ask more pressing questions concerning its origin.

Thus, the clearest and most important finding reported in Okanda, *et al.*’s paper (2010) is the association between verbal ability and executive control.

REFERENCES

- BIALYSTOK, E. (1999) Cognitive complexity and attentional control in the bilingual mind. *Child Development*, 70, 636-644.
- BIALYSTOK, E., & CRAIK, F. I. M. (2010) Cognitive and language processing in the bilingual mind. *Current Directions in Psychological Science*, 19, 19-23.
- BIALYSTOK, E., LUK, G., PEETS, K. F., & YANG, S. (2010) Receptive language differences in monolingual and bilingual children. *Bilingualism: Language and Cognition*, 13, 525-531.
- BIALYSTOK, E., & MARTIN, M. (2004) Attention and inhibition in bilingual children: evidence from the dimensional change card sort task. *Developmental Science*, 7, 325-339.
- CARLSON, S. M., & CHOI, H. P. (2009) Bilingual and bicultural: executive function in Korean and American children. Talk presented at the 2009 biennial conferences of the Society for Research in Child Development, Denver, CO, April 2-4.
- KOVACS, A. M., & MEHLER, J. (2009) Cognitive gain in 7-month-old bilingual infants. *Proceedings of the National Academy of Sciences*, 106, 6556-6560.
- MORTON, J. B., & HARPER, S. N. (2007) What did Simon say? Revisiting the bilingual advantage. *Developmental Science*, 10, 719-726.
- MORTON, J. B., & HARPER, S. N. (2009) Bilinguals show an advantage in cognitive control: the question is why. *Developmental Science*, 12, 502-503.
- OKANDA, M., MORIGUCHI, Y., & ITAKURA, S. (2010) Language and cognitive shifting: evidence from young monolingual and bilingual children. *Psychological Reports*, 107, 68-78.
- OWEN, A. M., HAMPSHIRE, A., GRAHN, J. A., STENTON, R., DAJANI, S., BURNS, A., HOWARD, R. J., & BALLARD, C. G. (2010) Putting brain training to the test. *Nature*, 465, 775-778.
- ZELAZO, P. D. (2006) The dimensional change card sort (DCCS): a method of assessing executive function in children. *Nature Protocols*, 1, 297-302.

Accepted November 14, 2010.

LANGUAGE, BILINGUALISM, AND EXECUTIVE
FUNCTIONING IN EARLY DEVELOPMENT

J. BRUCE MORTON

Department of Psychology
University of Western Ontario