Cognitive Advantages of Bilingualism: Age and Time-based Considerations

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Abstract

After an examination of two theories related to bilingual education, namely, the BICS/ CALP distinction and the advantages of beginning bilingual programs at a young age, some successful as well as unsuccessful bilingual programs will be addressed. This is followed by a more critical examination of the positive effects that bilingualism can have on cognition, including, but not limited to, the Threshold Hypothesis. This essay will conclude with some advantages that bilingualism has on cognition, specifically, cognitive flexibility, metalinguistic awareness, communication sensitivity, and field independence. Data for this essay have been collected from books, online archives and journals, and published reports, focusing on the works and theories of Cummins (1976, 1979) and Baker (2000, 2001), with a range of supporting evidence from a host of different researchers.

Keywords: BICS/CALP, successful and unsuccessful bilingual programs, Threshold Hypothesis, bilingualism’s effect on cognition

Much research has been devoted to bilingualism and bilingual education with very differing results. Cummins (2000) claims that bilingual education gives the student greater problem-solving and analytical skills, higher curricular achievement, and both superior academic and linguistic performance compared to that of their monolingual counterparts. However, other earlier studies have concluded that bilingual education had no effect of any kind, positive or negative, on scholastic achievement (Wijnstra, 1976), and it has also been stated that many bilingual education programs “do not, by aim, content, or structure, have bilingualism defined as an outcome” (Baker, 2001, p. 48). All of these results may be true to some extent, but none of them can be considered as the “end all” regarding bilingual education. With these different views in mind, this paper will address different theories related to successful bilingual education and bilingualism, some constructive relationships between language and cognition, and
conclude with a look at certain ways in which bilingualism has positive impacts on cognition.

**Theories for Successful Bilingual Education**

Any discussion regarding the successful implementation of a bilingual (or multilingual) program must consider both the age of the learners and time-based factors such as how long students will need to stay in the program. Although divergent hypotheses exist regarding these dual considerations (Petitto et al., 2001), they are nonetheless united by the fact that a successful bilingual program must take into consideration the varied maturational stages that humans go through, and the effect that these stages have on their ability to learn languages (Singleton, 1995). A good place to begin to address these two phenomena is a theory developed by Jim Cummins called BICS/CALP.

**The BICS and CALP distinction**

BICS stands for basic interpersonal communicative skills and CALP stands for cognitive academic language proficiency. These acronyms are commonly used when discussing bilingual education as a way to distinguish between simple conversational fluency and academic language proficiency. They came into being in the early work of Cummins (1979) and can be best represented by the simple matrix shown below in Figure 1 (Robbins, n.d.).
Cognitively Undemanding (BICS)

Initial levels of ESL, T.P.R.
Following directions
Face-to-face conversation
Getting absence excuse
Buying popcorn
Oral presentations
Content classes (Art, Music)

Context
Embedded

Demonstrations, experiments
A/V assisted lessons
Basic math computations
Plane geometry
Projects and activities
Health instruction
Social studies
Science experiments

Context
Reduced

Telephone conversation
Note on the refrigerator
Written directions, instructions
(No diagrams or illustrations)

Standardized tests
CTBS, SAT 9, CAP
Reading / writing
Math concepts and applications
Explanations of new abstract concepts
Lecture with few illustrations
Social science texts
Mainstream English texts
Most content classes

Cognitively Demanding (CALP)

Figure 1. Cummins’ Language Development Matrix

In Figure 1, the horizontal axis represents a continuum relating to the range of contextual support available to learners to help them express or understand meaning. At this ‘context embedded’ end of the continuum, the language being used is supported by a wealth of situational and paralinguistic indicators (e.g. pictures, objects, or gestures) with which the learner is familiar (Robson, 1995). At the ‘context reduced’ extreme, however, learners must rely more on language-based cues and knowledge about language and text to understand meanings (Franson, 2011).

The vertical axis relates to the level of cognitive involvement in a language task and moves from cognitively undemanding, which requires little conscious attention to language (e.g. explaining what is happening in a picture that you took), to demanding, or, requiring active cognitive effort (e.g. talking about others’ feelings or one’s motivation to study) (Robson, 1995). So as can be seen in Figure 1, an activity in the upper left hand corner (cognitively undemanding and context-embedded) would be appropriate for
a beginner, but language tasks in the lower right hand corner (more cognitively demanding and context-reduced) would be more suitable for advanced learners (Franson, 2011).

