



The “Bilingual Paradox” Explained: A Review Paper

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ABSTRACT

The present paper aims at analysing the so-called “bilingual paradox”, providing an insight into the phenomenon by comparing and contrasting the most relevant empirical research which examine the cognitive costs and benefits of bilingualism. Specifically, it takes into account different historical phases and perspectives of study, highlighting the effects of the bilingual experience on cognitive skills and Executive Functions (EFs) in verbal and non-verbal domains. A particular focus is placed on the difference between two cognitive components, i.e. analysis of representation and control of attention, to better understand and define the positive and negative effects of bilingualism. Indeed, current studies have highlighted the importance of considering the joint relationship between different aspects of cognition, for they are affected by the bilingual experience in different ways and lead to different outcomes in linguistic and non-linguistic tasks.

1. Introduction

Nowadays, with more than half of the world’s population speaking at least another language, considering the relevance of dialects too, it can be claimed that bilingualism represents the default state of language competence, rather than the exception. That is to say, more than half the world’s population lives with two or more languages. Bilingualism is found in all parts of the world, at all levels of society, in all age groups. Moreover, as Grosjean points out, even in countries with many monolinguals, the percentage of bilinguals is high (Grosjean, 2010). Accordingly, in the last decades, the phenomenon has received attention from different fields of studies, i.e. educational, cognitive, neurolinguistics, psycholinguistics etc. with the aim of providing an answer to one main question: which are the effects of bilingualism? The present paper investigates different historical phases and perspectives of study of the so-called “bilingual advantage”, providing an insight into the phenomenon by reviewing the most relevant contributions which examine the cognitive costs and benefits of bilingualism. Specifically, it investigates the effects of the bilingual experience on cognitive skills and Executive Functions (EFs) in verbal and non-verbal domains. A particular focus on the relevance of differentiating between analysis of representation and control of attention is included since it leads to what has been defined as the “bilingual paradox”, i.e. different outcomes in linguistic and non-linguistic tasks. Indeed, current studies have highlighted the importance of considering the joint relationship between different aspects of cognition for they are affected by the bilingual experience in different ways.

2. Bilingual advantage? The historical perspective

From a close look at the literature on bilingualism and intelligence over its long history, two contrasting assumptions can be delineated. The “additive effects” phase started in 1962, when

the most influential work on bilingualism was published. Indeed, Peal and Lambert's contribution (1962), *The Relation of Bilingualism to Intelligence*, paved the way to a number of important studies questioning the validity of previous research focused on bilingual disadvantages. Recent literature, improving on the earlier methodologies, shows that bilingualism could have a positive effect on cognitive development. Specifically, the main areas where the bilingual experience has been proved to have positive outcomes concern the cognitive skills involved in language learning processes such as speed of processing, Working Memory (WM), Theory of Mind (ToM), and Executive Functions (EFs) in general (see Bonifacci et. al., 2011; Bialystok, 2009).

Nonetheless, prior to 1962, the mainstream concept among scholars and lay speakers was that being bilingual could be detrimental from a cognitive and psychological point of view. The contrasting opinions, characterising the two historical phases on the effects of bilingualism, are conveyed in these representative assumption taken, respectively, from the negative and additive effects research. Hakuta et al. (1987) report the following statement from George Thompson's (1952: 367) American textbook on child psychology:

There can be no doubt that the child reared in a bilingual environment is handicapped in his language growth. One can debate the issue as to whether speech facility in two languages is worth the consequent retardation in the common language of the realm.

On the other hand, Elizabeth Peal and Wallace Lambert (1962), in reporting the aforementioned study of bilingual children in Montreal, describe their typical subject as:

A youngster whose wider experiences in two cultures have given him advantages which a monolingual does not enjoy. Intellectually his experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, a more diversified set of mental abilities... In contrast, the monolingual appears to have a more unitary structure of intelligence which he must use for all types of intellectual tasks (p. 20).

