The Influence of Bilingualism on Cognition and Third Language Acquisition

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Abstract: The aim of this paper is twofold. Firstly to explore how bilingualism influences cognition and secondly how it influences the third language learning process. Some of the most prominent advantages of bilingualism on cognition were explored such as higher level of metacognition, inhibitory control, task switching etc. together with the most significant disadvantages to form a comprehensive view of the issue. The effects on third language acquisition were explored with a slight emphasis on cross-linguistic influence and transfer. In order to understand why bilingualism can have such diverse effects the factors that influence the development of bilingualism were also explored.

Key words: bilingualism, acquisition, cross-linguistic influence, cognitive advantages, transfer;

Apstrakt: Ovaj članak se bavi odgovorom na dva pitanja gde je prvo kako bilingvizam utiče na kogniciju a drugo kako utiče na usvajanje trećeg stranog jezika. Istražene su neki od najznačajnijih pozitivnih uticaja bilingvizma na kogniciju kao što su viši nivo metakognicije, brzo menjanje zadataka itd. Takođe su istraženi i negativni uticaji bilingvizma. Pri razmatranju uticaja bilingvizma na usvajanje trećeg stranog jezika blag je naglasak stavljen na međujezički uticaj i transfer. Razmotreni su i faktori koji utiču na razvoj bilingvizma i kognitivnih prednosti.

Ključne reči: bilingvizam, usvajanje, međujezički uticaj, kognitivne prednosti, transfer;

Introduction

In the 21st century where knowledge is the most valuable commodity the importance of language is even more prominent. It is no longer enough to know only one language to be a successful and integrated individual in today's society. Bilingualism and multilingualism is no longer considered a rare phenomenon, there are actually more bilingual and multilingual speakers in the world than monolinguals. According to the Ethnologue (2009) more than 7000 languages are spoken in 149 countries. In such a linguistic environment multilingualism and bilingualism are inevitable. Furthermore David Cristal (2003:69) estimates that two thirds of the world's children grow up in a multilingual environment. Consequently research on bilingualism and multilingualism has dramatically increased in the last few years in quantity, quality and breadth (T. K. Bhatia 2013).

Therefor this article aims to explain how this omnipresent phenomenon influences cognition and even more relevant for teachers how it influences the acquisition of a third language.

The influence of bilingualism on cognition

Bilingualism is a phenomenon which has always provoked a strong response. Our understanding of bilingualism and its effects has colossally changed over the years. From the

early 19th century to approximately the 1960's it was considered that bilingualism had a negative effect on cognitive development. The research supported the view that bilingual children suffered from academic retardation, were socially maladjusted and had a lower IQ than monolingual children. Pinter & Keller (1922) spoke of 'linguistic handicap' and Sear (1923) spoke of 'mental handicap' to describe the bilingual the bilinguals cognitive development (Baker 2011, Hammers 2000).

However modern research gives us opposite research findings and speaks of positive effects of bilingualism on cognitive development. This difference is explained by the fact that the early research had many methodological problems (for a detailed overview of these problems refer to Baker 2011).

The first in the series of studies in which the conditions met modern standards was Pearl and Lambert (1962) where the age, socioeconomic status and sex of the participants were matched. Here balanced bilinguals were chosen to participate in the study. The results were that bilinguals showed higher scores on verbal and non-verbal intelligence. Their explanation of these results is that because bilinguals manipulate two symbolic systems they analyze underlying semantic features in greater detail and have greater mental flexibility and facility in concept formation (Hammers 2000).

