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Critical Review:
Effectiveness and generalization of treatment methods in persons with word finding deficits

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Word finding deficits are one of the most common and often debilitating issues following a stroke. Despite the high incidence rate, researchers have yet to reach a consensus on the most effective treatment. This critical review examines the effectiveness and generalization of various word finding treatments in patients with aphasia. A literature search using computerized databases was completed resulting in four articles meeting the inclusion criteria. Study designs include: single subject design and case studies. The articles were evaluated using a critical appraisal template evaluating the level of evidence, validity and importance of the information included in the article. Overall, the research indicates that word finding treatments are beneficial and the effects continue once treatment has ceased; however, identification of a single effective treatment for all persons with word finding deficits has yet to be found. Possible reasons for the difficulty in identifying and implementing a single effective treatment is discussed in the review.

Introduction

There is great debate in regards to the treatment of word finding deficits, although it is one of the most common symptoms of aphasia (Best et al., 2002). Word finding deficits can have a large impact on communication and therefore the need for an effective treatment with effects lasting after treatment cessation is important. For patients who know they have word finding deficits it can be frustrating and potentially limiting on their daily lives, including reluctance to participate socially. For quality of life reasons, as well as the common occurrence of word finding problems, it is crucial to find effective, lasting treatment methods.

Typically, treatment for word finding can be divided into two categories: semantic and phonological. Phonological therapy focuses on strengthening the access and accuracy of lexical and phonological representations of words (Best et al., 2002); while semantic therapies attempt to strengthen the access and accuracy of lexical representation through categorization or semantically related details.

The literature investigating word finding treatments is conflicting. Studies have shown that semantically based therapies are effective in improving word finding abilities in treatment (Best et al., 2002); whereas, studies focusing on phonologically based therapies have shown to be both effective and ineffective at improving word finding. Although there have been studies about actual treatment methods, there are relatively few that assess whether the treatment effects continued once treatment was completed.

Effectiveness and maintenance in this review refer to improved naming ability and the continued improvement in word finding once treatment has stopped. This criterion is used to provide recommendations later in the review in regards to quality of life and improvement to communication rather than just the specific language impairment of word finding abilities. This review also includes information regarding generalization to untrained items, as it is also an aspect of successful word finding, with the potential to lead to improvements in overall communication and quality of life.

Objectives

The primary objective of this paper is to critically evaluate existing literature regarding the effectiveness and generalization of word finding treatments in persons with aphasia.

Methods

Search Strategy

A variety of computerized databases, including CINAHL, PubMed, Psych Info, Scholars Portal, were searched using the following terms:

> (Word finding deficits) OR (anomia) AND (treatment) OR (cueing) or (cues) AND (generalization)

The search was limited to articles written in English between 1990 and 2008.

Selection Criteria

Studies selected for inclusion in this review paper was required to investigate any type of treatment for word finding problems in adults with aphasia and whether the treatment effects continued after treatment. There were no limits set on the demographics of the research participants or outcome measures.

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Data Collection

The results of the literature search yielded the following types of articles harmonious with the selection criteria mentioned above: case study (1) and single-subject design (3).

Results

Single-Subject designs

Single-subject designs are appropriate objective methods for testing hypotheses related to aphasia and word finding deficits due to the relatively small subject population. As well, single-subject designs are considered to be suitable methods to use when attempting to compare treatment effects. Interpretation of the results from this design must be made cautiously because of the small sample size and possible selection biases.

A study conducted by Kendall et al. (2008), used a single-subject design to examine the effects of a phonological based treatment on naming ability in individuals with word finding deficits. Following an ABA repeated-probe design, ten participants with word finding deficits were given 96 hours of phonological and orthographic sequence training. A standardized test battery was administered pre and post treatment, with confrontation naming, phonological production, non word repetition and discourse naming probes administered in eight baseline, twelve treatment and two follow-up sessions. Results of the study indicated 8 out of 10 participants were judged to show evidence of minimal generalisation immediately following treatment cessation and 6 out of 8 participants maintained word finding improvements at three months post treatment.

