

Original Paper

Bilinguals and Their Perceptions of Both Languages in Their Brains

Julia Falla-Wood^{1*}

¹ School of Education, Burman University, Lacombe, Alberta, Canada

* Julia Falla-Wood, School of Education, Burman University, Lacombe, Alberta, Canada

Received: May 13, 2020

Accepted: May 24, 2020

Online Published: June 4, 2020

doi:10.22158/sll.v4n3p1

URL: <http://dx.doi.org/10.22158/sll.v4n3p1>

Abstract

This descriptive research examines the perception of bilingual students on the status of the mother tongue (L1) and the second language (L2) in their brains. The question of the influence or non-influence of L1 in using L2 has been studied under different theoretical frameworks. The issue of the representation of the languages in the brain has also been considered from a neurological perspective. However, no study has been undertaken on how bilinguals themselves perceive both languages in their minds. Do students see L1 and L2 as being together in one system, separate and independent of each other, or independent but sharing an intersection? The sample available to the researcher was 54 high school bilingual students. The research instruments are a questionnaire and a semi-structured face-to-face interview. The results of this study show that the highest percentage of students believe that both languages are independent of each other but share an intersection. All students have compared both languages, and have established differences and similarities between L1 and L2 through mental translations.

Keywords

Bilingualism, second languages, learning strategies, mother tongue, mental translation

1. Introduction

Second language acquisition has been profusely studied, and two leading positions coexist about the theoretical framework. On one side, Lennenberg (1967) and Chomsky (1965, 1976, 1980a, 1980b) propose that there is an innate device for language acquisition, and this specific device is different from the other general cognitive mechanisms. On the other hand, other researchers, Krashen (1981), MacWhinney, Bates and Kliegl (1984), Piaget (1961), and Piaget in Piatelli-Palmarini (1979), claim that the general cognitive mechanisms used for different cognitive activities are the same as the ones

used for language acquisition. Both theoretical frameworks have been applied to studies in second language acquisition, in particular, to understand errors made by learners or speakers of L2 (Falla-Wood, 2017).

Moreover, the relationship between language and thought in bilinguals has been examined in the light of evidence from pathology. Paradis (1987) analyzes studies on aphasic bilinguals from Scoresby-Jackson (1867) to Whitaker (1971) and proposes a set of hypotheses on how the two languages are represented in the brain and how bilinguals process languages. Could one or more of Paradis' assumptions correspond to bilingual students' perception of both languages in their brains? Do students perceive both languages as being together in one system, or two separate systems, or two systems sharing an intersection, or one large system with two independent subsystems? Could these perceptions be related to the strategies students use to speak in both languages? Could these perceptions be associated with the influence of L1 or L2?

2. Literature Review

To explain the representation of two languages in the brain, researchers have generated different theories. Weinreich (1953) posits that there are two types of bilinguals: compound and coordinate. The compound bilinguals learn L2 at the same time and within the same context, while the coordinate bilinguals learn L2 at a different time and a different learning context. The languages will function more independently in coordinate bilinguals than compound bilinguals. Lambert and Fillenbaum (1959, p. 29), collecting data from bilingual aphasics, use the compound-coordinate distinction and suggest in a neuropsychological hypothesis that languages could be represented in separate neural structures, depending on the context of the acquisition. They claim, "coordinate bilinguals should have more functionally separate neural structures underlying their languages than should compound bilinguals". Thus, the concepts *house* and *maison*, which are more functionally independent for coordinate than for compound bilinguals, would be "stored" in neural elements that have some sort of greater functional discreteness for the coordinate bilinguals. Kolers (1963) sees the independence-interdependence question in terms of bilingual memory stores. In the independence position, the bilingual memory has two independent storage and retrieval systems interrelating through translations. For the interdependence position, there is one memory store for both languages.

On the other hand, Paradis (1980) proposes that both languages are distinctively connected to the same conceptual-experiential store. Paradis (1987) analyzes studies related to the functional development and image of the bilingual brain. He collects data from aphasic bilinguals, who have suffered cardiovascular accidents, and proposes several hypotheses for the bilingual brain. The Extended System Hypothesis posits that there is one neuro-functional system for both languages. In this case, the representation of both languages is a common way with no difference in languages. In the Dual System Hypothesis, two neurophysiological systems are coexisting independently in the brain. In this case,

each linguistic structure has different neural connections for each language. Thus, both languages are represented separately in the brain. In the Tripartite System Hypothesis, there is one representation of what is common to L1 and L2, and two different neural structures for what is different. Therefore, what is different is represented separately, and what is common to both is represented only once. Finally, in the Subsystem Hypothesis, which is a variation of Lambert and Fillenbaum's hypothesis, the context of the acquisition, separated in time or by a cultural environment, determines if the neural system is separate or together. For Paradis, there is one neuro-functional system and two independent subsystems. In this case, bilinguals have two subsystems, one for each language. Each subsystem can be activated or deactivated independently, and these subsystems can exist inside an extensive system, called the language system. Paradis uses a neurolinguistic approach; however, its interpretations can be applied to second language acquisition within a psycholinguistic perspective.