The evolution of this language ability distinction started when Skutnabb-Kangas and Toukomaa (1976) first pointed out that most Finnish immigrant children in Sweden appeared to be fluent in both Finnish and Swedish, but often performed poorly on academic tasks involving their L2. Essentially, they were conversationally fluent, but lacked academic proficiency. Cummins (1981) states that recognizing this distinction is a vital qualification in order to have an effective bilingual educational program. This need to recognize the differences between daily conversational fluency and the academic aspects of L2 performance was emphasized by the reexamination of large-scale language acquisition data by the Toronto Board of Education (Cummins, 1981). Cummins points out that these data showed that immigrant students were being discharged from their bilingual language programs into all English, mainstream educational programs based solely on their surface fluency in English (BICS) with little consideration given to their academic linguistic ability (CALP). It was the failure to recognize this difference that led to the premature departure of students into the mainstream programs, all with disastrous results for the students. These children were found to frequently perform poorly on academic tasks as well as in psychological assessments (Skutnabb-Kangas & Toukomaa, 1976). Ultimately, the data showed that children were capable of attaining a BICS level of ability after about two years, but it would take five to seven years for them to acquire “grade norms in academic aspects in English,” or, their CALP (Cummins, 2003, p. 323). This one example demonstrates the need to recognize that there are in fact two kinds of proficiencies, which in turn require different maturational and cognitive processes, and these processes are governed by the learner’s age.

The advantages of starting at an early age

Some media pundits not directly involved in education, such as members of anti-immigrant organizations (Barkan, 2013) and even such past and present luminaries as Norman Cousins, Walter Cronkite, Norman Podhoretz, and Gore Vidal have shown a good deal of opposition to bilingual education (Crawford, 1992). However, the information they employ to show their opposition has been found to be mostly doublethink by providing opposite or contrasting interpretations of bilingual program
results (Cummins, 1999). Overall, researchers see bilingual education as a positive process if it is done correctly. Regardless of the program being employed, it is of great importance that the learners’ ages be taken into consideration in order to conduct a successful bilingual program. Cummins (2003) states that on the surface, a 5-year-old and a 12-year-old would perform exactly the same as native speakers in everyday conversation, but the 12-year-old would have much more depth of knowledge, vocabulary, and overall comprehension. So, the question to be asked is what is the best time period for children to acquire (not necessarily learn) a language in a smooth and organized fashion (Lier, 2004). Lenneberg (1967) coined this time in a child’s life the Critical Period Hypothesis (CPH).

It was hypothesized that the best time to acquire a language was between the age of two and puberty after which time the brain is said to lateralize and make post-adolescent language acquisition difficult due to less plasticity in the brain (Collier, 1987). However, CPH has been the target of criticisms due to the fact that, even after puberty, many adults can and do become very proficient in their L2 (Vanhove, 2013). Also, others believe that Lenneberg’s period is too long. For example, Kinsbourne (1975) believes that the critical period happens before birth, and Krashen (1973) believes this critical period to be over by age 5. In spite of these different criticisms and theories, it is a commonly shared belief by the linguistics community that there are several long term educational benefits to getting started in a bilingual program at an early age, such as the fostering of classification skills, concept formation, creativity, and visual-spatial skills, among others (Bialystok, 1991). Twyford (1987) theorizes that the skills that a young child will need for scholastic performance later on in life are built on the foundation of skills picked up or learned during this period.

There have been a number of documented bilingual programs that have met with success that help to strongly support this theory. For example, the Kohango Reo "language nests" of New Zealand were introduced first only in pre-schools or kindergartens to try to raise (from only 5% of speakers in 1975) the number of speakers proficient in Maori. By 1988, the schools were able to reach 15% of children under 5 years old (Skutnabb-Kangas, 2000). Also, the Montreal-based St. Lambert’s kindergartens experiment enabled the native English speaking students to become "bilingual and bicultural without loss of [academic] achievement" (Baker, 2000). Baker goes on to explain that the reason for this success comes down to the “uncluttered”
way young children acquire language skills. They do not ascribe to society’s values of people or things, and consequently just have a natural acceptance of two or more languages and/or cultures.

One more example of a successful bilingual program involving younger aged learners was the Cree Way Project in Quebec, Canada (Stiles, 1997). This was a Cree language immersion program that was instituted in 1988 at the preschool level in reaction to a growing problem of code-switching between Cree and French, or, “sloppy” Cree being used by older language learners (p. 249). The purpose of this program was to prevent language loss while at the same time promote proficiency before the children were exposed to public schools. In 1989 and 1993, the program was extended to kindergarten and grade one, respectively, and another grade level was added each year thereafter up to grade four. Subsequent and continued community backing and academic support of the program throughout high school and then university has also been implemented. Currently, the Cree Way Project “...demonstrates its continued viability in the Cree communities” and community educators “report [that] students are actively participating in the Cree language and actually increasing proficiency in two languages.” (p. 250).

