

BILINGUALISM AND INTELLIGENCE

Is bilingualism an asset or a hindrance?

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ABSTRACT

Although the effects of bilingualism on cognitive development have been widely investigated, the issue is still controversial. The question of whether bilingualism leads to cognitive advantages not shared by monolinguals has been debated for decades. Most of the studies in the first half of the 20th century show a bias towards the negative aspects of bilingualism on intelligence (Romaine, 1995). More recent studies, however, have addressed methodological problems that biased the results of these investigations towards negative findings (Jarvis et al., 1995). The present article provides an opportunity for the reader to familiarize themselves with the most famous studies done on this issue in the 20th century. They are chronologically divided to two types according to their results.

Key terms: bilingualism, cognitive development, intelligence, bilingual

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1. INTRODUCTION

Does bilingualism facilitate the development of cognitive abilities, and if so, how? Does bilingualism have any effect on IQ? According to Diaz (1985) only in the early stages of second language acquisition bilingualism fosters cognitive ability.

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These days, few researchers believe that bilingualism hinders cognitive development; rather, the focus of the debate has shifted to whether bilingualism actually facilitates cognitive development, and if so how (Diaz, 1983; 1985).

Romaine (1995) states that most studies conducted before 1960 concluded that bilingualism hindered children's academic performance due to linguistic interference. More recent studies, however, have addressed methodological problems that biased the results of these investigations towards negative findings (Jarvis et al., 1995).

2. BILINGUALISM AND INTELLIGENCE

Hakuta (1986) has pointed out that research on bilingualism in general in the first half of the twentieth century was guided by the question of whether bilingualism had a negative effect on intelligence. It was carried out largely on immigrant populations in the United States. More recent work, however, has been concerned to demonstrate a positive effect. One justification for bilingual education hinges on the resolution of the intelligence issue.

A brief glance at two opposite viewpoints will give an idea of some of the issues. Jespersen (1922, p. 148), for example, expressed a negative opinion:

It is of course an advantage for a child to be familiar with two languages: but without doubt, the advantage may be, and generally is, purchased too dear. First of all the child in question hardly learns either of the two languages as perfectly as he would have done if he had limited himself to one. It may seem on the surface, as if he talked just like a native, but he does not really command the fine points of the language... . Secondly, the brain effort required to master the two languages instead of one certainly diminishes the child's power of learning other things which might and ought to be learnt.

By contrast, Lambert (1977, p. 30) summarizes the research supporting the positive advantages of bilingualism as follows:

There is, then, an impressive array of evidence accumulating that argues plainly against the common sense notion that becoming bilingual, that is, having two strings to one's bow or two linguistic systems within one's brain, naturally divides a person's cognitive resources and reduces his efficiency of thought. Instead, one can now put forward a very persuasive argument that there is a definite cognitive advantage for bilingual children in the domain of cognitive flexibility.

Other prominent linguists writing around the same time as Jespersen and later expressed equally negative views. Weisgerber

(1966; cited in Romaine, 1995), for example, went so far as to say that bilingualism could impair the intelligence of a whole ethnic group and lead to split personalities. This kind of negative thinking has been widespread among psychologists and educators.

Some have also claimed that bilingual children are more prone to stuttering (Mattes & Omark, 1984). Karniol (1992), for instance, claims that stuttering is prevalent in bilinguals due to the syntactic overload imposed by processing and producing two languages. She examined the case history of a child acquiring Hebrew and English in Israel who started stuttering severely in both languages at 25 month, just as he was on the point of transition to grammatical sentences of more than one word and had become aware of his bilingualism. The child requested people to speak only Hebrew to him. He then stopped stuttering in Hebrew. Subsequently, after being in a summer camp in Canada, he started speaking English again without stuttering. In any case stuttering was a short-lived phenomenon.

3. RESEARCH FINDINGS

3.1 Negative Effects of Bilingualism on Intelligence

One of the most widely cited studies to conclude that bilingualism had a negative effect on children's intelligence was done by Saer (1924). He studied 1400 Welsh/English bilingual children between the ages of 7 and 14 in five rural and two urban areas of Wales. His results can be seen in table 3.1 which shows the correlation between IQ and bilingualism.

Table 3.1

Relationship between bilingualism and IQ in
Saer's study of Welsh/ English bilingual children

	Average IQ	
	Urban	Rural
Monolingual English	99	96
Bilingual Welsh / English	100	86

Saer (1924) concluded that bilingualism resulted in lower intelligence because of the lower scores obtained by bilingual children in rural areas. His explanation was that urban children managed to resolve their emotional conflict between the use of Welsh and English at an earlier age than rural children.