In regards to thinking in the second language, Whorf (1897-1941), considered as one of the fathers of linguistic relativity, believes that languages have an impact on perceptions, thoughts, and behaviours. Whorf (1941c) postulates that the language or languages one learns influence one's worldviews. Languages can influence one's worldviews, but is it possible to think in a spoken language? Are thoughts independent of languages? Nisbett and Wilson (1977) claim that introspection, related to cognitive processes, is difficult to trust. However, they believe that introspective awareness is motivational, and even though people may not detect their cognitive processes, they could report correctly about them. Fodor (1987) posits, "Thinking consists of chains of mental events that instantiate mental representations" (p. 17). The mental representation is a mental item with semantic properties. Thus, thinking about something is manipulating sensory representations and not necessary linguistic ones. Therefore, thoughts can be represented without words. Pavlenko (2011) claims that language comes as silent-talk, which is the mental activity that occurs in a linguistic code. The results of the research on colour discrimination task with bilinguals in Greek and English carried out by Athanasopoulos (2009) show that the time and age of exposure to L2 play an important role in the perception of L2.

Furthermore, numerous second language teachers believe that thinking and dreaming in L2 are positive signs of fluency. Is it possible to dream in L2? Grosjean and Soares (1986) point out the complementarity principle, which postulates that dreaming in any of the languages depends on the situation and the person's language in which one is dreaming. The results of a study undertaken by De Koninck (1980) indicate that students who dream of speaking in French (L2) earlier show an improvement in their acquisition quicker than the other students do. Therefore, dreaming in L2 could be considered as a sign of language improvement. It could also reflect a level of acculturation.

Is French more complicated than English is? Historically and for centuries, French was the language of the aristocracy in England and the rest of Europe. Some would say that French pronunciation, spelling, and grammar are challenging; others would say that English is more complicated, and some others

would say that it depends on how distant L1 is from English. Is the difficulty a question of perception? In this study, it is not essential to determine which language is more complicated than the other but to examine if the difficulty of the language would be a factor to take into consideration in the perception of both languages in the brain.

Regarding the influence of L1 on L2 through the analysis of errors, three positions coexist: L1 exerts an important influence on L2; L1 exerts a partial influence on L2, and L1 does not exert any influence on L2. Falla-Wood (2017) suggests that the choice of a theoretical framework could explain the coexistence of these three positions. The results of studies, which the underlying conceptual framework was strategy-cognitivist, show a continuum from partial to a substantial influence of L1. In contrast, those using a linguistic-conceptual framework indicate a minimal or a non-influence of L1.

Different concepts, theories, or models have been used to explain the influence or non-influence of L1 in learning and speaking L2. Odlin (1989) defines *transfer* as the effect or influence that similarities and differences between L1 and L2 have on the learners of L2. Zobl (1984) states that the Positive Transfer strategy is used when L1 and L2 have the same structures, and *Negative Transfer* or *Interference* when L1 and L2 have different structures. The concept of *Interlanguage* proposed for the first time by Selinker (1972) is presented as an intermediate language different from L1 and L2. The concept of Interlanguage does not make a distinction between the types of knowledge. Bialystok (1982) tries to define the role of the instruction in L2 and distinguishes two types of knowledge: the implicit knowledge, which is the interiorized knowledge, and the explicit knowledge, which is the conscious knowledge. For the strategies that learners used in L2, O'Malley et al. (1985a, 1985b) define these strategies as steps that the learners take to increase their comprehension and expression in L2. They classify 26 strategies in three different categories: cognitive, metacognitive, and social. In this classification, mental translation is considered a cognitive strategy. Falla-Wood (2018) proposes that the students use a Mental Translation Strategy (MTS) to compare and establish similarities and differences between both languages. These comparisons create a translational zone where the similarities and differences of both languages are placed. The product of MTS becomes a procedural knowledge, stored in the long-term memory; the learners will retrieve automatically and unconsciously the information from their translational zone to communicate in L2. The constant passage between L1 and L2 could explain the errors, on the one hand, and on the other hand, it could explain the code-switching that happens between bilinguals.

For the theories in L2, Ellis (2002) proposes the *Connectionism Model*, a model where it is the frequency of language input, which creates associations in the brain. MacWhinney, Bates and Kliegl, (1984) put forth the *Competition Model*, where they claim that the learners do not rely on linguistic universals but use cues to understand L2. McLaughlin (1987) states that the capacity of the learners to process information depends on the tasks required and their ability to process information. Thus, learning an L2 is like executing any other complex activity. O'Malley et al. (1987, 1990) try to insert

the learning strategies in Anderson's *Automaticity Model* (1983, 1985) and claim that the cognitive and metacognitive strategies can be classified as procedural knowledge. For the Noticing Hypothesis, Schmidt (1990) posits that the learners must be able to "notice" the differences between their Interlanguage structures and the L2 to improve their acquisition in L2. Ullman (2001) applies the *Automaticity Model* (Anderson, 1983, 1985, 1992) to understand how the declarative knowledge (what we know or static information) and the procedural knowledge (what we know how to do or dynamic information) related to language are stored in the memory.

As mentioned above, concepts and theories have been developed to understand second language acquisition, and it is still a field to be explored. In this paper and for practical purposes, it is important to define specific terms employed in this paper. The term *system* will be used to point out the mental processes made by the bilingual student, and the term *model* will be used to point out a set of concepts. The four models proposed are the *Single System*, which refers to Paradis' Extended System Hypothesis; the *Double System*, which refers to the Dual System Hypothesis; the *Intertwined System*, which refers to the Tripartite System Hypothesis, and, finally, the *Double Subsystem*, which refers to the Subsystem Hypothesis.

