Critical Review:
In bilingual adults with aphasia what is the evidence that semantic naming treatment leads to crosslinguistic generalization?*

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This critical review examines the impact of a semantic naming treatment on crosslinguistic generalization for bilingual individuals with aphasia. A literature search yielded 5 articles (single subject designs and case studies). Overall, the evidence for crosslinguistic generalization in individuals with bilingual aphasia following semantic naming treatment is variable. Future recommendations and clinical implications are discussed.

Introduction

It is estimated that over half of the world is bilingual or multilingual and this creates a clinical need for Speech-Language Pathologists (SLP) to consider the effectiveness of semantic naming treatment of bilingual individuals and the manner in which it may differ from the treatment of monolingual individuals (Kiran, Sandberg, Gray, Ascenso & Kester, 2013). This is particularly relevant in a multicultural country such as Canada where over 200 languages are spoken and over 20% of Canadians report speaking a language other than French or English as their first language (L1) (Statistics Canada, 2012).

For the purpose of this review, bilingualism will be defined as: "an individual who uses two or more languages in their everyday life, regardless of the context of use" (Ansaldo, Marcotte, Scherer & Raboyeau, 2008). Other factors contributing to an individual's bilingualism such as age of acquisition, exposure and proficiency are acknowledged however they will not be considered at this time.

Damage to a bilingual individual's language dominant hemisphere can result in a loss of one or both languages (Edmonds & Kiran, 2006).[1]

There are various treatment protocols, which are commonly used in treatment with individuals who have aphasia. Semantic naming treatment is an intervention that is used for individuals with word finding deficits. This technique focuses on accessing semantic networks to increase retrieval of conceptual information in naming tasks (Boyle and Coelho, 2005).

When a bilingual individual receives treatment for aphasia the question of crosslinguistic generalization arises. Crosslinguistic generalization occurs when an individual is treated in one language, either their dominant or non-dominant language, and a significant improvement is noted in their untreated language (Croft, Marshall, Pring & Hardwick, 2011).

The study of bilingual aphasia is still relatively new. Current research results are unclear as to whether or not crosslinguistic generalization occurs, and if it does, under what conditions it may occur (Kiran et al., 2013).

Objectives

The primary objective of this paper is to critically analyze studies that address the following research question: In bilingual adults with aphasia, what is the evidence that semantic naming treatment leads to crosslinguistic generalization?

Methods

Search Strategy

Research studies were searched in the Western University library website online database. The following databases returned relevant articles: CINAHL, PubMed and Scopus.

Search terms included ((Semantic Feature Analysis) OR (Semantic Naming Therapy)) AND (Bilingual Aphasia). Reference lists of the articles selected were also searched for further relevant articles.

Selection Criteria

Studies using semantic naming treatment (such as Semantic Feature Analysis) as the sole treatment

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[1] It is important to note that the terms "bilingual aphasia" and "bilingual individuals with aphasia" are commonly interchanged in the literature.

This paper was created as a required assignment for the CSD9639 Evidence Based Practice for Clinicians course at Western. While it has been evaluated by course instructors for elements of accuracy and style, it has not undergone formal peer-review.

variable were included. Studies that involved multiple types of treatment, one of which was semantic naming treatment, were excluded because results could not solely be attributed to semantic naming treatment. The studies selected needed to include participants who were bilingual and had been diagnosed with aphasia.

Data Collection

Five articles addressing crosslinguistic generalization using semantic naming treatment for bilingual adults with aphasia were found: three studies are single subject designs with multiple baselines; and two studies are case studies.

Results

Single Subject Designs

Edmonds and Kiran (2006) examined the effect of semantic naming treatment on crosslinguistic generalization in 3 participants with English-Spanish bilingual aphasia. Multiple baselines were taken in both languages. The participants received semantic naming treatment from a bilingual clinician in one language (either English or Spanish) with the goal of improving naming on items in both languages. Results demonstrated both within- and between- language generalizations. However the pattern of generalization was not uniform. Two of the three participants were treated in their non-dominant language (Spanish) and the results demonstrated crosslinguistic generalization to their dominant language (English). The authors concluded that it may be more beneficial to train the less dominant language in order to facilitate crosslinguistic generalization.

The authors used multiple baselines across participants and behaviours. They varied the baselines, the order of the stimuli and counterbalanced the languages. The participants had a staggered entry with multiple baselines. The baseline results were not stable and often showed an upward trend prior to the beginning of treatment. Insufficient baselines indicate that increases in scoring in pre- to post-intervention cannot be reliably attributed to the treatment.