There are a number of criticisms to be made about the design of the study and its conclusions, which makes the results suspect. Firstly, it appears to be only in the rural districts that the correlation between bilingualism and lower IQ holds. In urban areas monolinguals and bilinguals are comparable in intelligence as measured by IQ. The urban bilingual children had more contact with English both before beginning school and outside school hours than did the rural bilinguals. Thus, the depressed scores of the rural population are probably more a reflection of lack of opportunity and context to use/hear English, and are not necessarily indicative of any social-psychological problems of emotional adjustment (Romaine, 1995). Saer, however, ignored these and other social differences between the rural and urban children.

A later study by Morrison (1958) indicated that if the occupation of the parents, which is a good indicator of social class status, is taken into account, there are no differences in IQ between rural and urban bilinguals.

More importantly however, is the issue of statistical inference in this and other studies. Correlations of this type do not allow us to infer cause and effect relationships, particularly when other variables may be mediating factors. Another major factor is the language in which such tests are administered, particularly tests of verbal intelligence. Many such studies measure children only in the second or non-dominant language.

Many of the same criticisms apply to Smith's (1923) study of bilingual and monolingual Welsh school children. He found that monolinguals were better than bilinguals in tasks involving dictation, sentence formation and composition in English. There was also more improvement over a period of two years for the monolingual group. Smith (1923, p. 81) concluded from this that bilingualism was a "positive disadvantage".

Some studies claimed that disadvantage was apparent in both languages known by the bilingual in comparison to the respective monolingual population. Smith (1949), for example, tested Hawaiian children of Chinese ancestry in both English and Chinese. She found that the scores of these children on vocabulary development were below the monolingual norms. However, when the scores from the two languages were combined, the children compared favorably with monolinguals. Nevertheless, she concluded that it would be unwise to start children in a second language unnecessarily during the pre-school years, unless they were of superior linguistic ability.

Anastasia & Cordova (1953) measured the non-verbal intelligence of Puerto Rican children in New York City in both Spanish and English and concluded that the language in which the test was administered made no difference. The children were still behind the norms in both languages, and therefore their mastery of both Spanish and English was restricted and inadequate. Although they recognized that there were other mitigating factors, such as low socio-

economic status and problems of adjustment to the school environment, they still advocated a (Anastasia & Cordova, 1953, p. 17) “solution to the language problem as a necessary first step for the effective education of migrant Puerto Rican children”.

Thus, most of the studies done before the 1960s indicated that monolingual children were up to 3 years ahead of bilingual children in various skills relating to verbal and non-verbal intelligence (Romaine, 1995).

One exception to this trend, however, can be found in a study done by Malherbe (1946) on bilingual schooling in English and Afrikaans in South Africa. His survey included over 18000 pupils in monolingual and bilingual schools. In bilingual schools children would receive primary instruction through their first language. Beyond that instruction would be in both languages. In the monolingual schools the other language is taught only as a subject. Malherbe (1946) compared the scholastic and linguistic achievement of pupils in bilingual and monolingual schools. He found a considerable superiority among pupils who attended bilingual schools. The English-speaking pupils, who were less bilingual to begin with, gained more in Afrikaans than the Afrikaans-speaking pupils did in English. There was also no loss of first language skills. The highest level of bilingualism was achieved by the pupils in the bilingual schools.

3.2 Positive Effects of Bilingualism on Intelligence

In the 1960s it was becoming increasingly apparent that bilingualism was essential to political power (Hakuta, 1986). One of the most influential studies in this period was done by Peal & Lambert (1962). They gave particular care to variables which have either been ignored or not carefully controlled in earlier studies. Firstly, they compared 10-year old bilingual and monolingual children from the same French

school system in Montreal, whose parents were of the same social class background, in this case, middle class. Secondly, they (Peal & Lambert, 1962, p. 6) distinguished between what they called “true, balanced bilinguals”, who were proficient in both languages, and “pseudo-bilinguals”, who for various reasons had not attained age-appropriate abilities in the second language. Peal & Lambert (1962) used only bilinguals who were equally good in both languages, as assessed by various tasks and subject’s self-ratings. Thirdly, they relied on a wider view of cognitive abilities than those on which the concept of IQ is based.