Single System

From the psycholinguistic perspective in second language acquisition, the *Single System* gathers those researchers who believe that the learning processes for L1 and L2 are the same. These researchers, under the influence of Chomsky's Language Theory (1965), postulate the intervention of universal principles, which are grammar properties applicable to all languages and parameters, which are specific properties applicable to each language. Therefore, the acquisition of L2 follows the same phases of development as L1. The influence of L1 on L2 is negligible. Clahsen and Muysken (1986) suggest that L1 has minimal influence on learning an L2. Dulay and Burt (1974b) undertake a study with 60 Spanish-speaking children and 55 Mandarin-speaking children and find that the sequence of acquisition of function words is the same for both groups even though their L1s have linguistic distance. Flynn (1984, 1987) suggests that the learners have access to all parameters, and the difficulties the learners encounter in L2 are the same as in L1. Hawkins (2001) supports the view that the syntactic performance of L2 learners shows the use of universal principles. Krashen (1982, 1983) proposes that linguistic Interference is due to ignorance and not to the influence of L1. Liceras (1988a, 2007) states that the learners have access to all parameters, but they prefer to use the L1 parameters. Meisel, Clahsen, and Pienemann (1981) point out that the learners follow an order of acquisition in L1 and L2, and this order is independent of their social profile or their L1. Schachter (1989) claims that the learners have access to the universal principles and the parameters that they have already established in L1. Slabakova (2006) argues that Universal Grammar plays an essential role in the acquisition of L2. White (1985, 1986, and 2003) posits that the learners use the L1 parameters, and when their competence increases in L2, they will use L2 parameters. Wode (1981) suggests that the mechanisms

responsible for the acquisition of L1 are the same for L2. From a neurolinguistics perspective, Paradis (2004) hypothesizes that two languages in the same cortical zone of the brain constitute one neuro-functional system: the language system.

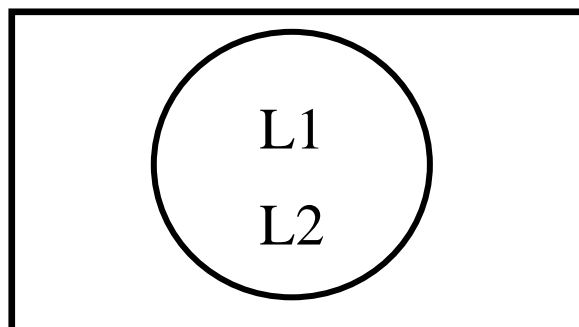


Figure 1. Single System

Double System

The *Double System* gathers those researchers who believe that the learning processes for L1 and L2 are separate and independent. Only two researchers in second language acquisition support this position: Fries (1945, p. 6) defines language as “a set of habits for oral production and reception”. He claims that the students will not learn a language unless the automatic habits have been established. Lado (1957) develops the contrastive analysis theory, which helps to identify the difficulties a learner will encounter in learning a second language. They believe, under the influence of the behavioural approach, that it is possible to create two independent systems in the learner's brain. Selinker (1972, 1992) uses for the first time the term *interlanguage*. He observes that second language learners use different linguistic structures from native speakers to communicate the same message. As these linguistic structures are different, the two linguistic systems are also separate. The Interlanguage is an intermediate language, which is independent of both L1 and L2. Paradis (2004) presents the hypothesis of two different neurophysiological entities. These two systems will exist separately and independently.

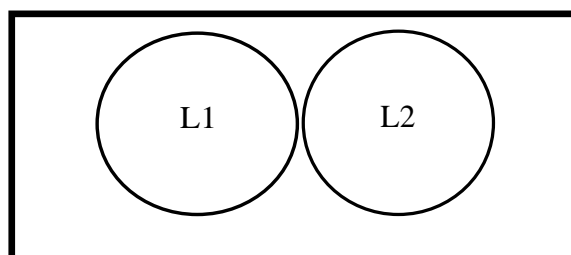


Figure 2. Double System

Intertwined system

The *Intertwined System* gathers those researchers who believe that the learning processes for L1 and L2 are partly dependent and partly independent of L1. Numerous studies have been undertaken in the field of second language acquisition to understand errors made by the learners in L2. Carrió-Pastor (2012) analyses the lexical errors made by Spanish researchers writing scientific texts in English and indicates that more than half of the errors came from L1. Carrió-Pastor (2014) suggests that there is conceptual Interference in scientific texts written in English by non-native speakers. These errors are the result of an “erroneous conception of the relationship between the image, concept and term” (p. 99). Therefore, “The process followed in translating a concept from the mother tongue into the target language is not always followed correctly by speakers of a second language and so conceptual errors may be detected” (p. 102). Faerch and Kasper (1986) state that transfer takes place when a structure in L2 is identical to a structure in L1. Hulk and Müller (2000) report a cross-linguistic influence from two bilingual children (Dutch-French and German-Italian) when there is an overlap between both languages and ambiguity in one of them. Köhlmyr (2003) states that English high school students’ errors come from transferring Swedish grammatical structures into English. Larsen-Freeman (1976) states that the morphological acquisition order is interrelated to the student mother’s tongue and the learning process of L2. Furthermore, Miliander (2003) examines the errors made by future English teachers in written and oral production and relates those errors to their L1, Swedish.

