APHASIA IN BILINGUAL INDIVIDUALS

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Abstract:Nowadays most of us speak more than one language. We all use language in order to communicate with others. Damage to the brain due to certain neurological disorders, such as stroke, can lead to language impairment defined as aphasia. A lot of studies were performed with reference to the mechanisms involved in language production in case of monolingual aphasic patients but little attention was attributed to bilingualism in cognitive neuropsychology research. Due to the language differences that frequently appear as a result of this disorder, it is vital to perform speech-language evaluation in each of the languages the patient is proficient in, as these can distinctively be affected thus, testing only one language cannot evaluate the severity of the impairment.Understanding language organization and processing in bilingual aphasic speakers is important for the understanding of the structure and function of bilingual speech in people who do not suffer from any kind of language impairment.

Keywords: aphasia, language disorder, monolinguals, bilingual aphasics

Nowadays most of us speak more than one language. It is impressive how a person can learn and use more languages. Discoveries performed in the past regarding bilingualism managed to enhance our knowledge about its implications for language and cognition. One of the results of imaging and studies carried out on patients is the fact that in bilingual individuals both languages are regularly active (cross-language interaction).[1] Thus, a great demand is imposed on the bilingual speaker to control the language that is not supposed to be used in order to be fluent in the target one. Bilingualism may affect L1 (native language) as well as L2 (second language) and it seems to mirror a restructuring of the brain networks.

Healthy individuals generally produce spoken and written language without any effort but in case of a neurological disorder, such as aphasia, this process is realized in a difficult way and it is full of errors. A lot of studies were performed with reference to the mechanisms involved in language production in case of monolingual aphasic patients but little attention was attributed to bilingualism in cognitive neuropsychology studies. Bilingualism started to occur more and more often in neurogenic language impairments and according to Paradis ʻit is a phenomenon every clinic must be prepared to cope with.ʼ[2] If until now monolinguals were considered as normal language users and bilinguals as a special group, in recent years a shift has been observed in this respect. Thus, a lot of research in cognitive psychology and neuroscience and linguistics was carried out with regards to this special group.[3]

It is of utmost importance to understand language organization and processing in bilingual aphasic speakers in order to develop successful treatment plans. These findings can also be useful for the understanding of the structure and function of bilingual speech in people

[1] Judith, Kroll, Paola, E. Dussias, Cari, A. Bogulski & Jorge R. Valdes Kroff, *Juggling two languages in one mind. What bilinguals tell us about language processing and its consequences for cognition,* in *Psychology of Learning and Motivation*, vol. 56, 2012, p. 230.
[2] Michel, Paradis, *Bilingual aphasia 100 years later: consensus and controversies*. In M. Paradis (Ed.) *Aspects of bilingual aphasia*, Tarrytown, NY: Pergamon, 1995, p. 219.
[3] Judith, Kroll, Paola, E. Dussias, Cari, A. Bogulski & Jorge R. Valdes Kroff, *Juggling two languages in one mind. What bilinguals tell us about language processing and its consequences for cognition,* in *Psychology of Learning and Motivation*, vol. 56, 2012, p. 248.

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who do not suffer from any kind of language impairment. Literature concerning bilingual aphasia highlights that the left hemisphere is dominant for language in L1 as well as L2.[4]

The question researchers wanted to find an answer to was which of the two languages returned first, the mother tongue, L1 or the second language, L2 and why a language recovers to a greater extent than the other. In 1895 Pitres was the first who described seven cases in which patients presented differential retrieval of the two languages they were proficient in. He elaborated the hypotheses according to which patients were inclined to recover the language they were more familiar to. Pitres also suggested that the language which failed to recover was not lost but it could not be recovered due to the inhibitory effects caused by the disorder.[5]

More, neurolinguistic studies were performed in order to find out whether all the languages spoken by an individual are found in the same or in different parts of the brain. In 1897, Scoresby-Jackson suggested that a person's mother tongue is illustrated in Broca's area while languages learned later are represented in cortical sites anterior to Broca's area. In 1931, Veyrac rejected Scoresby and Jackson's theory after performing a post-mortem study of the brain of a multilingual speaker. The examination revealed that the cortical sites anterior to Broca's area mentioned by his predecessors were not altered.[6]

Francois Grosjean[7] defines bilinguals as 'those people who use two or more languages in their everyday lives'. According to Grosjean[8] a bilingual person should not be regarded as two monolinguals in a single body. This can also be applied for the diagnosis and treatment of these individuals. In recent decades, due to the growing number of bilingual or multilingual speakers, research regarding aphasia in this population has arisen.