They found that the bilingual children performed better than the monolinguals on both verbal and non-verbal intelligence tasks. In particular, they noted that bilinguals were specially good on certain sub-tests which required mental manipulation and recognition of visual patterns. The same was true for concept formation tasks which called for a certain mental or symbolic flexibility. From this they (Peal & Lambert, 1962, p. 20) concluded:

Intellectually the bilingual’s experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, and a more diversified set of mental abilities, in the sense that the pattern of abilities developed by bilinguals was more heterogeneous. It is not possible to state from the present study whether the more intelligent child became bilingual or whether bilingualism aided his intellectual development, but there is no question about the fact that he is superior intellectually. In contrast, the monolingual appears to have a more unitary structure of intelligence, which he must use for all types of intellectual tasks.

Following the work of Peal & Lambert (1962), many studies appeared which supported their findings (Hamers & Blanc, 1989). One of these done by Ianco-Worrall (1972) concluded that Afrikaans/English bilingual children in South Africa between the ages of 4 and 9 were able to analyze language as an abstract system earlier than their monolingual peers. This was evident in a number of tasks. She asked children to suppose that they were making up names for things, and whether they could then call a cow a dog and a dog, a cow. The majority of bilinguals answered yes, while only a small minority of monolinguals did so. From this she concluded that bilingual children become aware at an earlier age of the arbitrary connection between things and the names they are given in a particular language.

In another task she asked children to associate words, for example is can or hat more like cap? If the child chose can, it indicated phonetic preference. A choice of hat on the other hand indicated a semantic preference. More of the younger bilingual children chose the semantic response than the monolinguals. From this she concluded that bilinguals reach a stage in semantic development two or three years earlier than monolinguals.

This conclusion has been challenged by Aronsson (1981; cited in Romaine, 1995), who points out that monolingual children have to deal with lexical arbitrariness in the form of stylistic variants. He notes that there is no reason to believe that the parallel existence of “boy” (Aronsson, 1981; cited in Romaine, 1995, p. 113) in English and “pojke” (Aronsson, 1981; cited in Romaine, 1995, p. 113) in Swedish will assist the child’s thinking more than the exposure to synonyms like boy and guy in English. The alleged advantage of bilingual children may come from sensitivity to the more formal aspects of language rather than from any cognitive insights. Bilingual children are aware of not only the fact that things can be said in

different ways, but they also understand that there are different formal means of realization in two languages.

Another study by Scott (1973; cited in Romaine, 1995, p. 113) argued that bilingual children were better than monolinguals at divergent thinking tasks. Some researchers see divergent thinking as an index of creativity. Convergent thinking, on the other hand, is what is measured by intelligence tests, where the person being tested is required to converge on one correct answer rather than consider a number of outcomes to an open-ended problem or question. Lambert (1977, p. 15), for instance, characterizes divergent thinking as “distinctive cognitive style reflecting a rich imagination and an ability to scan rapidly a host of possible solutions”. It has been measured by tasks which provide a starting point for a problem and ask for solutions, for example think of all the things you could do with a paper clip.

A study by Carringer (1974) of 15-year-old Spanish/English bilingual children also concluded bilingualism promoted creative thinking. Carringer (1974) specifically attributed the greater cognitive flexibility shown by bilinguals to the fact that they were better able to separate form and content because they had two terms for one referent. Liedtke & Nelson (1968) concluded that bilingual children were better at concept formation, which is a major part of intellectual development, because they were exposed to a more complex environment and a great amount of social interaction compared to the child who was acquiring only one language.

Similarly, Genesee, Tucker & Lambert (1975) found that English-speaking children receiving most of their instruction in French in immersion programs proved to be more sensitive to the communicative needs of blindfolded listeners than other children. It is possible that exposure to two languages accelerates the child’s ability to de-center.

Kessler and Quinn (1980; cited in Bialystok & Majumder, 1998) looked at the effects of bilingualism on scientific problem solving. They hypothesized that certain relevant aspects of a problem may become more salient to bilingual children because their experiences in two different languages and cultures would enable them to bring different perspectives to the problem. Children were shown a physical science problem on film and were required to write as many hypotheses as possible to solve the problem within a limited time period. The bilingual children performed better than monolingual children; their hypotheses were more structurally complex and qualitatively sophisticated than those given by the monolingual children. The authors concluded that there is a common underlying ability that governs both formulating a hypothesis and expressing it in complex linguistic structures.