Mourssi (2013) points out “Arab learners of English think in Arabic first, before performing the task in English. [...] This happens with most of the Arab learners of English up to higher levels” (p. 255). Nicoladis (2002, 2006) argues that there is a transfer in speech production in bilingual children (English-French). Pavlenko (2011) states, “The enormous literature on transfer or cross-linguistic influence from L1 indicates that even advanced L2 speakers continue to be influenced by their L1 in a range of domains” (p. 146). Sharwood-Smith and Kellerman (1986) propose the term *Cross-linguistic influence* through *Facilitation* (Positive Transfer), *Interference* (Negative Transfer), *Avoidance* (learners avoid the use of structures they find difficult or ignore), and *Overgeneralization* (excessive use of premature generalization). Towell and Hawkins (1994) claim that transfer exists at all linguistic levels. Lixin (2015) suggests, “*Interlingual Transfer* might account for most of the errors. As there are substantial differences between Chinese and English in regards to the word class, Chinese learners may inappropriately apply their mother tongue rules and knowledge to their English learning” (p. 44). Ye (2004) says, “The struggle between English and Chinese is constant. When speaking English, I may think in English, but only partially; the next moment, it flicks back to Chinese” (p. 138). After analyzing the tag question errors in Chinese people, Zhang (2010, indicates, “Many elements of the native language have no corresponding counterparts in the target language; L1 habits would cause errors in the L2, and learners would transfer inappropriate properties of L1” (p. 579). Paradis (1987) proposes the Tripartite System Hypothesis, where what is common to L1 and L2 is represented only

once, and what is different and specific to each language is located in different neural structures.

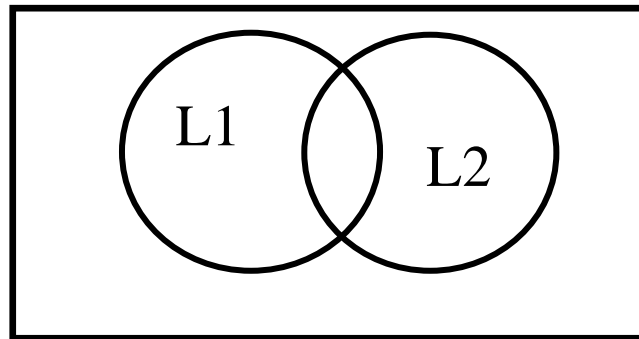


Figure 3. Intertwined System

Double Subsystems

Paradis (1987) also proposes a hypothesis called *subsystems*. According to this hypothesis, both L1 and L2 have two subsystems, which exist in one system: the language, but both subsystems retain their autonomy. In the *Double Subsystems*, bilinguals would possess two subsystems of neural connections, one for each language, and they will activate each subsystem independently. The frequency of code-switching and code-mixing may be a factor in how these two languages are processed (Grojeans, 1089). Grojeans and Li (2013) propose that both languages are active to a different degree, depending on the similarities and differences between both languages. This hypothesis could be represented as follows.

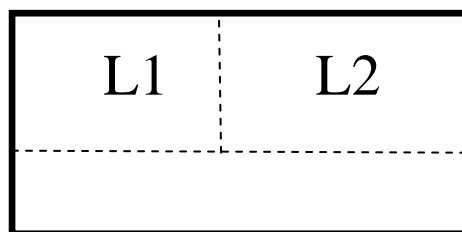


Figure 4. Double Subsystems

One controversial point expressed by Paradis (2009) is whether both languages are active at the same time in the brain, or whether one is activated while the other is deactivated. Is the mixing of languages a matter of lack of control, or lack of knowledge of L2, or is it because both languages are active at the same time, or could it be just a question of accessibility to a word in one language while speaking the other? How do bilinguals themselves perceive both languages in their brain? Do students perceive L1 and L2 as being together in one system, separate and independent of each other in two separate systems,

two systems sharing an intersection, or two independent subsystems in one large system? Could one or more of Paradis' hypothesis correspond to bilingual students' perceptions?

3. Method

This research is an exploratory study. The sample available to the researcher consists of 54 bilingual high school students living in Quebec, a French province in Canada where most of the population speaks French, but studying in English in an English private school. The research instruments used in this study are semi-structured face-to-face interviews and a questionnaire. All of the students voluntarily agreed to participate in this study and signed a consent form. The interviews and questionnaires took place in the school setting during French and English periods in the morning. The researcher conducted the interviews and gave the questionnaire to the students. A research assistant transcribed the semi-structured face-to-face interviews and compiled the results of the questionnaires. The researcher verified both the transcriptions and the results of the questionnaires. The students answered the following questions: Do you consider yourself bilingual? Did you study in an English school in elementary and secondary? Have you compared both languages? Which language do you think is more difficult? Do you know the similarities and differences between both languages? Have you done mental translations between L1 and L2? Do you think in L2? Do you dream in both languages? How do you think both languages are in your brain? Are both languages together? Are both separate? Are both languages independent but share a portion of similarities and differences? Does one language come forward, and the other stays back?

4. Results

The purpose of the question related to bilingualism is to determine if they consider themselves as being bilinguals. The results show that 100% of the students affirm being bilingual. To the question about comparing both languages, 100% of students acknowledge having compared both languages. They declare having established differences and similarities between both of them. They also claim having done mental translations between L1 and L2.