The Routledge Dictionary of Languages and Linguistics defines bilingualism as 'a speaker's competence in two or more languages and their use in everyday communication.'[9] There are many factors that have an impact on the patterns of damage and recovery in bilingual aphasic patients. The most important ones are age, level and method of acquisition of the second language. In the majority of the cases, most of us master our mother tongue (L1) and not the second language (L2). However, there are cases when people move from one country to the other and possibly they forget their L1 and use L2 more often.

Pathological mixing,[10] pathological switching[11] and translation disorders[12] are the most common symptoms observed in bilingual aphasics. Thus, aphasics either mix the languages they are aware of within a single utterance or they alternate between diverse languages within a single utterance. Regarding transition, four types were identified: *inability to translate, spontaneous, paradoxical translation or translation without comprehension*.

Besides the tests used for the assessment of monolinguals, special tests are used for the assessment of bilingual aphasic patients, such as the bilingual aphasia test (BAT). Due to the differences that frequently appear after aphasia, it is vital to perform speech-language evaluation in each of the languages that are used, even if one of the languages has formerly

[4] Robert, Zattore, *On the Representation of Multiple Languages in the Brain: Old Problems and New Directions*, in *Brain and Language*, vol. 36, 1989, p.130.
[5] Franco, Fabbro, *The Neurolinguistics of L2 Users*, in *Portraits of the L2 Users* edited by Vivian Cook, UK: Multilingual Matters LTD, 2002, p. 199; available at https://goo.gl/odYA7K , accessed 10 October 2017.
[6] *Ibidem*, p.200.
[7] François Grosjean, *Neurolinguists, Beware! The Bilingual Is Not Two Monolinguals in One Person*, in *Brain and Language*, vol. 36, 1989, p.4.
[8] *Ibidem*, p.4.
[9] Hadumod, Bussmann, *Routledge Dictionary of Languages and Linguistics*, translated and edited by Gregory P. Trauth and Kerstin Kazzazi, London: Routledge, 1996, p. 130.
[10] Eleonora, Rossi, Gianfranco, Denes and Roelien Bastiaanse, *A single case study of pathological mixing in a polyglot aphasic*, in *Brain and Language*, vol. 87, 2003, p.46.
[11] Franco, Fabbro, Miran, Skrap, Salvatore, Aglioti, *Pathological switching between languages after frontal lesion in a bilingual patient*, in *Journal of Neurology, Neurosurgery, and Psychiatry*, vol. 68, 2000, p. 650-652.
[12] Michael, Paradis, Marie-Claire, Goldblum and Raouf Abidi, *Alternate Antagonism with Paradoxical Translation Behavior in Two Bilingual Aphasic Patients*, in *Brain and Language*, vol. 15, 1982, p. 55-69.

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been spoken the most. Paradis affirms that 'because two languages can be affected differentially, testing in one language only cannot assess the severity of aphasia.'[13]

According to the impairment model, bilingual aphasia can be classified as: parallel[14], selective[15] and differential[16]. A parallel impairment pattern refers to the fact that the aphasic patient uses both languages equally. A selective impairment pattern invokes that there was only one language preserved as a result of brain damage while the differential pattern indicates that one of the languages was more impaired than the other one.

When assessing bilingual aphasics one has to take into consideration several factors that may have an impact on the impairment the aphasic patient suffers from and the recovery procedure he has to follow. Here we can mention the pre- and postmorbid proficiency level in each language, the age when the patient started learning the language and the method used for its acquisition, linguistic environment and language characteristics, which refers to the resemblance between the two languages.