Thompson's statement and its inherent contradictions can be interpreted as a dramatic example of a superficial approach to such a complex phenomenon. First, when dealing with empirical research on bilingualism, different degrees and types of bilingualism need to be taken into account. Second, current studies have highlighted the importance of considering the joint relationship between different aspects of cognition, which are affected by the bilingual experience in different ways. Specifically, as it will be further evaluated in the following sections, the two main cognitive components, namely analysis of representation and control of attention, lead to cognitive costs and benefits depending on the extent to which they are involved in the specific task under investigation.

3. The Bilingual Disadvantage in Verbal Tasks

Despite the substantial advantages in EFs reported in bilinguals, the literature investigating the effects of bilingualism has also reported a series of cognitive and linguistic processes where bilinguals are seen to perform poorly compared to monolinguals. Specifically, the most important disadvantages related to the bilingual experience concern lexical retrieval, verbal fluency, and language proficiency. However, it is important to highlight that most of the experiments employed in these studies are based on response times and have neural correlates.

It is well documented that bilinguals control a smaller vocabulary in each language compared to monolinguals. As Bialystok points out, this is particularly important given that vocabulary size is a central measure to assess children's progress in language development. Specifically, a richer and more refined vocabulary reflects a better understanding of the language under investigation. Nonetheless, developmental research has demonstrated that bilingual children control a smaller vocabulary in each language than their monolingual peers (e.g. Oller and Eilers, 2002). Bialystok and Feng (2009) confirmed these findings by combining results from a standardised Peabody Picture Vocabulary Test score of monolingual and bilingual children aged between 5 and 9 years old, who had participated in a number of studies for several years. The difference between bilingual and monolingual children was confirmed in each age group and the vocabulary gap was constant through the sample as the analysis showed no interaction of age and language group.

The same scenario is found in adults even though the measures employed do not concern vocabulary size but rather access to vocabulary or lexical retrieval. During picture-naming tasks, for instance, reaction times have been observed to be slower for bilinguals immersed in their L1 environment and for those living in the L1 environment (Gollan et al., 2008; Ivanova & Costa, 2008). Moreover, bilinguals have also been reported to have longer reaction times in verbal fluency tasks, where they are asked to produce as many exemplars as possible within a given category or given a first letter (e.g. Sandoval et al., 2010), in semantic decision tasks (e.g. Proverbio et al., 2007). In addition, bilinguals have been reported to experience more tips of tongue, demonstrate poorer word identification through noises and experience more interference in lexical decision.

It has been argued that, on the basis of the bilingual deficit found in all these studies, there is the interface from other competing languages. Costa (2005) points out that manipulating the relationship between the words into the two languages may change bilingual performance, for example, by controlling the cognate value or adjusting word frequency.

Bialystok (2009) maintains that the bilingual disadvantage in lexical access and retrieval persists with aging. In order to confirm this hypothesis, she administered three tasks to assess verbal knowledge and retrieval: an English vocabulary test and two tests of verbal fluency. What was particularly interesting about the design of tasks is that the author decided to substitute the drawings that they were supposed to name with verbal definitions. The assumption was that accessing words would be more demanding from abstract definitions rather than concrete drawings, where a contextual support can be found. The findings confirmed bilinguals' worse performance compared to monolinguals in both age groups.

4. Different Accounts for the Bilingual Disadvantage

As already argued, the major problem observed in the early studies on bilingualism is that they failed to control the type and degree on bilingualism since the criteria used to distinguish between bilingual and monolingual groups were not reliable. For instance, they were classified on the basis of their parents' surnames, place of residence, and parents' birthplace (Brunner, 1929). The other fundamental deficit of previous literature, highlighting bilingual disadvantages from a cognitive points of view, deals with type of task used to assess bilinguals' performance. That is, they mainly assessed bilinguals' verbal abilities which, as previously debated, lead to costs for bilinguals being the type of task employed of fundamental importance.

Nowadays, thanks to an improved methodology and a broader knowledge of the phenomenon object of investigation, it is not surprising that bilinguals performed poorly than monolinguals in the majority of the studies reviewed. Indeed, current studies shed light on the bilingual disadvantage observed resorting to more refined and detailed accounts. A number of researchers

support the aforementioned assumption that it is the cross-language interference to cause bilinguals' poor performance (e.g. Rosselli et al., 2000, Sandoval et al., 2010). However, they notice that bilinguals show poorer performance on certain tasks, such as semantic fluency tasks, and no difference compared to monolinguals on letter fluency tasks.