Regarding their time studying in English (L2), the percentage of students who studied in L2 from elementary to high school is 70%. The percentage of students who studied in English from middle school to high school is 30%.

The percentage of students who say that they think in English is 87%. The percentage of students who say that they do not think in English is 13%.

Regarding the question about dreaming in both languages, the percentage of students who dream in both languages is 56%. The percentage for those who do not dream in L2 is 44%.

Regarding which language is more difficult English or French, 87% of students believe that French is more complicated. English is considered more difficult than French by 13% of the students.

Regarding the questions about their perception of both languages in their brains, four options are presented to the students:

- 1) Do you think that both languages are together?
- 2) Do you think that both languages are separate?
- 3) Do you think that both languages are independent but have a shared section?
- 4) Do you think that both languages are independent, but one comes forward, and the other stays back?

The first option shows that 17% of the students believe that both languages exist together in their brains. This perception can be related to the single system, the first hypothesis of Paradis (1987): Extended System Hypothesis.

The second option shows that 39% of the students believe that both languages are separated. Their perception is related to the double system, the second hypothesis of Paradis (1987): Double System Hypothesis.

The third option shows that 44% of the students believe that both languages are independent but sharing a portion of similarities and differences. Their perception corresponds to the third hypothesis of Paradis (1987): the Tripartite System Hypothesis.

There was no response compiled to the fourth option, Paradis' Subsystem Hypothesis, due to a lack of subjects' responses.

5. Discussions

The perception of both languages as being together (Single System) rated the lowest percentage (17%). In this category, males and females studied in French in elementary and began studying in English in secondary. All these students affirm that they do not dream in English, but all of them say that they think in English. All of them consider themselves as being bilinguals. All of them acknowledged having compared both languages through mental translations.

The perception of both languages as being separate (Dual System) and independent of each other reached 39%, which is not negligible. All of them acknowledged having compared both languages. It is worth mentioning that 39% is a high percentage considering that there are very few researchers in second language acquisition, who believe that both languages are completely separate.

The perception of both languages as being separate and independent, but sharing a section (Intertwined System) obtained a result of 44%, which is the highest percentage among all options presented to the students.

These results on the perception of both languages in the brain by bilingual high school students can be associated with Paradis' three hypotheses, the Extended System Hypothesis (Single System), the Dual System Hypothesis (Double System), and the Tripartite Hypothesis (Intertwined System). It is worth mentioning that 100% of students, whether they think in English or not, and whether they dream or not in both languages, have all compared both languages at all linguistic levels and have established

differences and similarities between L1 and L2. In addition, they have all acknowledged having done mental translations between L1 and L2.

Falla-Wood (2018) proposes that the students use a mental translation strategy (MTS) to compare and establish similarities and differences between both languages. These comparisons create a translational zone where the similarities and differences of both languages are placed. As the knowledge in L2 increases, the shared intersection or translational zone becomes larger too, but both languages are still, and will remain separate or independent. Thus, the translational zone contains the product of similarities and differences. The bilingual students retrieve the information from this translational zone and use it to communicate in both languages. The constant passage between L1 and L2 could explain not only the errors in L1 and L2 made by bilinguals but also the code-switching, which frequently occurs in conversations between bilinguals. In this case, the shared space proposed by Paradis in the Tripartite Hypothesis System (Intertwined System) could be the translational zone, an area shared by both languages.

6. Conclusions

The data collected for this study indicate that high school students' perceptions of both languages in the brain are as diverse as Paradis' Hypotheses. These perceptions correspond to three of Paradis' assumptions regarding the bilingual brain: The Extended System Hypothesis (Single System), the Dual System Hypothesis (Double System), and the Tripartite System Hypothesis (Intertwined System). However, the Intertwined System shows the highest percentage among the other systems. This result of a joint section between both languages seems to support what most psycholinguists agree today, i.e., that lexical representation in bilinguals is linked to the same conceptual system (Abel, 2003; Laganaro & Overton Venet, 2001; Larsen et al., 2002; Pavlenko, 2002). This result could also lead to thinking of a narrower relationship between both languages. Falla-Wood (2018) proposes a constant mental passage between L1 and L2 and vice-versa. This continual passage, establishing a translational zone of equivalences or similarities and differences of L1 and L2, could be the sharing section proposed by Paradis' Tripartite Hypothesis System. The frequency of code-switching/code-mixing in conversations between bilinguals may be a factor in how these two languages relate.

Thinking in L2 and dreaming in both languages does not seem to be a determinant factor in the students' perception of both languages in their brains. However, dreaming in both languages could be associated with the length of exposure in L2. Those students who affirmed that they do not dream in both languages began their schooling in secondary only.

Regarding the French language, the results show that the majority of the students think that French is more complicated than English. These results do not appear to be interconnected with the systems, but more with the difficulty of the course itself. In the private English school, where the sample was taken,

French is taught as a second language course. The students claim that French grammar is more complicated than English grammar.

The results of this study also show that no student chose Paradis' Subsystems Hypothesis. Could it be that the other options applied immediately to their perceptions? Could it be that it was the last option proposed? Could it be that it was not clear enough for them? The fact is that none of them chose it. However, the Subsystems Hypothesis could easily explain the code-switching/code-mixing occurring in bilingual conversations.