Lexico-semantic, syntactic and morphologic impairments have been observed in bilinguals suffering from aphasia.

One of the problems bilingual aphasics deal with is represented by word-finding difficulties in production as well as comprehension. There are various methods used in the examination of lexical access in bilingual people. Comprehension tasks like word matching or word-picture matching are poorly performed. Bilingual aphasics often exhibit paraphasias, circumlocutions during conversation or spontaneous speech. Word omissions and errors during picture naming tasks can also be observed. All these errors are observable in speech production. As there are other languages that may interfere in bilinguals, 'wrong language' errors may appear together with "an impairment in cognate/homograph production and comprehension."[17]

Samantha Siyambalapitiya et al.[18] investigated the case of a 70-year-old bilingual speaker suffering from nonfluent aphasia whose mother tongue Italian and her second language was English. She was tested on cross- and within-language semantic priming by taking into account the patient's comprehension. The authors reached to the conclusion that 'the mechanism of impairment was confined in the delay or inhibition of lexical access in their patient rather than a deficit in lexical representation of words as the priming was partially preserved.'[19]

In respect of production Roberts and Deslauriers[20] performed a study by which they wanted to find out whether cognate status has an influence on accuracy in naming and types of errors by applying a confrontation naming task. Cognates are defined as pairs of words which have a similar form and meaning in two languages. We can mention here French/English examples like 'tigre/tiger' but such examples can also be found in English/Romanian: 'apartment/apartament', 'lift/lift', and 'garden/grădină'. These cognate words, which actually are nouns, are more rapidly recognized by bilinguals than non-cognate

[13] Michel, Paradis, Gary, Libben, *The Assessment of Bilingual Aphasia*, New York: Psychology Press, 2014, p.23.
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[20] Patricia, M. Roberts, Louise Deslauriers, *Picture naming of cognate and non-cognate nouns in bilingual aphasia*, in *Journal of Communication Disorders*, vol. 32, 1999, p. 2.

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ones.[21]Homographs, on the other hand, are words with the same form but different meaning. Bilinguals, as opposed to monolinguals, recognize cognates more easily than homophones.[22]

It was concluded that semantic and 'no response' errors are similar in both monolingual and bilingual aphasic patients while the 'wrong language' does not appear in monolinguals and self-correction attempts are usually successful in bilingual aphasics. It is very important that bilingual aphasics to be examined by clinicians who are bilingual and have an accurate knowledge of both languages. Why? As in this way they can respond to and correct the errors performed by bilingual aphasics.

Grammatical disorders which are characteristic for aphasia depend on the structure of each language. These disorders often lead to agrammatism. Omission and substitution errors and naming difficulties are common in both monolingual and bilingual aphasic patients. When investigating bilingual speech one has to take into consideration the differences between morpho-syntactic structures of languages and the interaction between them as well as the features of language acquisition. Cholin et al.[23] investigated the case of a German-English bilingual aphasic patient who instead of using the irregular form of the verbs regularized them (added the *–ed* affix) in both languages. The patient had a preference for the language which had a more regular structure but from a morphological point of view was more fix. Mireia Hernandez et al.[24] described the case of a Spanish-Catalan bilingual male patient who presented difficulties in naming verbs compared to nouns in both languages. The linguistic problems exhibited by the patient were represented by word-finding problems and by not using Catalan (L2) in spontaneous speech. The patient was unable to name verbs in L1 ('no response') and in L2 the principal error type was 'wrong language.' The errors performed by the patient were dependent on the set of stimuli used by the researchers. The naming and picture-matching test revealed that it was more difficult for the patient to name verbs than nouns instead he was able to name the first syllables or phonemes of the words he could not remember. This highlights that the patienthad access to the semantic representation of the word he could not name. It was concluded that grammatical deficit can be seen as a result of the lexical one. The patient's L2 is also characterized by grammatical deficit. He was tested with the same set of stimuli for L2 as well as just in case of L1 he had more difficulties in naming verbs than nouns. The errors that occurred during the performance of the different tasks were 'no response' and 'wrong language' errors, the patient providing the responses in L1 (Spanish). All in all, the patient showed the same pattern of grammatical category-specific deficit in his L1 and L2. The authors concluded that 'the two languages are organized following the same governing principles.'[25]

