Bilingualism and children's cognitive

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After the publication of the Peal and Lambert study in 1962, further research was conducted implying the same results, or a positive effect on children's cognition caused by bilingualism. Most studies have provided empirical evidence on the cognitive advantage among bilingual children compared with their monolingual counterparts, particularly in high control tasks requiring increased cognitive flexibility (Bialystok, 1999). Deán (2003) defines flexible cognition as: the dynamic construction and modification of representations and responses based on information (i.e., similarities, cues, relations) selected from the linguistic and nonlinguistic environment. That is, when there is a range of plausible ways to understand and respond to a problem, flexible thinkers select patterns that limit this range. The selected information must change over time as a function of shifting task demands. That is, as new problems and circumstances are imposed by the environment, the cognitive focus should shift to new, pertinent information. (p. 275 — 276)

This flexibility can be tested with changing task demands which are unpredictable or novel to the participant. A study undertaken by Ellen Bialystok (1999) on cognitive complexities and attentional control among bilingual children supported the claim of bilingual cognitive advantages. Engle et al. define attentional control (2004) as a cognitive act applied effortfully and voluntarily in order to obstruct any information that is irrelevant or distracting, and suppress any response tendencies which are irrelevant to the task. The research by Bialystok (1999) consisted of 60 children who were equally divided into two age groups ranging from 3,2 to 6,3 years of age and represented two linguistic groups. Half of the children were bilingual speakers of Chinese and English where their mastery in English differed but their Chinese was fluent. The other half consisted of monolingual speakers of English. All the children had similar socioeconomic backgrounds and attended the same school. The children were given tasks in two separate sessions; PPVT-R and Visually-Cued Recall Task in the first session and the Moving Word Task and the Dimensional Change Card Sort Task in the second. The results correlated with Bialystok's previously mentioned ideas as the children "were shown to have equivalent levels of receptive vocabulary (PPVT-R) and comparable capacity for working memory (Visually Cued Recall). Both these measures indicate a general equivalence of intelligence" (p. 641). However, when solving tasks in which the solution was made more complex with distracting information, the bilinguals showed better skills than the monolinguals. The study gives empirical support to the claim that bilingual children are more able to solve problems which are based on attention and opposing information (Bialystok, 1999). Consequently, this may indicate that bilingual children possess an increased advantage in problem solving requiring a high level of control, or selective attention.

Another study, one by Kovacs and Mehler (2009) on cognitive gains in 7-monthold bilingual infants, indicates enhanced executive control among bilinguals. According to the researchers, bilingual speakers are compelled to exercise their cognitive abilities in order to manage two languages in an effective manner. Furthermore, the same researchers refer to cognitive control or executive functions (EF) as "mechanisms involved in conflict monitoring, planning, attentional control, and the suppression (inhibition) of habitual responses" (p. 6556). In their study, Kovacs and Mehler discovered that despite both groups performing equally on a task testing learned responses, the bilinguals showed an increased capability on suppressing

this previously learned response and update the anticipated action according to the changing demands of the task. This could indicate that even before language production begins bilinguals show better executive control than monolinguals. In addition, it appears that having to process more than one language from birth could be sufficient to improve executive control which can be considered a cognitive gain resulting from bilingualism. These conclusions support the findings of Bialystok presented above.

Another research, by Bialystok and Martin-Rhee (2008), revealed an increased ability in control of attention among bilingual children. Testing inhibitory control on French-English bilingual children showed that despite scoring lower on tests on receptive vocabulary, the bilinguals held a significantly greater advantage in complex tasks demanding control of attention than monolinguals. In this part of the study, the children were given three tasks which differed in the amount of delay between the exposure to stimulus and the chance to respond. That is, the children were tested on the ability to respond to certain stimuli and the withholding of responses, or their attentional control. In contrast, when the same children were tested on inhibition of response which demands the execution of motor responses and less attentional control, the results were equivalent with the monolingual children. The authors explain the outcome by distinguishing "between bivalent displays which are comprised of two potentially conflicting dimensions, and univalent displays in which only a single feature is presented" (p. 85). Where the tasks in question were distracting and required a higher control over attention, or based on bivalent displays, the bilinguals outperformed the monolinguals whereas the univalent displays were equally resolved by both language groups. Bialystok and Martin-Rhee explain their findings explaining that bilingual children are constantly required to control their attention between two opposing and active language systems in order for communication to take place in the demanded language. Additionally, Martin-Rhee and Bialystok (2008) maintain that some developmental psychopathologies, such as attention deficit disorder and autistic spectrum disorder, have been linked to ineffectual inhibitory control. Based on these assertions, bilingualism can be regarded as an important factor in children's developmental processes. As Martin-Rhee and Bialystok claim, bilingualism can enhance inhibitory control which in turn influences certain disorders in a positive manner. Therefore it follows that bilingualism could possibly serve as a factor in limiting the progression of these disorders but it must be stressed here that further research on this subject is necessary for validity. Nevertheless, bilingualism could be an important addition to the data needed in order to understand children's developmental processes. Other studies have demonstrated results giving further evidence to these assertions, such as a comprehensive research by Carlson and Meltzoff (2008) on executive functioning. The researchers discovered that bilinguals outperformed monolinguals on tasks requiring the management of conflicting attentional demands (conflict tasks). However, the two groups performed comparably on delay tasks which demand impulse control (Carlson & Meltzoff, 2008). These outcomes have all supported the claim of bilinguals' advance in their cognitive development and metalinguistic awareness resulting in a more advanced cognitive flexibility. Hamers and Blanc claim that it is the bilingual child's ability to alternate between and then manipulate two systems of symbols rather than one that causes this extensive cognitive flexibility and enhanced metalinguistic awareness. Other researchers maintain the same ideas, such as Hakuta and Diaz (1985) who claim that the bilinguals' flexibility could be a result of abilities related to language, for example the language use in observing cognitive functioning or an early perception of its structural properties and conventionality. In addition, Vygotsky maintains that "bilingualism frees the mind from the prison of concrete language and phenomena" (Hakuta, 1985) which indicates the flexibility resulted by simultaneous language acquisition.

References

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