Perceptions of students on how both languages interact in the brains are the first steps to understanding how bilinguals see the relationship between L1 and L2. Could the mental translation strategy still be active in bilinguals? Could the errors made in both languages by bilinguals be the result of the constant passage between L1 and L2? Could the mental translation strategy explain the fact that some bilinguals use words in L1 that are translations from L2 or the code-switching phenomenon? Further research is needed to understand how bilinguals relate to L1 and L2, and to determine whether they either are coordinate or compound bilinguals.

References

- Abel, B. (2003). English idioms in the first and second language lexicon: A dual representation approach. *Second Language Research*, 19(4), 329-358. <https://doi.org/10.1191/0267658303sr226oa>
- Anderson, J. R. (1983). *The architecture of cognition*. Cambridge, Massachusetts: Harvard University Press.
- Anderson, J. R. (1985). *Cognitive psychology and its implications*. New York: W.H. Freeman.
- Anderson, J. R. (1992). Automaticity and the ACT theory. *American Journal of Psychology*, 105(2), 165-180. <http://doi.org/10.2307/1423026>
- Athanasopoulos, P. (2009). Cognitive representation of colour in bilinguals: The case of Greek blues. *Bilingualism*, 12(1), 83-95. <https://doi.org/10.1017/S136672890800388X>
- Bialystok, E. (1982). On the Relationship Between Knowing and Using Linguistic Forms. *Applied Linguistics*, 3(3), 181-206. <http://dx.doi.org/10.1093/applin/3.3.181>
- Carrió-Pastor, M. L. (2012). A contrastive analysis of epistemic modality in Scientific English. *Revista de Lenguas para fines específicos*, 19, 15-132.
- Carrió-Pastor, M. L., & Mestre-Mestre, E. M. (2014). Lexical errors in second language scientific writing: Some conceptual implications. *International Journal of English Studies*, 14(1), 97-108. <http://dx.doi.org/10.6018/ijes/14/1/154361>
- Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge: M.I.T. Press. <https://doi.org/10.21236/AD0616323>
- Chomsky, N. (1976). *Reflections on Language*. London: Temple Smith.

- Chomsky, N. (1980b). On cognitive structures and their development: A reply to Piaget. In Piatelli-Palmarini (Ed.), *Language and Learning*. London: Routledge & Kegan.
- Clashen, H., & Muysken, P. (1986). The availability of universal grammar to adult and child learners-a study of the acquisition of German word order. *Second Language Research*, 2, 93-119. <https://doi.org/10.1177/026765838600200201>
- De Koninck, J., & Sirois-Berliss, M. (1978). La motivation au rendement dans les rêves et durant l'éveil chez des étudiants canadiens-français et canadiens-anglais [Achievement motivation in dreams and during awakening in French-Canadian and English-Canadian students]. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 10(4), 329-338. <https://doi.org/10.1037/h0081562>
- Dulay, H., & Burt, M. (1974b). Natural sequences in child second language acquisition. *Language Learning*, 24(1), 37-53. <http://dx.doi.org/10.1111/j.1467-1770.1974.tb00234.x>
- Ellis, N. (2002). Frequency effects in language processing: A Review with Implications for Theories of Implicit and Explicit Language Acquisition. *Studies in Second Language Acquisition*, 24(2), 143-188. <https://doi.org/10.1017/S0272263102002024>
- Faerch, C., & Kasper, G. (1986). Perspectives on language transfer. *Applied Linguistics*, 7(2), 111-136. <https://doi.org/10.1093/applin/8.2.111>
- Falla-Wood, J. (2017) Errors in second/foreign language learning and their interpretations. *Education and Linguistic Research*, 3(1), 1-14. <http://dx.doi.org/10.5296/elr.v3i1.10251>
- Falla-Wood, J. (2018). The role of mental translation in learning and using a second/foreign language by female adult learners. *Journal of Global Education and Research*, 2(2), 98-112. <https://www.doi.org/10.5038/2577-509X.2.2.1001>
- Flynn, S. (1984). A universal in L2 acquisition based on a PBD typology. In F. Eckman et al. (Eds.), *Universals of Second Language Acquisition*. Rowley, Massachusetts: Newbury House.
- Flynn, S. (1987). A Parameter-Setting Model of L2 Acquisition. *Studies in Theoretical Psycholinguistics*. <http://doi.org/10.1007/978-94-009-3747-5>
- Fodor, J. A. (1980). *The Language of Thought*. Harvard University Press.
- Fries, C. (1945). *Teaching and Learning English as a Foreign Language*. Michigan: University of Michigan Press, Ann Arbor.
- Grosjean, F., & Soares, C. (1986). Processing Mixed Language: Some Preliminary Findings. In J. Vaid (Ed.), *Language Processing in Bilinguals: Psycholinguistic and Neuropsychological Perspectives* (pp. 145-179). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Grosjean, F. (1989). Neurolinguists, Beware! The Bilingual Is Not Two Monolinguals in One Person. *Developmental Psychology*, 25, 577-588.
- Grosjean, F., & Li, P. (2013). *The Psycholinguistics of Bilingualism*. Oxford: Blackwell.
- Hawkins, R. (2001). *Second Language Syntax: A Generative Introduction*. Oxford: Blackwell.

