A Critical Review:
The effect of unilingual treatment in bilingual adults with aphasia

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This critical review examines whether the treatment of one language in bilingual adults with aphasia leads to parallel recovery of the untreated language. The five case studies that were reviewed suggest that both parallel and nonparallel recovery patterns exist. Recovery appears to depend on factors such as: premorbid language proficiency and use, age of language acquisition, structural similarity between languages, and language preference. Recommendations for future research and clinical practice are further discussed.

Introduction

Bilingualism has now become a rapidly growing occurrence in North American society. In Canada, more than one hundred languages are spoken in addition to French, English and indigenous languages (Office of the Commissioner of Official Languages, 2005). Similarly, in the United States, there are an estimated 45,000 new cases of bilingualism per year (Paradis, 2001). This increased trend has led to a rise in the number of bilinguals who are referred for speech and language services (Marrero et al., 2002). As a result, the issue of intervention for bilingual adults with aphasia is particularly relevant for present and future clinical practice.

The recovery pattern of languages spoken by bilingual adults with aphasia has been well documented in the literature. Recovery patterns that have been identified include parallel recovery, differential recovery, selective recovery, blended recovery and antagonistic recovery. Parallel recovery involves simultaneous and equal restoration of both languages, whereas in differential recovery, languages do not recover in equal patterns. There are also cases where one language does not recovery at all, and this is defined as selective recovery. Blended recovery refers to situations where the client's language codes mix and the languages are used inappropriately. Researchers have also documented cases of antagonistic recovery where languages recover in successive fashion (Paradis, 1977).

Although these various recovery patterns have been documented, extensive research has yet to be done on the mode of treatment and appropriate methods of intervention for these individuals. There have been studies suggesting the treatment principles that are successful for monolingual individuals with aphasia are effective in bilingual individuals as well (Chapey, 2008). However, the question of whether treating exclusively one language leads to parallel recovery in the untreated language of a bilingual client remains to be examined in further detail. It is particularly relevant for monolingual speech-language pathologists who are faced with the possibility of treating bilingual clients with aphasia. Future research in this area will help clinicians ensure that they are providing the most effective form of treatment for this particular population.

Objectives

The primary objective of this paper was to critically examine the current literature to determine whether treatment of one language in bilingual adults with aphasia results in parallel recovery of the untreated language. The secondary objective of this paper was to provide evidence based recommendations for future clinical practice and research.

Methods

Search Strategy

The research articles for this critical review were obtained by conducting a computer database search. These databases included: Scholars Portal, Google Scholar and PubMed. The following search terms were used: (bilingual aphasia) AND (treatment) AND (recovery).

Selection Criteria

Studies that described treatment of exclusively one language in bilingual or polyglot adults with aphasia were included. Studies that involved simultaneous treatment of more than one language were not included for this critical review. There were no limitations placed on the type of language intervention program used in the studies.

Data Collection

The search results yielded five articles that were selected for the critical review process. All five articles were case study designs.

Results

Gil and Goral (2004) describe a case study of KV, a 57-year-old Russian speaking individual with aphasia who learned Hebrew at age 35. KV was assessed at four different evaluation periods: prior to treatment, after one month of treatment in Hebrew, after 3.5 months of treatment in Hebrew, and after 1.5 months of treatment in Russian. Initial assessment revealed that KV demonstrated parallel deficits in both languages. After one month of treatment in Hebrew, re-assessment measures demonstrated that KV had improved in both languages. Re-assessment at 3.5 months of treatment showed significantly greater improvement in Russian. This increased performance in Russian continued when the subject was re-assessed 5 months post-onset. Thus, the researchers concluded that the patient had non-parallel recovery of both languages. They also postulated that factors such as language proficiency, language use and the structural relation between the two languages influenced the recovery for this particular patient.

Gil & Goral provide a thorough examination of both languages at four different assessment periods, which increases the reliability of the results. They also provided detailed explanations of the tasks they used to test the patient's language ability across different modalities. This is seen as a strength. However, there are limitations to this study that must be considered. The researchers acknowledged that the subject's proficiency in Hebrew and Russian was not equal prior to the stroke, as KV had learned Hebrew at a later age. The recovery pattern may reflect his earlier exposure and proficiency in Russian. Another factor that must be considered when interpreting the results is that the researchers switched the language of therapy from Hebrew to Russian after 3.5 months of therapy had already been initiated. This change and uneven amount of treatment provided in both languages may be a confounding variable in the results obtained. It is uncertain whether the recovery pattern can be attributed to the generalization of the treated language to the untreated language, or whether the patient was influenced by the initial exposure and treatment in Hebrew. The design of this study and the existence of potentially interacting variables may limit the reliability of the results.