Since this important study numerous cognitive advantages of bilinguals have been found, we will note just some of the most prominent but not a comprehensive list. Some of the advantages of bilingualism on cognition are (according to Hammers 2000): better ability in reconstructing perceptual situations (Balkan 1970); superior results on verbal and non-verbal intelligence tests, verbal originality and verbal divergence tests (Cummins & Gulutzan 1974); greater sensitivity to semantic relations between words (Ianco-Worrall 1972, Cummins 1978), higher scores on Piagetian concept formation tasks (Liedtke & Nelson, 1968); better performance in rule-discovery tasks (Bain, 1975); a greater degree of divergent thinking (Da Silveira 1989); higher efficiency in verbal-transformation and symbol substitution tasks (Ekstrand 1981); greater originality in creative thinking (Torrance, 1970); greater metalinguistic ability (Pattnaik & Mohanty, 1984).

Recent studies have focused on bilingual's enhanced problem solving abilities where solutions depend on inhibitory control (Grosjean 2011). The bilinguals' advantage in tasks where inhibitory control is needed is explained by the "inhibitory control theory" which was proposed by D. W. Green in 1998 (Hilchey & Klein 2011). Research has shown that when a bilingual person

uses one language, the other is activated at the same time. When people listen they do not hear the whole word simultaneously and even before the whole word is said our brain starts to process the information and guess what the word could be. Therefore if a person hears the word ‘can’ he/she will probably also activate the word ‘candle’ or ‘candy’ at least in the earlier stages of word recognition. For bilingual speakers this process is not limited to the language that they are using but both languages are activated (Marian & Shook, 2012). In order to retrieve the relevant word, one of the words needs to be inhibited. The supervisory attentional system (SAS) regulates this process in which only the relevant semantic unit for speech or language is retrieved by solving the conflict associated with two simultaneously activated semantic units, by virtue of inhibition (Hilchey & Klein 2011). Because bilingual speakers need to activate the SAS every time they speak or listen it is highly strengthened.

Bilingual people are also better at switching between two tasks and switching strategies quickly on the fly (Prior & MacWhinney 2010). Bilinguals also have heightened metalinguistic abilities but it is only present when inhibitory control is needed for the task. Therefore when a problem contains a conflict like for example counting the words in correct sentences bilinguals would have an advantage but if it were just a metalinguistic task without the conflict like for example correcting mistakes in sentences or replacing one sound with another bilinguals and monolinguals obtain similar results (Grosjean 2011).

Bialystok, Craik and Freedman (2007) discovered that bilingualism protects against symptoms of dementia into old age. This relates to the ‘cognitive enrichment hypothesis where a wide variety of specific lifestyle factors have pervasive beneficial effects on cognitive functioning through the lifespan (Hilchey & Klein 2011).

Another area in which bilinguals differ from monolinguals is the neurological activation. Bilinguals appear to have advantages in auditory attention. ‘The cognitive control required to manage multiple languages appears to have broad effects on neurological function, fine-tuning both cognitive control mechanisms and sensory processes.’ (Marian & Shook 2012, p 5).

The brain’s structure is also influenced by bilingualism. Bilinguality correlates with higher gray matter volume in the left inferior parietal cortex (Mechelli et al., 2004). Scientists have found that damage to this part of the brain causes uncontrolled language switching which implies that it may play an important role in managing the contextual usage of language. Furthermore researchers have found that white matter volume changes in bilingual children and adults (Luk

et al., 2011; Mohades at al. 2012). All this implies that bilingualism not only influences the neurological functioning but also the neurological structures (Marian & Shook 2012).

However the parallel activation of two languages in bilinguals can also have some negative effects. Scientists have concluded that bilinguals are slower on picture naming tasks (Gollan, Montoya, Fennema-Notestine, & Morris, 2005), that they produce fewer words in verbal fluency tasks (Rosselli, Ardila, Araujo, Weekes, Caracciolo,Padilla, & Ostrosky-Solis, 2000) perform worse on lexical decision tasks (Ransdell & Fischler, 1987), and experience much more difficulty with lexical access, despite sometimes similar receptive vocabulary scores (Gollan & Acenas,2004 as cited in Hilchey & Klein 2011). It appears that one domain in which they do less well than monolinguals are verbal tasks such as “choose a picture that illustrates the spoken word” or the ones that have been mentioned earlier. These results could be explained by the complementary principle according to which the bilinguals usually use their languages for different purposes in different contexts and with different people. When bilinguasl are tested in both their languages the results improve significantly (Grosjean, 2011).