Galambos & Goldin-Meadow (1990) presented monolingual and bilingual children with a range of metalinguistic problems; they found that bilinguals progressed faster than monolinguals, and that there was a general ordered progression in this development: given a series of sentences, the children were asked to note any errors, correct the errors, and explain why the errors were incorrect. These abilities were considered to be ordered for difficulty from the lowest to the highest levels of awareness. Galambos & Goldin-Meadow (1990) interpreted the developmental progression as moving from a content-based to a structure-based understanding of language. Bilingual children were more advanced than monolingual children in all of these areas.

In a series of studies done by Bialystok (1987), bilinguals were more advanced than monolinguals in specific uses of language applied to certain types of problems. She says (Bialystok, 1987) that bilingual children were notably more advanced when they were required to separate out individual words from meaningful sentences, focus on

only the form or meaning under highly distracting conditions, and reassign a familiar name to a different object. Each of these tasks requires selective attention to words or their features and the performance of some operation on that isolated competence, for example counting the number of words in a sentence. The ability to attend selectively to units of language such as words and their boundaries and to apply specific processes to them is an integral part of using language for advanced and specialized purposes such as literacy (Romaine, 1995). Following Hamers & Blanc (1989), Bialystok (1991) says that the seemingly diverse range of tasks on which bilinguals are superior to monolinguals are all dependent on high levels of selective attention, which is a central mechanism of cognitive performance.

These kinds of general abilities to manipulate language as a formal system have sometimes been referred to as “metalinguistic skills, or in other words, the use of language to talk about or reflect on language” (Romaine, 1995, p. 114). They allow an individual to step back from the comprehension or production of language to analyze its form. Such skills are believed to be helpful in learning how to read and necessary for advanced uses of oral and literate language in school. Schooling in general increases an awareness of language as an object in and of itself (Romaine, 1984a). Metalinguistic problems demand a high level of selective attention, such as when a child is asked what the sun and moon would be called if they switched names. In order to separate the word from its meaning children must attend selectively in an unusual way.

An additional source enhancing the bilingual’s flexibility and creativity may derive from the different semantic networks associated with words in each language (Romaine, 1995). For example, the word for ‘school’ in Welsh also means ‘ladder’ (Baker, 1993, p. 119), while the English word has no such associations. Welsh bilinguals may have

mental imagery connecting the concepts of 'school' and 'ladder', which allows them to create metaphorical links, for example the school is a ladder to knowledge.

Translation is also another example of metalinguistic task (Romaine, 1995). Many bilingual children are habitual and skilled translators. Malakoff (1992) claims that even young school children show a low rate of errors. In many minority language communities it is children who routinely provide translation for parents who are not as proficient as they are in the community's dominant language (Romaine, 1995).

4. CONCLUSION

Most of the studies in the first half of the 20th century show a bias towards the negative aspects of bilingualism on intelligence (Romaine, 1995). According to Baker (1980; cited in Ploch, 2003) the period of negative thinking lasted from the early 19th century until the 1960s. Other researchers who worked on the relation between bilingualism and intelligence in this period found similar negative results (Goodenough, 1926; Saer, 1924). Baker (1980; cited in Ploch, 2003) claims that this period of negative views of bilingualism was followed by a period when there were neutral results. Finally there were positive results which he considers to have begun to be published in 1962 after the important work of Peal & Lambert (1962). Since then there have been many more studies which have found that there were positive results; in fact different researchers found interesting positive results in various fields such as a greater cognitive flexibility (Genesee, Tucker, & Lambert, 1975), viewing the world more flexibly and being more versatile in processing information (Lemmon & Goggin, 1989; Landry, 1973a and 1973b; cited in Romaine, 1995; Peal & Lambert, 1962), object constancy tasks,

naming tasks, sentence construction tasks and metalinguistic awareness (Lemmon & Goggin, 1989), early awareness of the conventionality of words and the arbitrariness of language (Leopold, 1961; cited in Romaine, 1995), and processing verbal material (Ben-Zeev, 1977; cited in Romaine, 1995). Others who found similar results in this area were Cummins (1977; cited in Romaine, 1995) and Cummins & Gulutsan (1974; cited in Romaine, 1995). As the conclusion of this review we can state that the linguistic and cultural experience of the bilinguals is an advantage; intelligence factors necessary for concept formation seem to be developed to a greater extent in the bilingual subjects and the results of various studies seem to indicate that becoming bilingual speeds up the normal process of some parts of mental development.

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