All three of the aforementioned bilingual programs differ in aim and outcome, but all of them were implemented when the learners were of preschool age or younger and can be considered successful models of bilingual education. So it seems that from a young age, children can master quite easily the BICS end of language mentioned above, but what of their CALP, or, academic language abilities, and how does bilingual education effect cognition?

**Some Effects of Bilingualism on Cognition**

Various forms of research have been done regarding the performance of students of different ages on language tasks associated with cognitive skills such as greater problem-solving ability and ease of switching between intellectual tasks. In some short studies, results have shown that there is an initial advantage for the older learner, and now, in contrast to earlier studies, long term studies have shown a continuing advantage more for older students (8 to 12 years old) than for younger ones (4 to 7 years old) (McLaughlin, 1984). Children aged 4 to 7 take a longer time to master L2 skills needed for academic purposes because children of this age and even older are still acquiring the
more complex rules of their L1 (Collier, 1987). Older learners already have more advanced L1 skills and therefore have more skills available to transfer to their L2, and they take a more active role in learning an L2 (Scarcella & Higa, 1981). However, there is no uniform pattern that everyone follows for linguistic development because there is no uniform pattern for cognitive development (Twyford, 1987).

Cognitively, we all develop at different rates but not so differently that levels of cognition for a certain age cannot be accurately classified. Piaget (1997) stated that young children speak a sort of egocentric language which is a mix of monologues or collective monologues if there is more than one child speaking in the room. However, at around the age of 6 or 7, due to gradually maturing intellect, children start to use socialized speech where they begin to focus on more than just any one single aspect of a situation and begin to consider augmenting their speaking depending on the audience, the situation, or both. Children at this age begin to outgrow their inability to focus on more than just one aspect or point of view of a situation and begin to consider relationships. Furthermore, Twyford (1987) states that as children reach middle childhood (about 8 to 12 years old), they move into a stage of cognitive development at which point they become consciously aware of language and begin to “think about it, judge it, and manipulate it” just as adults do (p. 2). This progressive idea of language corresponds to an overall cognitive “decentering” that children experience as they step back and reflect on situations rather than just on themselves (Flavell, 1977, p. 124).

As bilingual children age, the effects of their bilingual nature on their cognition are mediated by the levels of proficiency in their L1 and L2. Jim Cummins (1976) referred to this as The Threshold Hypothesis. The Threshold Hypothesis states that there could be a threshold level that children must achieve so as to gain advantages and avoid disadvantages in their cognitive development. Cummins then goes on to identify two thresholds, the higher and lower threshold levels, of bilingual proficiency:

This raises the possibility that there may be not one but two thresholds. The attainment of the first threshold would be sufficient to avoid cognitive retardation but the attainment of a second, higher, level of bilingual competence might be necessary to lead to accelerated cognitive growth. (p. 24)
The Threshold Hypothesis proposed by Cummins with two threshold levels is shown below in Figure 2 (Takugawa, 2005, p. 2223).

![Threshold Hypothesis](image)

*Figure 2: Threshold Hypothesis Proposed by Cummins (1976)*

Figure 2 shows that, in order to prevent ‘negative cognitive effects’, children must achieve a certain level of proficiency or competency in their L1 or L2. There needs to be a minimum level of linguistic and conceptual knowledge in the L1 for the child to successfully add an L2 and develop bilingually (Franson, 2011). Once the child has mastered their L1, they can move beyond the first threshold level and will suffer neither positive nor negative effects. Finally, ‘positive cognitive effects’ can be realized when the child develops a high proficiency in both languages (MacSwan, 2000). This Threshold Hypothesis also helps to explain why language minority children taught only in their L2 might fail in school, as mentioned earlier, and why children educated in a successful bilingual program might have a cognitive advantage over monolingual students (Baker & Jones, 1998). Baker (2001) states that bilingual individuals, through knowing two or more words for one object or idea, might possess more cognitive flexibility than monolingual individuals. This can be seen by the following example:
“...in Welsh, the word ‘ysgol’ not only means a school but also a ladder. Thus having the word ‘ysgol’ in Welsh and ‘school’ in English may provide the bilingual with an added associations—the idea of the school as a ladder (e.g. the steps as going through the grades)” (p. 149).

As outlined above, in linking bilingualism to cognitive benefits, many researchers have focused on cause and effect as well as the possibility that bilingualism and cognition enhance each other. However, most research assumes that bilingualism is the cause and cognitive advantages are the result (Chipongian, 2008).