The influence of bilingualism on third language acquisition

Most of the research on the effects of bilingualism on third language acquisition shows that bilingualism has a positive effect on third language acquisition (Cenoz et al, 2001). As evidence for this statement we can mention some studies done in Spain where the acquisition of English as the L3 was tested in monolingual Spanish students and bilingual (Basque-Spanish or Catalan-Spanish) students. Catalan and Basque are minority languages in Spain but they are regarded as an asset by the whole community in Spain. The monolingual learners received education in Spanish while the bilinguals were educated in their minority languages. In these conditions the results of research from Cenoz, 1991, 1996; Cenoz &Valencia, 1994; Lasagabaster, 1998, 2000 concluded that bilingualism was a factor that predicted better general proficiency in the third language regardless of other factors such as age, intelligence, exposure and motivation (Mesaros [no year]). However other researchers suggest that it is not bilinguality but biliteracy which facilitates the acquisition of an L3 (Swain, Lapkin, Rowen & Hart, 1990 as cited in Sanz 2000).

L3 learners have more experience at their disposal than do the L2 learners because they have already gone through the process of learning a language twice (Cenoz and Jessner, 2000). Furthermore the knowledge of these two languages and the experience of the acquisition

process of another language are likely to influence the acquisition of a third language (Cenoz et al, 2001).

One of the most researched positive effects of bilingualism on L3 acquisition is the higher level of metalinguistic awareness. Metalinguistic awareness allows a person to deeper understand and analyze language by focusing on different levels of linguistic structure such as words, phonemes, syntax, phonological awareness, word awareness, sentence awareness and semantic awareness (Weiqiang 2011). Research by Bialystok (1986, 1987, 1991), Diaz (1985), Galambos and Goldin-Meadow (1990), Yelland, Pollard, and Mercury (1993), and Ricciardelli (1992a, 1992b) found bilinguals to have greater explicit knowledge of the language. According to Ellis (1994) the weak interface position in L2 acquisition theory proposes that: “while explicit knowledge cannot be transformed into implicit knowledge of the L2, it can help in the acquisition process by acting as an advanced organizer, focusing learners’ attention on the relevant features of the language. That is, heightened metalinguistic awareness, which results from exposure to literacy in two languages, gives bilinguals the capacity to focus on form and pay attention to the relevant features in the input. Just as more efficient use of memory space enhances the amount of input that can be processed into intake, metalinguistic awareness enhances the quality of the intake that feeds into the interlanguage system.” (Stanz 2000, p 14).

Klein (1995) suggests that because bilinguals have two sets of vocabularies they have a better understanding of the arbitrary relationship between words and their referents. This suggests that bilinguals would have an advantage over bilinguals in lexical awareness. This is important for L3 acquisition because the skills used in the acquisition of the second set of vocabulary are transferable and applicable to the acquisition of the L3 vocabulary. However this positive effect is more evident in consecutive than simultaneous bilinguals since in the case of simultaneous bilinguals the acquisition of both vocabularies was spontaneous and not as much attention was given to the learning strategies as in the case of consecutive bilinguals (Weiqiang 2011).

The advantages connected to lexical awareness brought up the issue of transfer which in turn invokes the question of cross-linguistic influence, because transfer is just one of the forms of cross-linguistic influence.

It is by now fairly obvious that L3 acquisition is not just another case of L2 acquisition. Even though the two processes may be similar as Clyne (1997: 113) put it: “the additional language complicates the operations of the process” (as cited in Mesaros [no year]). The differences are most evident when we look at Cross-linguistic influence. In second language acquisition the first

language can influence the second and vice versa that is cross-linguistic influence can occur in these two languages in both directions (L1 ← → L2). This process is considerably more complicated in third language acquisition because cross-linguistic influence occurs between the first language and the second language, the first language and the third language as well as between the second language and the third language (L1 ← → L2; L1← →L3; L2← →L3) (Cenoz et al., 2001).