- Hulk, A., & Muller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, 3, 227-244. <https://doi.org/10.1017/S1366728900000353>
- Köhlmyr, P. (2003). *To Err is Human...: An investigation of grammatical errors in Swedish 16-year-old learners' written production in English*. Goteborg Universitet, Goteborg.
- Kolers, P. A. (1963). Interlingual word associations. *Journal of Verbal Learning & Verbal Behavior*, 2(4), 291-300. [https://doi.org/10.1016/S0022-5371\(63\)80097-3](https://doi.org/10.1016/S0022-5371(63)80097-3)
- Krashen, S. (1981). *Second Language Acquisition and Second Language Learning*. Oxford: Pergamon
- Krashen, S. (1982). *Principles and Practice in Second Language Acquisition*. Oxford: Pergamon.
- Lado, R. (1957). *Linguistics Across Cultures: Applied Linguistics for Language Teachers*. Michigan: University of Michigan.
- Laganaro, M., & Overton Venet, M. (2001). Acquired alexia in multilingual aphasia and computer-assisted treatment in both languages: Issues of generalisation and transfer. *Folia Phoniatica et Logopaedica*, 53, 135-144. <https://doi.org/10.1159/000052668>
- Lambert, W. E., & Fillenbaum, S. (1959). A pilot study of aphasia among bilinguals. *Canadian Journal of Psychology/Revue canadienne de psychologie*, 13(1), 28-34. <https://doi.org/10.1037/h0083764>
- Larsen-Freeman, D. (1976). An explanation for the morpheme acquisition order of second language learners. *Language Learning*, 26(1), 125-134. <http://doi.org/10.1111/j.1467-1770.1976.tb00264.x>
- Larsen, S. F. et al. (2002). Inner speech and bilingual autobiographical memory: A Polish-Danish cross-cultural study, *Memory*, 10, 45-54. <https://doi.org/10.1080/09658210143000218>
- Lennenberg, E. (1967). *Biological Foundation of Language*. New York: Wiley and Sons.
- Liceras, J. (1988a). L2 learnability: Delimiting the domain of core grammar as distinct from the marked periphery. https://doi.org/10.1007/978-94-009-2733-9_12
- Flynn, S., & O'Neil, W. (Eds.). *Linguistic Theory in Second Language Acquisition* (pp.199-224). Dordrecht: Kluwer.
- Liceras, J. (2007). A linguistic approach to the idiosyncratic nature of second language acquisition: monosyllabic placeholders and morpheme orders. *Bilingualism Language and Cognition*, 10(1), 39-41. <http://doi.org/10.1017/S1366728906002781>
- Lixin, X. (2015). An error analysis of the word class: A case study of Chinese college Students. *International Journal of Emerging Technologies in Learning*, 10(3), 41-45. <http://dx.doi.org/10.3991/ijet.v10i3.4563>
- Mac Whinney, B., Bates, E., & Kliegl, R. (1984). Cue validity and sentence interpretation in English, German, and Italian. *Journal of Verbal Learning and Verbal Behaviour*, 23(2), 127-150. [http://dx.doi.org/10.1016/S0022-5371\(84\)90093-8](http://dx.doi.org/10.1016/S0022-5371(84)90093-8)
- McLaughlin, B. M. (1987). *Theories of Second Language Learning*. London: Edward Arnold.

- Meisel, J., Clahsen, H., & Pienemann, M. (1981). On determining developmental stages in natural second language acquisition. *Studies in Second Language Acquisition*, 3, 109-135. <https://doi.org/10.1017/S0272263100004137>
- Miliander, J. (2003). *We Get The Answer We Deserve. A study of vocabulary in a spoken and written corpus of advanced learner English*. Karlstad University: Karlstad University Studies.
- Mourssi, A. (2013). Crosslinguistic influence of L1 (Arabic) in acquiring linguistic items of L2 (English): An empirical study in the context of Arab learners of English as undergraduate learners. *Theory and Practice in Language Studies*, 3(3), 397-403. <http://doi.org/10.4304/tpls.3.3.397-403>
- Nicoladis, E. (2002). What's the difference between "toilet paper" and "paper toilet"? French-English bilingual children's cross-linguistic transfer in compound nouns. *Journal of Child Language*, 29(4), 843-863. <https://doi.org/10.1017/S0305000902005366>
- Nicoladis, E. (2006). Cross-linguistic transfer in adjective-noun strings by preschool bilingual children. *Bilingualism: Language and Cognition*, 9(1), 15-32. <https://doi.org/10.1017/S136672890500235X>
- Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84(3), 231-259. <https://doi.org/10.1037/0033-295X.84.3.231>
- Odlin, T. (1989). *Language Transfer*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781139524537>
- O'Malley, J. M. et al. (1985a). Learning strategies used by beginning and intermediate ESL students. *Language Learning*, 34(1), 21-46. <http://doi.org/10.1111/j1467-1770.1985.tb01013.x>
- O'Malley, J. M. et al. (1985b). Learning strategy applications with students of English as a second language. *TESOL Quarterly*, 19, 287-306. <http://doi.org/10.2307/3586278>
- O'Malley, J. M. et al. (1987). Some applications of cognitive theory to second language acquisition. *Studies in Second Language Acquisition*, 9, 285-296. <http://doi.org/10.1017/S02772263100006690>
- O'Malley, J. M., & Chamot, A. (1990). *Learning Strategies in Second Language Acquisition*. New York: Cambridge University Press. <http://doi.org/10.1017/CBO9781139524490>
- Paradis, M. (1980). Contributions of neurolinguistics to the theory of bilingualism. In R. K. Herbert (Ed.), *Applications of Linguistic Theory in the Human Sciences* (pp.180-211). Michigan: Michigan State University Press.
- Paradis, M. (1987). Organisation cérébrale des deux langues du bilingue. In J. A. Rondal, & J. P. Thibeaut (Eds.), *Problèmes de psycholinguistique*. Bruxelles: Pierre Mardaga.
- Paradis, M. (2004). *A neurolinguistic theory of bilingualism*. Amsterdam: J. Benjamins. <https://doi.org/10.1075/sibil.18>
- Paradis, M. (2009). *Declarative and Procedural Determinants of Second Languages*. Amsterdam: J. Benjamins. <https://doi.org/10.1075/sibil.40>
- Pavlenko, A. (2002). Conceptual change in bilingual memory: A NeoWhorfian approach. In F. Fabbro (Ed.), *Advances in the neurolinguistics of bilingualism* (pp. 69-94). Udine, Italy: Forum-Udine