Marangolo and Rizzi (2009) present the case of VR, a 60-year-old Flemish speaking woman who learned Italian at the age of 26. She was diagnosed with chronic aphasia in both languages. The Aachener Aphasia Test (AAT) was administered in Flemish and Italian two months after VR experienced a left ischemic lesion. It was re-administered after the patient underwent a six month rehabilitation program in Italian.

The authors state that statistical analysis did not reveal a difference between the Flemish and Italian scores on the AAT. Despite treatment being conducted exclusively in Italian, the patient showed parallel recovery rates in the untreated language, Flemish. At eight months post-stoke, the researchers also obtained fMRI results while the patient engaged in an overt picture naming task in Italian and Flemish, before and after receiving two weeks of language therapy in Italian. The researchers concluded that there was generalization from the treated language (Italian) to the untreated language (Flemish). The fMRI results also demonstrate the same cerebral regions were recruited in the brain for both Flemish and Italian pre and post training. Marangolo & Rizzi suggested that the parallel recovery that was observed is due to the same neural substrates being engaged in the brain.

A limitation in this study design involves the stimuli used in the fMRI experiment. The stimuli used during the two week training period were the same stimuli that were used pre-treatment to assess areas of brain activation while naming in both languages, allowing for the possibility of a learning effect to be present. Another limitation lies in the use of language questionnaires, which were filled out by the patient's relatives in order to obtain a measure of the patient's premorbid language proficiency in Italian. This qualitative measure may not be the most reliable form of information. The study briefly mentions that statistical analysis was done to assess the difference between responses on the fMRI naming task in both languages. However, there is no detail or further information provided on the type of statistical analysis that was completed. Therefore, the results must be interpreted with caution.

Miertsch, Meisel and Isel (2008) discuss a case study of BL, a 48-year-old man from Germany who suffered a left hemisphere stroke. BL is a native German speaker who learned English at the age of 10 and French at the age of 13. He was diagnosed with moderate Wernickes aphasia. At the time of the study, researchers initiated the process of language training focused on lexical and semantic deficits with the patient eight years after the onset of the stroke. This training was conducted in French and occurred twice daily for three-and-a-half weeks. The researchers assessed BL in French, German and English using the Bilingual Aphasia Test (BAT) pre-training and post-training. An appropriate ANOVA design was used to analyze the patient's performance on the subtests of the BAT after treatment had been conducted. It revealed that the patient scored a higher percentage of correct answers in German, compared to French and English. However, significant improvement was observed in French and English across all linguistic levels, when scores from

pre-treatment and post-treatment were compared. The researchers concluded that since the non-treated language (English) showed improvement after the patient had been trained in French, the two languages share a common neuronal network within the lexical-semantic systems.

This study provides a detailed and thorough description of the treatment activities, which is seen as a strength because it allows for replication. However, there is inconsistency between the amount of time spent in therapy between the two treatment periods. The patient received therapy exclusively in German for nearly three years, however, treatment in French was only provided for three-and-a-half weeks. This disparity in the amount and intensity of therapy may influence the outcomes observed. Overall, these results can be interpreted with some confidence. In addition, they present an interesting avenue for future researchers to explore: the neural network of bilingual aphasics and a possible shared language structure system.

Filiputti, Tavano, Vorano, De Luca and Fabbro (2002) presented a case study of a 55 year old patient, EG, who suffered an ischemic stroke resulting in aphasia. EG is a native Slovenian speaker, and also learned to speak Italian, Friulian, and English. Language ability in Italian, as well as Friulian and French, was assessed using the Bilingual Aphasia Test (BAT) one month post-stroke. Slovenian was not initially assessed because the BAT was not available in this language at the time of testing. Treatment was conducted in Italian for a period of six months, consisting of three 45 minute sessions per week. The BAT was re-administered in all four languages immediately following therapy, and then re-administered at a final assessment point four years after therapy had been terminated. Although partial improvement was noted in Fruilian, English and Italian across assessment periods, the researchers concluded that the overall pattern of recovery was non-parallel. The most significant improvement was seen in Italian (language of treatment), while Slovenian remained the most impaired language. Statistical analysis using an appropriate two factor ANOVA revealed that improvement in Fruilian and English was not significantly different. The researchers acknowledged that there are factors that may influence the recovery patterns observed. These include: the structural similarly between languages, the order in which languages were acquired, the dominance of the language before the onset of stroke, the dominance of the language after the stroke, the type of aphasia and the type of language treatment.

