

RELATION OF BILINGUALISM TO INTELLIGENCE

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RESUMEN

El presente artículo se refiere a la organización neuroanatómica de los bilingües y su funcionamiento cognitivo, a la forma como están organizadas las lenguas en el cerebro y finalmente a la relación que existe entre bilingüismo e inteligencia. Dichos aspectos revisten especial importancia para profesores y estudiantes en el proceso de enseñanza- aprendizaje de una segunda lengua.

SUMMARY

This article refers to the neuroanatomical organization of bilinguals, their cognitive functioning, and the way languages are organized inside the brain. Moreover it shows the relationship between intelligence and bilingualism. These aspects are relevant if considering the importance they have for teachers and students when dealing with the teaching -learning process of a second language.

INTRODUCTION

Since I read some case studies about bilingualism "the native like control of two languages, that begins when the speaker of one language can produce complete meaningful utterances in the other language" Haugen 1953, Bloomfield 1933 (as cited in Hakuta, 1986)¹, I started to ask myself about the relation of bilingualism to intelligence in the process of acquiring and using a second language. Through this paper I aim to explore this question by presenting some aspects of neuroanatomical organization of bilingual subjects, their cognitive functioning and some aspects concerning the relation between bilingualism and intelligence as well as some opinions about the advantages of being bilingual.

NEUROANATOMICAL ORGANIZATION OF BILINGUALS

Taking into account the way languages are stored , organized and accessed in the brain of a bilingual subject during speech production and perception , Paradis ² (1978), contrasts two positions on this issue. One he calls "Extended System Hypothesis" . According to which view, there is a single stock which contains elements from both languages. When a second language is learned, sounds are treated as allophones (variants of the phonemes already established in the first language system). Thus the same neural mechanism underlies both language systems. Evidence from this view comes from the fact that bilinguals can speak one language with the accent of the other .

An opposing view which Paradis refers to as the " Dual System hypothesis", claims that there are different networks of neural connections underlying each level of the language (i.e. phonology, lexicon, grammar, etc.). The two

language systems are represented separately, although they are stored in the same general language area.

Ojemann and Whitaker (1978) (as cited in Hakuta, 1986)¹ found support for their view that there is one language area for bilinguals. After stimulating electrically a number of sites in the brains of two patients undergoing treatment for intractable epilepsy who were asked to name objects shown to them on slides, they found a number of cortical sites where both languages were distributed by stimulation , and sites where one language was distributed more than the other. They concluded that there are sites common for both languages and sites specific for each language.

Thus, there is still no consensus of opinion about neuroanatomical organization in bilinguals. Nevertheless, no one seems to accept the extreme position (i.e. that the bilingual's languages are not stored in completely different sites in the brain). Albert and Obler (1978) (as cited in Hakuta, 1986)¹ after examining the results of different experiments and case stories, concluded that different languages might have different anatomical representations, which would be determined by factors such as age and manner of acquisition, order of learning, and other factors specific to each language.

Paradis ² has proposed a kind of solution to the dual and extended system hypothesis. He suggested that, although both languages may be stored within a single extended system, there may be elements of each language which form subsystems within the larger system. Consequently, bilinguals would have two subsets of neural connections , one for each language. Each one can be activated or inhibited independently, at the same time, however they possess a larger set from which they are able to select elements of either language at any time.

BILINGUALISM AND COGNITIVE FUNCTIONING

Talking about the relationship between bilingualism and intelligence and their cognitive processes it is appropriate to observe research overlapping into three periods according to Baker (1988) (as cited in Romaine, 1989)³: The period of detrimental effects, the period of neural effects and the period of additive effects. During the first one, nineteenth and early twentieth century psychologists expressed their belief that bilingualism had an adverse effect on the cognitive development of the child. However this conviction was not based on empirical research but on educational thinking and probably on political decision making. Later on, the period of neural effects had important contributions to this field if considering some investigations such as the one of Arsenian and Darcy (1963) (as cited in Oller, 1991)⁴ who reported certain inadequacies in the methods previously employed, their general conclusion was that bilingualism itself does not affect intelligence. They also reported on the imperfect knowledge on the L2 (Second language) possessed by many bilinguals. In last period, the one of the additive effects Peal and Lambert (1977) (as cited in Jarvis et al, 1995)⁵ after testing some groups observed that bilinguals scored more highly than monolinguals in both verbal and non-verbal measurements of intelligence. They argued that the former had a more diversified structure of intelligence and greater mental flexibility and that therefore the cognitive functioning of bilinguals benefited from their bicultural experience and from positive transfer between languages.

RELATION OF BILINGUALISM TO INTELLIGENCE

The acquisition of a second or third language often results in significant cognitive gains. In particular, bilinguals achieve some kinds of flexibility in reasoning and their capacity to appreciate certain abstract relations that might remain outside the reach of monolinguals (Cummins⁶ (1983). Hakuta and Diaz (1984)¹. This result can be better understood if considered the so called "Threshold Hypothesis" (Cummins, 1976)⁷, an idea that relates to the impact of bilingualism, or more specifically adding a second language, on cognitive development. This hypothesis suggests that the child's starting level in one or both languages may be an important mediating variable in avoiding a burden in becoming bilingual or in benefiting from bilingualism once achieved. There are actually two thresholds being proposed: On the "Low end" it is claimed that a child may have to achieve a certain minimal

level of proficiency in one or both languages to avoid deficits. It is presumably important in the determination of when instruction might be appropriately introduced in a non-primary language. At the other threshold 'A high end' claimed that in order for a bilingual child to experience the expected benefits of bilingualism, e.g., greater ability to appreciate and utilize symbols and greater "metalinguistic awareness", i.e., ability to appreciate the arbitrariness and conventionality of linguistic symbols, the child must have surpassed the high threshold presumably in one or both languages (Cummins 1976)⁷.

In short, I assume that second language proficiency should have a positive effect on cognitive development level, considering that bilingualism is a good factor which enriches intelligence and create a multidimensional view of the world. Even if languages are stored or not in the same area, a bilingual subject is always using information and knowledge stored in his brain, this individual can have two different perspectives about the surrounding world, his ability to communicate is not limited by verbal or non verbal features of one unique language, he knows two different worlds from the point of view of culture, politics, education, religion and so on. It would be possible that when a child acquires a second language this fact facilitates the distinction between writing and sound due to the fact that it is necessary to establish comparisons and differences between pronunciation of both languages. Furthermore, it is important to consider that in early stages children are assumed to become aware of the function of language, and understand how it can be used as a tool of thought.

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