A licensed bilingual speech-language pathologist conducted reliability testing for the independent variable (treatment) on all of the baseline and probe sessions. The speech-language pathologist also conducted reliability on 75% of the sessions for the dependent variable (naming responses). Participant eligibility criteria was specified: diagnosis of a left hemisphere stroke, at least 9 months post-onset, right-handed, functional English-Spanish bilinguals with

equal performance in both languages, absence of hearing/vision deficits and stable health status. Despite these criteria, the participants had a range of proficiencies. One participant had severe aphasia and apraxia of speech and the other two participants had moderate aphasia.

To obtain an idea of the participant's language proficiency pre-stroke, each participant completed a self-report language-use questionnaire. The validity of this self-report questionnaire is unknown. The authors used other methods to corroborate this information such as interviews with family members to finally characterize the participant's premorbid language proficiency. Results should be interpreted with caution as no statistical analysis of data was conducted.

Overall, the study provides suggestive evidence for crosslinguistic generalization for semantic naming treatment in individuals with bilingual aphasia.

In a follow-up study using the same design, Kiran and Roberts (2010) aimed to replicate the study from 2006 however this time the participants included four bilingual women with aphasia, two of whom were Spanish-English and two of whom were French-English. The two Spanish-English participants were not participants in the previous study. The same semantic naming treatment was used to examine the effect of the treatment on crosslinguistic generalization. The treatment was given in different languages for different participants. For some it was given in their more dominant language followed by their weaker language for others the reverse. One participant only received treatment in one language. Outcome measures were evaluated in both of the participant's languages. Results indicated that crosslinguistic generalizations occurred only for one French-English patient. They concluded that there are several explanations for the different patterns of generalization including the participant's pre-stroke language proficiency, age of acquisition, level of impairment and type and severity of aphasia.

The authors describe their recruitment and selection criteria for their participants but do not address that all of their participants are female. In addition, their participants have varying types of aphasia and one participant was noted to have apraxia as well. The participants also varied in their bilingual proficiency ratios. During treatment, 2 patients had 15 words in each stimuli set and the other 2 patients had 10 words in each set. The authors note that valid word frequency values for all stimuli were not attained. All four participants did not receive the same length of treatment. The Spanish-English treatment was longer than the French-English treatment.

Authors employed a procedure to measure Effect Size (ES) in single subjects. However, the authors reported no other statistical analysis. Overall, the evidence for crosslinguistic generalization from this particular study is equivocal.

A third study of the same design by Kiran, Sandberg, Gray, Ascenso and Kester (2013) built upon the two previous studies by examining the effect of a five-step semantic naming treatment on crosslinguistic generalization in a larger group of Spanish-English individuals with aphasia (n=17). All of the participants were native Spanish speakers and English was their L2. Five of the participants were noted to have been previously reported on in other studies (Edmonds and Kiran, 2006; Kiran and Roberts, 2010). The participants received semantic naming treatment twice a week for 2 hours in one language, 9 receiving it in English and 8 in Spanish. Baseline and outcome measures were taken in both languages. Within-language and between-language generalizations were observed to be variable across the participants. They concluded that language of the environment, proficiency and use are likely to influence the extent of crosslinguistic generalization.

Although the authors specified the selection criteria for the participants, there was an uneven sex distribution in the participants (6 males and 11 females). The methods of this study were described in great detail and could be replicated. There was a range of treatment periods from 7-13 weeks across participants. In addition, 6 participants were not administered post-treatment probes. Appropriate statistical tests were employed and reported such as effect size to examine the effect of treatment.

While the authors of this study label it as a single-subject experimental multiple baseline design, it would appear the design is in fact mixed. In their statistical analysis, the examiners grouped the 17 participants and looked at the data as a within-groups repeated measure design. An ANOVA was used with language as the independent variable to determine if participants showed a greater gain in Spanish relative to English.

Overall, the study demonstrated suggestive evidence for improvement on the trained language however evidence for crosslinguistic generalization was equivocal.

Case Studies

Kiran and Iakupova (2011) used the same semantic naming treatment mentioned in previous studies to look at crosslinguistic generalization in a bilingual Russian-English patient with anomia. The participant received

treatment in English only however the results indicated improvements in both languages suggesting crosslinguistic generalization occurred.

