

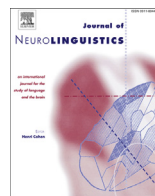


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Conflict resolution in sentence processing is the same for bilinguals and monolinguals: The role of confirmation bias in testing for bilingual advantages

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ABSTRACT

The primary purpose of this study was to test for bilingual advantages in conflict resolution during sentence processing. Experiment 1 examined the time-course of a homograph-interference effect when test words were either presented immediately after the sentence-final word or after a delay. Bilinguals and monolinguals were equally adept at using the extra time to suppress the context-inappropriate meaning when the sentence-final word was a homograph. Experiment 2 tested the hypothesis that bilingual advantages in inhibitory control enable bilinguals to close the performance gap in a *sentence grammaticality* task compared to a *sentence acceptability* task. The critical group by task interactions were not significant across four different behavioral measures. Recent studies offering opposing conclusions were examined for the influence of confirmation bias.

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The research question under investigation is this: Are there bilingual advantages in behavioral measures of conflict resolution that can reasonably be attributed to differences in the inhibitory control component of executive processing (EP)? Elsewhere (Paap & Greenberg, 2013; Paap & Sawi, 2013), we extend the question to the monitoring and switching components of EP, but the empirical and theoretical work reported here focus only on inhibitory control.

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1. Bilingual inhibitory control advantages (BICA) in nonverbal tasks

In a seminal article on bilingual advantages in executive functioning [Bialystok, Craik, Klein, and Viswanathan \(2004\)](#) proposed that bilinguals are better at selecting goal-relevant information and suppressing competing and distracting information. Bilinguals exercise this type of control at two levels: (1) at a high level of goal setting when one language is selected and the other is inhibited and (2) at a lower level where the lexical forms of the goal relevant language are activated and the competing translation equivalents are inhibited (e.g., [Green, 1998](#)). Bialystok et al. further hypothesized that this ubiquitous practice hones a general ability, not specific to language, and consequently that bilinguals should be less vulnerable to interference in nonlinguistic tasks. The standard marker of inhibitory control in these tasks is the difference in mean response time between trials that require conflict resolution compared to those that do not. In the Stroop (both verbal and nonverbal versions), Simon, and Eriksen flanker tasks conflict occurs on a subset of trials because a potent but task-irrelevant stimulus is paired in an incongruent manner with the task-relevant stimulus. The effectiveness of this control can be inferred from differences in response time between congruent trials and incongruent trials with smaller interference effects implying superior ability. In a recent and comprehensive review of bilingual advantages in EP [Hilchey and Klein \(2011\)](#) reviewed 31 experiments and concluded that evidence for a bilingual advantage in inhibitory control is rare in both children and young adults. More emphatically they assert that the collective evidence “...is simply inconsistent with the proposal that bilingualism has a general positive effect on inhibitory control processes” p. 629.

Since Hilchey and Klein’s insightful review there have been several additional tests for bilingual advantages in inhibitory control in these nonverbal tasks and they overwhelmingly report no group differences and on one occasion a monolingual advantage. [Kousaie and Phillips \(2012a\)](#) found no behavioral differences between groups of young adults in the Stroop, Simon, or flanker tasks (i.e., 0 group differences out of three tests). The [Kousaie and Phillips’ \(2012b\)](#) study used both young adults and older adults and found no differences in the magnitude of Stroop interference (i.e. 0 group differences out of two tests). A similar study by [Humphrey and Valian \(2012\)](#) using the Simon and flanker tasks follows the same pattern. Four different groups of multilinguals (lifelong balanced bilinguals, late balanced bilinguals whose native language is English, late balanced bilinguals whose native language is not English, and trilinguals) show Simon and flanker effects statistically equivalent to a group of English monolinguals (i.e., 0 bilingual advantages out of eight tests). [Paap and Greenberg \(2013\)](#) found no bilingual advantage in three Simon experiments and one flanker experiment (i.e., 0 bilingual advantages out of four tests with one monolingual advantage). [Sawi & Paap \(2013\)](#) tested an additional relatively large sample ($n's > 50$) of bilinguals and monolinguals in both the Simon and flanker effects and neither task resulted in a bilingual advantage. In another study using young adult participants [Ryskin and Brown-Schmidt \(2012\)](#) report no bilingual advantages in either the Stroop or flanker task.

Turning to studies using children rather than young adults a study by [Engel de Abreu, Cruz-Santos Tourinho, Martin, and Bialystok \(2012\)](#) does support the hypothesis that acquiring a second language yields smaller interference effects in the flanker task. Engel de Abreu et al. characterize their results as remarkable because, at the time the enhanced inhibitory control was measured, the bilingual children have strikingly low vocabulary scores in Luxembourgish and thus are not at all proficient in their L2. In this context, these differences in the magnitude of the interference effect invite consideration of alternative or additional reasons for the group differences. The matching reported by Engel de Abreu et al. is quite thorough, but no one study can match or hold constant all factors that could contribute to group differences on tasks assumed to measure EF. In this case, in order to hold Portuguese culture constant,¹ the bilinguals were immigrants and the monolinguals were not. Also, two years of preschool are compulsory in Luxembourg, but that is not the case in Portugal. Although the Portuguese monolinguals did attend preschools the quality of those programs was not formally assessed and may have differed. More generally, it is very difficult to assure that children living in Portugal have had the same experiences as those living in Luxembourg.

¹ One could argue that the second-generation Portuguese children living their entire life in Luxembourg are no longer precisely matched in culture to the monolingual children living in Portugal.

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