To account for these differences, an alternative explanation has been propounded, that is the "Weaker Links Hypothesis" (Gollan et al., 2008). It states that as regards lexical retrieval, the disadvantage is due to the fact that each individual lexical item is used less frequently by bilinguals compared to monolinguals of the same language used in experimental settings. Therefore, this explains why the lexical items within a language are less strongly connected in bilinguals than in monolinguals. To support this hypothesis, Gollan and colleagues demonstrated that bilinguals poorer performance occurred, specifically, with low-frequency words compared to high-frequency words, especially in their non-dominant language. Moreover, they also found that these frequency effects were attenuated in older participants, supporting the claim that frequency counts in the lexicon of bilinguals may be lower. This explanation comes from bilingual language modelling where the retrieval effects are simulated in a connectionist network. That is to say, the associative networks between words and concepts are distributed across two (or more) languages, making the association less practiced and less fluid.

On the other hand, Hernandez and Li (2007) have advanced a different explanation to account for the bilingual disadvantage in lexical retrieval. Indeed, they propose an explanation involving the age of acquisition of the vocabulary in each language, with the different performance on behalf of bilinguals depending on the age of the L2 acquisition. In addition, there are other views propounded to explain the reduction in lexical retrieval referred to the aforementioned conflict created by the competition between the item in the target and non-target language, which is still available in the bilingual lexicon (Green, 1998). This competition requires longer times to access the lexicon as a mechanism for controlling attention to the target language and for inhibiting the non-target one needs to be activated. This conflict is generally resolved by the executive processes for control, attention, and switching.

5. Language Processing: Monolingual and Bilingual Brain

Neuroimaging studies have found support to the idea that bilinguals and monolinguals process their native languages differently in lexical retrieval, although there is no common agreement on the brain regions involved, distinguishing monolinguals and bilinguals. Park et al. (2012) observed greater activation in the bilingual participants for both L1 and L2 compared to monolinguals in lexicon decision tasks. In particular, bilinguals involve more the left middle and superior occipital gyri and the right middle occipital gyrus whereas monolinguals showed greater activation of the right supramarginal gyrus.

Nonetheless, it has been argued that there may be additional factors to take into account when examining these differences in brain activation. For instance, the participants of the study had different L1s and the bilingual group had been living in the L2 environment for many years, suggesting an effect of L1 attrition. Similarly, a study by Perk et al. (2012) identified five left-hemisphere brain regions that showed greater activity for bilinguals than monolinguals in both of their languages.

As already argued, the type of tasks used in different studies may also account for different brain activation in monolinguals and bilinguals. For instance, Perk et al. used a lexicon decision task instead of the picture naming and word reading tasks. On the other hand, Martin et al. (2012) conducted a go/no-go word length task to measure Event-Related Potential (ERP) responses. Interestingly, the explanation advanced by the researchers for bilinguals slower lexical access is

that they automatically process semantic information in both languages even when it is not needed. Participants were required to respond to the pseudowords determining whether or not they were more than five letters long, ignoring the real English words. The access to semantic information was not necessary for the task. However, bilinguals were reported to always process the semantics of English words, while monolinguals showed no difference between primed and unprimed words. Accordingly, the study suggests that bilinguals delay in the lexical decision due to the stage of semantic analysis always occurring.

What is crucial to highlight about the reviewed studies on the differences between monolingual and bilingual language processing is the evidence they provide to the claim that bilingual experience reshapes speakers' linguistic system as a whole. In other words, apart from explaining bilinguals' poorer performance in certain tasks, these studies demonstrate that bilinguals are not two monolinguals put together in that they present a unique cognitive system, reshaped by the bilingual experience. Grosjean (1985, 2006) was the first to propound the view that bilinguals do not simply add an L2 repertoire to their original one. The concept is also in line with the dynamic system theory by De Bot and colleagues (2007), according to which a speakers' linguistic system encompasses all languages known and is an ever-changing identity. Differently from the linear additive approach to language development, the theory posits that language development is a dynamic system comprising a set of variables that interact with each other and continue changing throughout individuals' life.