- University Press.
- Pavlenko, A. (2011). *Thinking and speaking in two languages*. Bristol, UK: Multilingual Matters.
<https://doi.org/10.21832/9781847693389>
- Piaget, J. (1961). *La psychologie de l'intelligenc*. Paris, France: Armand Colin.
- Piatelli-Palmarini, M. (1979). *Théories du langage, théories de l'apprentissage: le débat entre Jean Piaget et Noam Chomsky*. Paris: Seuil.
- Schachter, J. (1989). Testing a proposed universal. In S. Gass, & J. Schachter (Eds.), *Linguistic Perspectives on Second Language Acquisition*. Cambridge: Cambridge University Press.
<https://doi.org/10.1017/CBO9781139524544.007>
- Schmidt, R. (1990). The Role of Consciousness in Second Language Learning. *Applied Linguistics*, 11(2), 129-158. <http://dx.doi.org/10.1093/applin/11.2.129>
- Selinker, L. (1972). Interlanguage. *International Review of Applied*, 10, 209-231.
<https://doi.org/10.1515/iral.1972.10.1-4.209>
- Selinker, L. (1992). *Rediscovering Interlanguage*. London, England: Longman.
- Scorsby-Jacson, R. E. (1867). Case of aphasia with right hemiplegia. *Edinburgh Medical Journal*, 11, 696-706.
- Sharwood-Smith, M., & Kellerman, E. (1986). Cross-linguistic influence in second language acquisition: An introduction. In E. Kellerman, & M. Sharwood-Smith (Eds.), *Cross-linguistic Influence in Second Language Acquisition*. Oxford: Pergamon.
- Slabakova, R. (2006). Is there a critical period for semantics? *Second Language Research*, 22(3), 302-338. <https://doi.org/10.1191/0267658306sr270oa>
- Tomlin, R. (1990). Functionalism in Second Language Acquisition. *Studies in Second Language Acquisition*, 12(2), 155. <http://dx.doi.org/10.1017/s0272263100009062>
- Towell, R., & Hawkins, R. (1994). *Approaches to Second Language Acquisition*. Multilingual Matters, Bristol: Longdunn Press.
- Ullman, M. T. (2001). The declarative/procedural model of lexicon and grammar. *Journal of Psycholinguistic Research*, 30(1), 37-69. <https://doi.org/10.1023/A:1005204207369>
- Weinreich, U. (1953). *Languages in contact*. New York: Linguistic Circle of New York.
- Whitaker, H. (1971). *On the Representation of Language in the Human Brain: Problems in the Neurology of Language and the Linguistic Analysis of Aphasia*. Edmonton, Alta: Linguistic Research.
- White, L. (1985). The Pro-Drop parameter in adult second language acquisition. *Language Learning*, 35, 47-62. <http://doi.org/10.1111/j.1467-1770.1985.tb01014.x>
- White, L. (1986). Implications of parametric variation for adult second language acquisition: An investigation of the pro-drop parameter. In V. Cook (Ed.), *Experimental Approaches to Second Language Acquisition* (pp. 55-72). Oxford: Pergamon.

- White, L. (2003). *Second Language Acquisition and Universal Grammar*. New York: Cambridge University Press. <http://doi.org/10.1017/CBO9780511815065>
- Whorf, B. L. (1941). Languages and Logic. *Technology Review*, 43, 250-252, 266, 268, 272.
- Wode, H. (1981). *Learning a Second Language: An Integrated View of Language Acquisition*. Tübingen: Gunter Narr.
- Ye, Z. (2004). Chinese categorization of interpersonal relationships and the cultural logic of Chinese social interaction: An indigenous perspective. *Intercultural Pragmatics*, 1(2), 211-230. <https://dx.doi.org/10.1515/iprg.2004.1.2.211>
- Zhang, Q. (2010). A Study of Chinese Learning of English Tag Questions. *Journal of Language Teaching and Research*, 1(5), 578-582. <https://dx.doi.org/10.4304/jltr.1.5.578-582>
- Zobl, H. (1984). Cross-language generalizations and the contrastive dimension of the interlanguage hypothesis. In A. Davis et al. (Eds.), *Interlanguage*. Edinburgh, UK: Edinburgh University Press.