This study presents a longitudinal examination of the patient's rehabilitation across treatment and four years post-therapy. This is seen as a strength because it allows for a thorough comparison of the subject's

recovery process. The researchers also used the same standardized testing instrument across all assessment periods, which increases the reliability of the results obtained. Although this study lacks external validity because of its case study design, it contributes to the research question by discussing the role that factors such as language dominance and memory systems have on the pattern of recovery that is observed in bilingual aphasics.

Watamori and Sasanuma (1976) discussed a case study of a 65-year-old Japanese and English speaking individual who suffered a cerebral thrombosis that resulted in aphasia. Assessment of this patient consisted of administering the Porch Index of Communicative Ability (PICA) and subtests of the Minnesota Test for Differential Diagnosis of Aphasia (MTDDA) in both English and Japanese, two months post onset. The patient was diagnosed with severe Brocas aphasia with oral and verbal apraxia in both languages. The impairment was demonstrated across all language modalities in similar fashion in Japanese and English. Language therapy was initially conducted in Japanese for two weeks until the researchers inferred that the patient would prefer English to be the language of treatment and this adjustment was made. Treatment in English occurred twice weekly for a period of three months and then was increased to four times per week. The researchers used PICA and the MTDDA subtests to periodically assess the pattern of recovery at four time points in therapy: two, six, nine and fourteen months post-onset. They found that auditory and reading comprehension improved at similar rates in English and Japanese. However, oral production and writing abilities had greater recovery in English. In other words, a non parallel pattern of recovery was found for different language modalities.

Although Watamori and Sasanuma described the patient in this case study in great detail and selected a suitable subject who had equal impairment in both languages, there are some weaknesses in the treatment design. The researchers originally provided therapy in Japanese for two weeks and then switched to English because it was preferred by the client. The initial use of Japanese could have influenced the results that were obtained. The non parallel recovery that was observed in certain language modalities could be attributed to factors that are not related to the language in which treatment was provided. For example, the patient may have had greater recovery of written ability in English because it was stated that he preferred to use this language for reading and writing pre-stroke. Overall, the study suggests that the pattern of language recovery may vary across different language modalities. Some modalities may show parallel improvement while others exhibit non-parallel recovery.

Discussion

Overall, three of the five case studies found a pattern of non parallel language recovery, while two of the studies postulate that the language recovery observed was parallel in nature. These studies suggest that there are factors that influence the pattern of language recovery in bilinguals with aphasia. These include: the individual's preferred language use pre-stroke, pre-morbid language proficiency, the degree of impairment across languages, and the age at which the languages were acquired.

All of the articles reviewed in this paper were case study designs. It should be noted that studies of this nature have an inherent limitation because they lack external validity. These results cannot be easily generalized to other bilingual or polyglot individuals with aphasia. A challenge with this type of research is the difficulty in determining whether the intervention results are exclusively the effect of the treatment that is provided, or whether factors such as pre-morbid language use and degree of impairment post-injury influence the results. However, the case study design may be the most appropriate way of examining this research question because bilingual and polyglot individuals will have different levels of proficiency in the languages they speak, as well as varying levels of impairment.

Non parallel recovery was found in cases where the languages were not equally impaired post-stroke (Filiputti et al., 2002) or the language chosen for treatment was not consistent throughout the study (Gil & Goral, 2004). Future studies should employ careful consideration when selecting subjects to improve the strength of the evidence obtained. Similarly, researchers should strive to maintain consistency throughout treatment and refrain from changing the language selected for treatment in order to avoid confounding results.

Recommendations

The following recommendations should be considered in future research:

1. It may not be realistic for case study subjects to have similar premorbid proficiency and equal impairment across all languages. However, researchers should control for the interacting effects of extraneous variables as much as possible in order to increase reliability of the results obtained.

2. Future study designs should be constructed so that they provide stronger levels of evidence that can be more applicable to future clinical practice.

3. Studies should consider employing longitudinal examination of subjects in order to obtain an extensive look at an individual's recovery of the languages post treatment.

Conclusion

Overall, the results of these studies should be interpreted with caution given the limited strength of evidence that is available. The articles reviewed in this paper report both parallel and non parallel recovery patterns. It may be that in situations where clinicians are only able to provide treatment in one language, positive results may occur in the treated language, as well as languages that are untreated in therapy.

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