It has been claimed (Higby et al., 2013) that the dynamic system theory could account for both the positive and negative effects of bilingualism in that it explains the unique characteristics of the bilingual language processing. Indeed, the idea that multilinguals have a single linguistic system involving different linguistic repertoires is supported by a series of studies of cross-linguistic interference. These studies have found out that bilinguals tend to resolve differences in their multiple languages by forming a set of intermediate representations that appear dissimilar from those of monolinguals in the same languages. This claim has been supported by empirical evidence in different areas such as in lexical category boundaries (i.e. Ameel et al., 2009), use and interpretation of grammatical subject (i.e. Tsimpili, Sorace et al., 2004), and colour perception (Athanasopoulos et al., 2010).

6. Analysis and Control: the Bilingual Paradox Explained

To find a unique explanation that accounts for both the advantages and disadvantages observed in bilinguals, in the different cognitive domains examined so far, is not an easy task. Bialystok (2009) suggests that the central conflict on the basis of bilingual language processing and production could explain the enhancement in executive control on one hand and, the slower lexical retrieval on the other. Indeed, it compromises lexical access in that, as already discussed, it is more effortful and enhances executive control through its continuous involvement in language production. In terms of memory there is a little impact but, since memory performance relies on either linguistic or executive processing, monolinguals and bilinguals will perform differently depending on the type of task used.

Besides, the fact that linguistic and non-linguistic processing are controlled by networks of activation (Abutalebi and Green, 2007) entails that bilingualism affects the entire brain processing, with consequences on the linguistic and non-linguistic cognitive aspects discussed. Besides, bilinguals have been reported to resolve verbal conflicts activating two areas that monolinguals use to resolve non-verbal conflicts, including Broca's area. Instead, another study by Bialystok et al. (2005) revealed that to resolve verbal conflicts, bilinguals have more resources (i.e. Broca's area) as well as more efficient resources (i.e. other frontal areas).

Therefore, the bilingual experience seems to lead to great benefits in non-linguistic processing and to costs in language production.

Bialystok and Ryan (1985) provided an interesting explanation to account for the positive and negative effects of bilingualism, reported in the present paper, moving performance in the opposite direction. On average, bilinguals have been seen to perform poorly compared to monolinguals in tasks based on the rapid lexical access whereas they perform more efficiently on non-verbal tasks assessing executive control. To account for this paradox where linguistic experience leads to costs for language processing and benefits for the non-verbal cognitive ability the authors refer to two different components involved: i.e. analysis of representation and control of attention. Indeed, they argue that both components are required for skilled performance in language processing and production and, when they are at different levels, they cannot be integrated properly into fluent performance. In particular, the knowledge base is the representation of information needed to perform in a cognitive domain.

However, linguistic development does not simply rely on the accumulation of knowledge since the increased organisation of that knowledge is needed to support higher levels of performance, that is to say, analysis. The more knowledge becomes organised and structured, the more it becomes explicit and can be manipulated. Therefore, through the process of analysis, knowledge is continually rebuilt by adding new information and by the constant restructuring of it that makes knowledge more abstract and accessible.

Moreover, Bialystok and Ryan claim that information moves along a continuum from implicit to explicit knowledge, with different degrees of explicitness needed to perform certain types of tasks. In this sense, the analysis is responsible for the reforming the organisational structure of information needed to support increasingly complex performance.

As regards the other component, control of attention, it refers to the cognitive procedures employed to access knowledge and carry out the required task. It started to be particularly relevant in the attempt to explain the relationship between explicit knowledge of the language, fluent performance, and MLA. Indeed, the control of attentional processes is fundamental when there is misleading or irrelevant information that needed to be avoided so that the selection of the target information occurs efficiently. Differently from the analysis component, which is domain specific, control of attention is domain general, for it does not reside in a particular knowledge system but in the resource-limited attention mechanism of the mind.