Research on cross-linguistic influence in L3 acquisition is grounded on psycholinguistic theories of speech processing and production in monolinguals (Levelt, 1989) and bilinguals (Green, 1986; De Bot, 1992; Grosjean, 1997), as well as on specific proposals of cross-linguistic influence in second language acquisition (Kellerman, 1983 as cited in Cenoz et al., 2001).

It is beyond the scope of this paper to go into all of the aspects and factors that affect cross-linguistic influence. Therefore we will only focus on one aspect of cross-linguistic influence – transfer.

The definition of transfer that I will use in this paper is Odlin's (1989): "transfer is the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired" (p 27 as cited in Murphy, 2005). I have selected this definition because it is rather general and it includes both positive, facilitative and negative transfer.

The first question that arises when we talk about transfer in L3 acquisition is from what language to what language the transfer occurs. Different hypothesis propose different answers to this question, and we will mention some that we perceive to be the most representative.

The Developmentally Moderated Transfer Hypothesis (Hakansson et al. 2002) which incorporates transfer in *Processability theory* argues that transfer will occur only between the L1 and L2 and L1 and L3 but that no transfer will occur between L2 and L3 (Bardel & Falk, 2007). The Failed Features Hypothesis (Hawkins 1998, 2000; Hawkins & Chan 1997; Smith & Tsimpli 1995) also states that no transfer will happen between L2 and L3 but that L1 will influence both L2 and L3 (Leung, 2005).

On the other hand the Full Transfer Full Access Hypothesi (FTFAH)s, as the name implies, argues that transfer happens between all of the languages in other words L1 ← → L2; L1← →L3; L2← →L3 (Leung, 2005).

Transfer hypothesis also differ in regard to the presumed impact of the L1 grammar. According to the FTFAH all syntactic properties of L1 initially constitute a base for new developing grammar, which is constructed with the involvement of Universal Grammar. There are weaker views which predict different levels of involvement of first language grammar. For example Vainikka and Young-Scholten (1994; 1996) propose that there is only transfer of the lexical categories. Eubank (1993/94; 1994) proposes that both lexical and functional categories are transferred but that feature strength is not. After this initial transfer phase, the learner is assumed to construct an interlanguage grammar on the basis of L2 input and the Universal Grammar (Bardel & Falk 2007).

Bardel and Falk (2007) studied the effects of bilingualism on third language acquisition. More specifically they wanted to see whether transfer would occur and from what language. They tested the placement of sentence negation. The participants were separated into two groups: In the first group were bilinguals whose L1 had the same placement of negation (verb second V2) as the target language L3, in the second group were bilinguals whose second language L2 had the same placement of negation (V2) like the L3. This study showed that transfer did occur. Transfer occurred from L2 to L3 in both groups. The researchers interpreted these results by attributing the fact that transfer occurred only from L2 to L3 to the stronger status factor of the L2 which in this case overpowered the typology factor. The results of this research also confirm the Full Transfer Full Access Hypothesis if we accept the explanation as to why L1 transfer did not occur.

As we have seen from the results from the aforementioned study transfer and cross-linguistic influence is a phenomenon which is influenced by many factors. These factors can be loosely divided into two categories: learner based variables and language based variables. The learner based variables are: proficiency, amount of target language exposure, language mode, age, linguistic awareness and educational background. The language based variables are typology, frequency and word class (Murphy, 2005).

However the evidence of the positive effects that bilingualism has on L3 acquisition should not lull us into acquiring a black and white view on this topic and immediately assume that if a person is bilingual they have acquired these advantages.