Two participants are described in this article however only one of the participants participated in the 10-week semantic naming treatment program. He received more intensive therapy than those reported in the previously mentioned studies (3.5 hour sessions, 4 times a week). He was 76 years old and had experienced two left hemisphere CVAs, one 10 years prior and the other 19 months prior. There is no description of the lesion sites. He only started learning English at the age of 42 and assessment of his language revealed that he was more successful at communicating in Russian. Statistical tests were employed to measure effect size and a t-test to compare pre- and post- treatment scores. It is unclear how a group statistic (t-test) was used on a single subject.

Overall, the study showed suggestive evidence for crosslinguistic generalization and for training in a participant's non-dominant language, however more research needs to be done before these results can be generalized to the bilingual aphasia population due to the limitations of having a single participant.

Kurland and Falcon (2011) conducted a case study with a Spanish-English bilingual female with severe expressive aphasia who was 10 months post-onset. The patient was 65 years old, right handed and had experience a large left hemisphere CVA. The participant received intensive semantic naming treatment in 3 phases: Spanish, English and mixed (both languages). The therapy was 5 days a week for 2.5 hours each day. Each phase lasted 2 weeks and there was a 2-month "washout" period between phases where the investigators withdrew therapy. The results indicated that the participant's performance was uneven over time. Improved object naming on treated and untreated stimuli was noted, however her performance was greater when being trained in Spanish and outcome measures were also greater in Spanish. These were measured by looking at accuracy on daily probes (total number correct). Spanish was her dominant language, which she was more familiar with and used most frequently.

The authors used standardized measures to assess the participants' receptive and expressive language abilities in both languages before and after treatment (Boston Naming Test, Bilingual Aphasia Test and Boston Diagnostic Aphasia Examination). The BNT and BDAE are not normed on bilingual individuals and the BAT does not have psychometrically sound standardization (Kiran & Iakupova, 2011). It is noted

that the therapist involved in treatment is a monolingual English speaker. The authors do not describe who was providing the treatment in Spanish and how the treatment was being delivered during the mixed phase.

A post-hoc analysis of errors was conducted and reported by the authors however no other statistical measures were reported because they were not appropriate for the case study design.

At this time, the results from this study do not provide compelling evidence for crosslinguistic generalization as a result of semantic naming treatment in individuals with bilingual aphasia. This is due to the lack of statistical evidence and the small sample size. However, there is some evidence for using semantic naming treatment in a person's dominant language though this can only be generalized to patients with similar backgrounds.

Discussion

Research in the area of bilingual aphasia has proven to be difficult for a variety of reasons including variables such as language type, language status and language dominance (Weekes, 2010). In addition, there is a lack of psychometrically sound standardized testing materials normed on bilingual populations (Kiran & Iakupova, 2011). This makes it more difficult to assess participants' relative language proficiencies and deficits in both languages.

For bilingual individuals with aphasia, it might be important to consider the lexical similarity of the person's languages. English and Spanish come from different language families, Germanic and Romance respectively, however they are each directly related to French (All Things Linguistic, 2014). English and French are more similar in their lexicality (All Things Linguistic, 2014). English and Russian have a very large lexical distance and come from different families, Germanic and Slavic respectively (All Things Linguistic, 2014). At this time, there is not enough evidence to determine whether lexical similarity could contribute to success in semantic naming treatment and crosslinguistic generalization for individuals with bilingual aphasia.

The research presented in the above articles provides some suggestive evidence for the presence of crosslinguistic generalization following semantic naming treatment in individuals with bilingual aphasia. However, given the small sample sizes and varied results from the studies no conclusions can be made at this time. More research needs to be conducted in this

area in order to create compelling evidence that is generalizable to this population.

Further research would benefit from a new perspective on the topic. Much of the research surrounding semantic naming treatment and bilingual aphasia has been conducted by Swathi Kiran and the same methods were used across multiple studies. It must be noted that this may contribute to a bias in the research. Future research should include larger sample sizes to increase statistical power, more specific information about site of lesion and type and severity of aphasia and should consider bilingual factors such as age of acquisition, language dominance and language proficiency.

Conclusion

There is some evidence for crosslinguistic generalization following semantic naming treatment in individuals with bilingual aphasia however there is currently not enough compelling evidence to incorporate this as part of standard practice for this population.

Clinical Implications

For speech-language pathologists working with adult populations, in hospitals, rehabilitation centres or in the community, the study of bilingual aphasia has great implications. Evidence for crosslinguistic generalization as a result of semantic naming treatment in one language could help clinicians achieve the greatest outcomes for their clients despite limited time for their treatment. Information regarding the direction of transfer may allow SLPs to access and treat a larger variety of clients despite potential language differences (Kiran & Roberts, 2010).

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