To better understand the role of analysis and control in performance, it is worth reconsidering the aforementioned metalinguistic awareness task administered to children (Bialystok, 1986), where they were asked to judge the grammaticality of sentences. Children's ability to reject an ungrammatical sentence, that is to say, a sentence such as "Apples grew on trees" relies on their representational knowledge of grammar (i.e. analysis of linguistic structures). On the other hand, children were also warned that the only criterion for judging the acceptability of the sentences was whether or not they were said "the right way", even though there might be some sentences that were considered to be "silly". Accordingly, when a sentence like "Apples grow on noses" is presented, children that were able to ignore the semantic anomaly and still judge the sentence as acceptable relied on their control of attention. Indeed, the salient anomaly acts as a distractor that needs to be inhibited to focus attention on the formal structure of the sentence.

Thus, the two components involved explain why in tasks where both analysis of representation and control of attention bilinguals and monolinguals perform differently. Specifically, they are equally successful at determining whether a sentence is correct or not but bilinguals are better at dealing with a grammatical but semantically anomalous sentence. This is due to their more

efficient use of the control of attention component, fundamental where inhibition of the non-relevant information is involved.

On the other hand, as discussed in the present work, bilingualism also leads to costs in cognitive performance. The difference between the tasks that lead to a deficit or advantages for bilinguals can also be interpreted in light with the analysis and control theory advanced by Bialystok and Ryan. All the tasks where bilinguals have been reported to perform poorly, that is lexical access tasks, involve rapid retrieval of a lexical item from semantic memory. The most important factor which determines how fast and how efficiently this retrieval occurs is the nature of the representational base in semantic memory. In other words, the better and more explicitly the linguistic and conceptual representations are organised, the easier it will be to retrieve specific items. However, the authors argue that while there is no reason to assume that bilinguals have less defined and organised representational systems, there is a reason to assume that bilinguals' representational systems for each language are less well connected to the conceptual system. Indeed, bilinguals use each of their naming options less often than monolinguals with the consequence of having a less efficient and fluent access to the items. Moreover, bilinguals poorer vocabulary in each language diminishes the representational base from which performance in these tasks proceeds.

In contrast, all the studies reported where a bilingual advantage was observed mainly rely on aspects of executive control. Thus, it can be argued that both, analysis of representation and control of attention, are involved in linguistic and non-linguistic tasks but the different performance between bilinguals and monolinguals is due to the different emphasis of each component. Thus, the general disadvantage for bilinguals in representation and the general advantages in control determines performance in these paradigms.

Nonetheless, the authors state that in fact, it would be more precise to claim that verbal and non-verbal tasks rely on the interaction of both components rather than mainly on one or the other. This interaction is particularly evident in linguistic tasks that also carry significant demands for executive control. Thus, it can be argued that Bialystok and Ryan's model accounts for a wide range of cognitive tasks including different domains and levels of skilled performance. That is, every single task we perform depends on how efficiently we manage to use both components to support performance. However, analysis of representation is specific to a domain while control of attention and executive procedures for monitoring information, conflict resolution, and task switching are more advanced for bilinguals and these processes concern all domains of expertise. Accordingly, the model provides a reasonable account for learning and development for language ability.

6.1 Analysis and Control in Metalinguistic Tasks

Another research by Friesen and Bialystok (2012) examines the relative contribution of language knowledge on one hand and executive control ability in metalinguistic tasks. It has been argued that ML tasks, unlike the reviewed linguistic tasks, require to access both attentional processes and linguistic knowledge in different extents. Again, the findings are consistent with the already discussed general framework of control and language analysis as originally proposed by Bialystok and Ryan (1985). What is more, through a number of different tasks that vary with regard to linguistic and metalinguistic demands, the authors were able to focus on the level of metalinguistic development in bilinguals. Indeed, the study provides additional evidence to understand the impact of each component and how analysis and control jointly affect MLA.