There is a number of studies that show no statistical differences between bilingual and monolingual performance (Balke-Aurell & Lindblad, 1982; Jaspaert & Lemmens, 1990; Sanders

& Meijers, 1995; Schoonen et al.,2002). The effects of bilingualism on internal cognitive variables are mediated by external factors related to particular sociolinguistic situations.

The sociolinguistic situation results either in subtractive or additive bilingualism (Sanz, 2000). In the case of additive bilingualism the bilingual should show the positive cognitive abilities of bilingualism while in subtractive bilingualism no advantages will be acquired in comparison to monolingual speakers. A number of factors influence which type of bilingualism will be acquired.

Additive bilingualism occurs when both languages have high social standing and are valued by the community. If the languages are valued by the community this will also influence the learners motivation and attitude towards the language. Motivation and attitude are important factors since they directly influence the level of language proficiency that will be achieved. If the level of proficiency is high in both languages then the bilingual will enjoy the cognitive benefits that come with additive bilingualism (Hammers 2000).

This is supported by Cummins's (1979) threshold theory according to which a bilingual will be able to acquire the cognitive benefits associated with bilingualism only if a certain minimum threshold of competence in a second language is acquired. There are essentially two thresholds the lower and the higher threshold of bilingual competence. If the lower threshold is reached the individual will be a dominant bilingual and will not reap the benefits of the cognitive advantages of bilingualism but will also not suffer from the disadvantages of subtractive bilingualism. If the higher threshold of bilingual competence is reached the individual will be a balanced bilingual who enjoys the cognitive advantages of bilingualism.

The developmental interdependence hypothesis (Cummins 1979) tells us how L1 and L2 skills are related. It proposes that the level of L2 competence which a bilingual child attains is partially a function of the type of competence the child has developed in L1 at the time when intensive exposure to L2 begins. For children whose L1 skills are less well developed in certain respects, intensive exposure to L2 in initial grades is likely to impede the development of L1. If this would happen the individual would not gain the cognitive benefits associated with bilingualism.

As we have mentioned status of the languages affects the motivation and attitude of the learner but it is also linked to the distinction between elite bilingualism and folk bilingualism. The languages of elite bilinguals as the name implies are highly valued in the community and country in which they live. An example of this would be English- or German-speaking immigrants in the Netherlands who consider their language a valuable asset and make every

effort to maintain it and pass it on to their children –efforts which are encouraged by the host community. The languages of folk bilinguals do not enjoy high social status. An example of this are Turkish migrants who will be confronted with the attitude that it is detrimental for them to continue speaking their L1 and for their children to learn it, that this will impair their chances for assimilation and career opportunities, and that a switch to monolingual Dutch is preferable. It is evident that elite bilingualism would have positive effects on the gain of bilingual cognitive advantages (Baker, 2011).

The country's minority language policy is of crucial importance. Which if it is minority oriented enables learning in the L1. As we have mentioned before it is not bilingualism per say but biliteracy which enables the forming of cognitive advantages of bilingualism therefore an opportunity for the bilinguals to be educated in both their languages improves their chances of reaping the benefits of bilingualism (Stanz, 2000).

When the L2 is present in the community the quality and quantity of the interaction with the speakers of the L2 is another factor. This is connected to L1 maintenance, if we are talking about a minority language situation. As we know from the developmental interdependence hypothesis the higher the levels in the two languages the better developed the cognitive functions. But it has also been confirmed that in minority settings it is better for the family to communicate in their L1. This is because L1 maintenance positively influences the acquisition of the L2 and L3.

Conclusion

As we have seen the effects of bilingualism on cognition are quite a complicated matter. The stand on this issue today is well described in the quote by Ellen Bialystok and Xiaojia Feng: "The picture emerging from these studies is a complex portrait of interactions between bilingualism and skill acquisition in which there are sometimes benefits for bilingual children, sometimes deficits, and sometimes no consequence at all." (p. 121 as cited in Grosjean 2011).

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