**Cognitive Advantages of Bilingualism**

From about 1920 to 1960, many studies focusing on bilingualism came up with negative results. Saer (1924) studied English-Welsh bilinguals, Yoshioka (1929) assessed Japanese-American bilinguals, and Smith (1939) studied bilinguals in Hawaii. All three of these studies compared bilinguals to monolinguals and bilinguals were found inferior, but this was largely due to the inadequacy of the instruments used to measure intelligence available at the time (Moran & Hakuta, 1995). However, the Peal and Lambert study in 1962 and many others leading up to the 1990s can be summarized by concluding that experience with bilingual education or bilingualism seems to have given young learners cognitive advantages (Robinson, 1992). These cognitive advantages of bilingualism can best be separated into cognitive flexibility, metalinguistic awareness, communication sensitivity, and field independence.

**Cognitive flexibility**

There are two general areas of cognitive flexibility: divergent thinking and convergent thinking. Divergent thinking is the ability to generate as many solutions as possible to a question that does not have a finite set of answers. An example given by May, Hill, and Tiakiwai (2004) is: “Think of a paper clip and tell me all the things you could do with it.” The other area is convergent thinking which involves synthesising a commonality or relationship between weakly related or unrelated bits of information. Researchers have reported that bilingual people are consistently superior to their monolingual counterparts in both of these areas (Ricciardelli, 1992). Also, data from studies performed on bilingual infants who received both English and Spanish exposure
showed that experience with two languages may play a role in bilingual children being more adaptive and perceptive. This seemed to make them more perceptually “open” to language experience longer into their development (Conboy et al, 2011). These results provide further evidence that experience shapes the brain and gives bilinguals advanced skills that can aid in dealing with tasks that require the ability to “reverse the rules and think flexibly” (Kuhl, 2011, p. 12).

Metalinguistic awareness

Metalinguistic awareness (MA) is the ability to treat language as an object of thought (Garcia, 2009). Simply put, MA is knowledge about language and it can be demonstrated at various levels: phonological awareness (the comprehension of different sound units), word awareness, and syntactic or grammatical awareness. May, Hill, and Tiakiwai (2004) theorize that bilingual students might have a greater MA due to the fact that, being proficient in two languages, they need to have a higher level of understanding of how each language works as well as their similarities and differences. This in turn requires bilinguals to think about which language they should use and how they should use it giving them a greater ability to detect syntactical errors and identify different words in common continuous speech (Bialystok, 1987). Higher MA also allows bilinguals to demonstrate better reading skills than monolinguals with as little as one hour a week of L2 class instruction (Yelland, Pollard, & Mercuri, 1993).

Communication sensitivity

A participant’s level of awareness in any particular language exchange is referred to as their communication sensitivity. Because bilinguals live in an environment where they often have to shift between two languages, they subconsciously develop a sensitivity to the needs of a particular situation (Baker & Jones, 1998). This helps to give the bilingual an increased understanding to both the social nature as well as communicative functions of the language (Ben-Zeev, 1977). Yow and Markman (2011) state that bilingual children have been shown to be more skilled than monolingual children at “...taking the perspective of a listener into account and picking up on feedback and prompts from their communicative partner, and have a greater level of pragmatic awareness” (p. 12). Also, research suggests that bilinguals may have more empathy towards listeners’ needs in communication. When meeting those who do not
speak either of their languages particularly well, bilinguals are more likely to be patient listeners than monolinguals (Mey, 1998).

Field independence

Field independence is the visual ability to focus on particular components distinguished from the whole (Baker, 2000). It is regarded as the general ability to understand visual contexts which are directly related to problem solving abilities and ease of cognitive restructuring (Baker & Jones, 1998). In a study conducted in Switzerland on French-English balanced bilinguals aged 11 to 17, Balkan (1970) found that children who learned their second language between the age of 4 and 8 years old were more field independent than monolinguals. These findings are especially important when considering that field independent individuals tend to achieve greater intellectual development than those who are field dependent (Duncan & De Avila, 1979).

So, what might these four different cognitive abilities have in common? Bialystok (1992) suggests that a common feature of these cognitive abilities is that bilingualism may lead to the development of a more sensitive means for bilinguals to control attention and input. This in turn helps them focus on the key parts of a problem and have the analytical skills to select the crucial parts of a solution. This gives bilingual learners advantages over monolinguals in divergent and creative thinking, as well as analysis.

Conclusion

Bilingualism and bilingual education, although first met with suspicion or outright indifference, has come to be known more for its successes than its failures. Discoveries regarding how children naturally incorporate a second language into their intellect have shown that, with the implementation of cooperative bilingual educational programs starting at a young age, proper bilingual education, and therefore bilingualism, can and does have a positive effect on an individual’s cognition. In this age of ever-increasing globalization, constant geopolitical and socioeconomic changes are bringing about new and complex language and cultural interactions. Add to this the innovative communication technologies that continue to spread to new corners of the world, it is only fitting to persistently challenge existing monolingual ideologies while continuing to advocate for effective bilingual and multilingual education.
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