In particular, they demonstrated that the two most important factors affecting bilinguals' performance are the nature of the task demands and the degree of bilingualism. In the Wug test

(Berko, 1958), children need to apply English morphological rules to nonsense words. It does not make a high demand on the executive control as there is no salient distracting information to ignore. Instead, it requires a high level of English morphological knowledge. Bilingual positive effects, here, were only observed with balanced bilinguals, that is participants with an equal level of proficiency in both languages. No additional advantages were recorded in participants becoming bilinguals with dual language exposure. Therefore, the better performance on the Wug test was due to the initial increased insight into the relationship between language's form and meaning and not by improving executive control.

On the other hand, in the grammaticality judgement and verbal fluency tasks, requiring high levels of executive control, the study showed that the superior executive control skills developed by bilinguals enable them to compensate for the weaker language skills. Moreover, the greater bilingual experience was the factor which determined the improved mechanism control observed.

7. Conclusion

The main aim of the discussion developed in the present paper was to disentangle the complex argument of the so-called bilingual advantage through evidence coming from several empirical studies, each employing a particular methodology to address specific questions, in different historical phases of the research on bilingualism. It can be concluded that since bilingual language processing relies on a series of networks, it is not possible to identify one single cause accounting for the different effects of bilingualism.

As regards the research conducted before 1962, the negative effects reported were mainly due to socio-political reasons, i.e. discrimination towards immigrants and their bilingual children, and a weak and ineffective methodology where socio-economic status, the type of bilingualism, and type of task employed were ignored or overlooked. On the whole, the positive effects observed in a number of EFs such as inhibition, control, attentional networks, WM, ToM etc. and the negative effects found in lexical retrieval, verbal fluency, and vocabulary size can all be considered as part of the complex, unique cognitive structure of bilingual language processing.

Thus, any attempt to define this system as better or worse compared to the monolingual system would fail, in that, the language deficit on one hand and the control advantages on the other constitute the peculiar aspects of the bilingual mind, which makes it different from the monolingual one. Accordingly, what is worth highlighting is the unique nature of bilinguals, together with their unique cognitive system, not comparable to two (or more) monolinguals put together. It is important to switch the focus from the benefits and deficits of bilingualism to the different way of learning and processing knowledge of the bilingual mind. Accordingly, to better understand the positive and negative effects coming from the bilingual experience, it is necessary to consider the linguistic system as a whole, its complex dynamics and how managing two or more language involves different cognitive processes which, in turn, affect linguistic and non-linguistic outcomes.

References

- Abutalebi, J., Green, D. (2007). Bilingual language production: The neurocognition of language representation and control. *Journal of Neurolinguistics*, 20(3): 242-275.
- Ameel, E., Malt B. C., Storms G., Van Assche F. (2009). Semantic convergence in the bilingual lexicon. In N. Ellis (Eds.), *Implicit and explicit language learning* (393-419). London: Academic Press.