Impaired syntax prohibits people to express their feelings and communicate their thoughts. These refer to impairments at the semantic and morpho-syntactic level. However, during sentence production patients may omit pronouns, articles or can omit or substitute words, a process defined as agrammatism. In case of bilinguals, the communication process is more complicated as they often mix and switch languages, which is defined as *pathological mixing and switching*. Complex sentences are usually more difficult to be understood by aphasic patients. Faustino Diéguez-Vide et al.[26] described the case of a Chinese–Spanish–

[21] Annette M.B.,de Groot and Gerard, L.J. Nas, *Lexical representation of cognates and noncognates in compound bilinguals,* in *Journal of Memory and Language*, vol.30, 1991, p. 96.
[22] Judith, F. Kroll, Susan, C. Bobb and Noriko Hoshino, *Two languages in mind: Bilingualism as a tool to investigate language, cognition, and the brain,* in Current Directions in Psychological Science, vol. 23, no. 3, 2014, p.160.
[23] Joana, Cholin et al., *The nature of the processing distinction between regular and irregular verbs: Evidence from an English–German bilingual aphasic speaker*, in *Brain and Language*, vol. 103, 2007, p. 61-62.
[24] Mireia Hernandez et al., *Grammatical category-specific deficits in bilingual aphasia*, in *Brain & Language*, vol. 107, 2008, p. 68–80. p
[25]*Ibidem*, p.75.
[26] Faustino Diéguez-Vide et al., *Chinese–Spanish–Catalan trilingual aphasia: A case study*, in *Journal of Neurolinguistics*, vol. 25, 2012, p. 630-641.

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Catalan trilingual aphasic patient whose language recovery was different for all three languages. They concluded that language recovery depends on language typology and the similarity between them. Artemis Alexiadou and Stavroula Stavrakaki[27] presented the case of a Greek-English bilingual patient, with Broca's aphasia having difficulties in adverb and verb movement in sentences. While asked to name the verbs presented to him, the patient made more omission errors in English and more substitution errors in Greek illustrating that language typology has an important role in language processing. Regarding the ordering task, the patient was asked to find the optimal position of an adverb in a certain sentence. The patient performed better in his mother tongue (Greek) than in English, which was his second language. This is because in Greek the structure of the language is 'fixed' while in English it is 'free'. Tom O. Abuom, Emmah Shah and Roelien Bastiaanse[28] studied sentence comprehension in Swahili (Bantu language)–English bilingual patients with agrammatism based on four principles: order of the words, embedding, the use of the relative pronoun 'who' and language. The authors concluded that patients presented difficulties in understanding sentences in derived order and performance in both languages was the same. So, sentence comprehension does not dependent on the morphological distinction regarding the verb inflection system of the two languages. The vast majority of the errors were observed in sentences where the object was placed before the subject ('The woman is rescued by the man.')

Lesion location is another factor that influences syntax processing in bilingual aphasics. In their study Tschirren et al.[29] exposed, after carrying out a study on 12 bilingual aphasics, that besides the age of acquisition of the second language the site of the lesion is also a key factor in syntax processing. Syntactic impairment in the second language was greater in patients with anterior lesions while syntactic processing in L1 was preserved in aphasics with anterior lesions.

In order to develop a correct and rigorous treatment plan for aphasic patients a systematic evaluation of language impairments has to be performed. The question whether there is a necessity to rehabilitate only one language or should all languages known by the aphasic patient be rehabilitated needs to be answered to. According to studies, currently only one language is rehabilitated depending on the family's or the patient's choice. Understanding language organization and processing in bilingual aphasic speakers is important for the understanding of the structure and function of bilingual speech in people who do not suffer from any kind of language impairment.

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