- Athanasopoulos, P., Dering, B., Wiggett, A., Kuipers, J., Thierry, G. (2010). Perceptual shift in bilingualism: Brain potentials reveal plasticity in pre-attentive colour perception. *Cognition*, 116 (3): 437-443.
- Berko, J. (1958). The Child's Learning of English Morphology. *Word*, 14(2-3): 150-177.
- Bialystok, E. (1986). Factors in the growth of linguistic awareness. *Child Development*, 57: 498-510.
- Bialystok, E. (2009). Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition*, 12(1): 3-11.
- Bialystok, E., Ryan, E. B. (1985). Toward a definition of metalinguistic skill. *Merrill-Palmer Quarterly*, 31(3): 229-251.
- Bialystok, E., Craik, F. I. M., Grady, C., Chau, W., Ishii, Y., Gunji, A. (2005). Effects of bilingualism on cognitive control in the Simon task: Evidence from MEG. *Neuroimage*, 24:40-49.
- Bonifacci, P., Giombini, L., Bellocchi, S., Contento, S. (2011). Speed of processing, anticipation, inhibition and working memory in bilinguals. *Developmental Science*, 14: 256-269.
- Brunner, E.D. (1929). *Immigrant farmers and their children*. New York: Doubleday, Doran. & Co.
- Costa, A. (2005). Lexical access in bilingual production. In J.F. Kroll & A. De Groot (Eds.), *Handbook of bilingualism: psycholinguistic approaches* (308-325). Oxford: Oxford University Press.
- De Bot, K., Lowie, W.M., Verspoor, M.H. (2007). A Dynamic Systems Theory approach to second language acquisition. *Bilingualism: Language and Cognition*, 10(1): 7-21.
- Feng, X., Diamond, A., Bialystok, E. (2007). Manipulating information in working memory: An advantage for bilinguals. Poster presented at the biennial meeting of the Society for Research in Child Development; Boston, MA.
- Friesen, D. C., Bialystok, E. (2012). Metalinguistic Ability in Bilingual Children: The Role of Executive Control. *Rivista di psicolinguistica applicata*, 12(3): 47-56.
- Gollan, T. H., Montoya, R., Cera, C., Sandoval, T. (2008). More use almost always means a smaller frequency effect: Aging, bilingualism, and the weaker links hypothesis. *Journal of Memory and Language*, 58:787-814.
- Gollan, T. H., Montoya, R., Cera, C., Sandoval, T. (2008). More use almost always means a smaller frequency effect: Aging, bilingualism, and the weaker links hypothesis. *Journal of Memory and Language*, 58:787-814.
- Green, D. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism: Language and Cognition*, 1:67-81.
- Grosjean, F. (1985). The bilingual as a competent but specific speaker- hearer. *Journal of Multilingual and Multicultural Development*, 6(6):467-477.
- Grosjean, F. (2006). Studying Bilinguals: Methodological and Conceptual Issues. In A. De Groot & J.F. Kroll (Eds.), *Tutorial in Bilingualism: Psycholinguistics Perspectives* (225-254). Mahway, NJ: Erlbaum.
- Grosjean, F. (2010). *Bilingual: Life and Reality*. Harvard: Harvard University Press
- Hakuta, K., Ferdman, B. M., Diaz, R. M. (1987). Bilingualism and cognitive development: Three perspectives. In S. Rosenberg (Eds.), *Advances in applied psycholinguistics*, Vol. 2, *Reading, writing, and language learning*. Cambridge, Cambridge University Press.

- Hernandez, A. E., Li, P. (2007). Age of acquisition: Its neural and computational mechanisms. *Psychological Bulletin*, 133: 638-650.
- Higby, E., Kim, J., Obler, L.K. (2013). Multilingualism and the Brain. *The Annual Review of Applied Linguistics*, 33: 68-101.
- Ivanova, I., Costa, A. (2008). Does bilingualism hamper lexical access in speech production?. *Acta Psychologica*, 127(2): 277-288.
- Martin, K., Ellis, N. (2012). The roles of phonological short-term memory and working memory in L2 grammar and vocabulary learning. *Studies in Second Language Acquisition*, 34(3): 379-413.
- Oller, K., Rebecca E. Eilers, (2002). *Language and Literacy in Bilingual Children*. Bristol: Multilingual Matters.
- Park, H. R. P., Badzakova-Trajkov, G., Waldie, K. E. (2012). Language lateralisation in late proficient bilinguals: A lexical decision fMRI study. *Neuropsychologia*, (50): 688-695.
- Peal, E., Lambert, W. (1962). The relation of bilingualism to intelligence. *Psychological Monographs*, 76(546): 1-23.
- Proverbio, A.M., Adorni, R., Zani, A., (2007). The organization of multiple languages in polyglots: interference or independence?. *Journal of Neurolinguistics*, 20(1): 25-49.
- Rosselli, M., Ardila, A., Araujo, K., Weekes, V., Caracciolo, V., Padilla, M., Ostrosky-Solís, F. (2000). Verbal Fluency and Repetition Skills in Healthy Older Spanish-English Bilinguals. *Applied Neuropsychology*, 7(1):17-24.
- Sandoval, T.C., Gollan, T.H., Ferreira, V.S., Salmon, D.P. (2010). What causes the bilingual disadvantage in verbal fluency: The dual-task analogy. *Bilingualism: Language and Cognition*, 13:231-252.
- Thompson, G. (1952). *Child psychology*. Boston: Houghton Mifflin.
- Tsimpli, T., Sorace, A., Heycock, C., Filiaci, F. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism*, 8: 257-277.