Despite inherent variability in this population, the researchers attempted to control for a number of factors including average age, gender, average months post onset, location of infarct, handedness, language spoken, and the absence of apraxia of speech. Although all participants had to be at least 6-months post stroke, there was a large variance between the minimum of 16 months post onset, to the participant with a maximum of 120 months post onset. This large variance may interfere with treatment effects, if the ability for recovery after a stroke diminishes over time.

Kendall et al.(2008) presented clearly and thoroughly a description of the outcome measures and the analysis procedures for others to replicate their findings in another study. The researchers' established an appropriate baseline by including eight data points in which to measure change. To control for retesting bias, the researchers used standardized tests only during pre and post testing, and used probes during the baseline and treatment sessions. Although the standardized tests were administered only three months apart, and more time between retesting is usually recommended, the use of such tests in this manner is common practice. In addition, two lists of stimulus items were created and one was used for treatment, and the other to probe for treatment improvement. The attempts to control for retesting and memory effects allow for greater acceptance of the outcomes, as the researchers tried to control for outside variables. Adding further credibility to the results of the study is the choice of outcome measures used. All measures were linked to treatment and through the repeated probes design, had the potential to show small changes over each session. In regards to data analysis, the researchers completed an appropriate statistical analysis of single-subject data using effect size.

The level of evidence offered by this study is high due to the appropriateness of the study design, the measures used and the analysis completed. However, based on the findings of the study, this type of therapy may result in modest gains only.

Freed, Celery and Marshall (2004) conducted a single subject, alternating treatments design study with three adults with aphasia to compare the effects of two different cueing procedures on word finding ability. Participants were asked to name 200 different pictures to establish baseline data from which 60 items were chosen for treatment. The 60 items were then randomly divided into three different sets; a personalised cueing set, a phonological cueing set and an untrained control set. Training was provided over 24 sessions, 12 for each cueing method provided on alternate sessions, followed by naming probes at 1 week, 1 month, 2 months, and 3 months post treatment cessation. The results indicated naming accuracy improved with both the personalised and phonologic cueing methods; however, naming accuracy was significantly higher following treatment and at follow up probes with the personalised cueing method.

The selection criteria employed by the researchers was adequate for the design and included: handedness, language spoken, education level, and months post onset of a left-hemisphere CVA. The researchers provided individual information on all three participants, and many differences between the subjects became evident. All participants had suffered previous CVAs, with some complications remaining. These concomitant problems may influence treatment effects and may contribute to some variability of the results.

The treatment proceedings are clearly described in a way that is easily understood and allows for replication of the study. The researchers' collected baseline data of the participants' naming abilities across three different sessions. Despite only recording data on confrontation naming, the three different sessions allowed for steady, more accurate baselines for each

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participant in which to measure treatment gains. The outcome measure of naming accuracy is directly related to the research question and the treatment method and is therefore considered an appropriate measure. The researchers tried to ensure treatment effects were not limited to the stimuli by alternating treatment type and using two different stimuli control sets and by recording the percentage of correct responses at each session to measure change over time. Excellent levels of unit by unit agreement ratio provided evidence of reliability of treatment and data probes.

The researchers used visual interpretations of graphs for analysis and number of correct responses to determine naming ability. Statistical evidence was therefore not reported, and although this does not allow for comparison to other studies or treatment methods, it is acceptable for this type of study.

Despite weaknesses in the study such as a small sample size, a single variable baseline and no statistical data, there is a moderate level of evidence provided which lends support for the effectiveness of word finding treatments, especially those involving personalised cueing methods.

A study conducted by Cameron, Wambaugh, Wright and Nessler (2006) investigated a combined semantic/phonologic cueing method on story retell and discourse tasks. Employing a multiple baseline, single-subject design, five participants were asked to complete several story retell tasks for analysis of production of trained words in discourse and provide several samples of connected speech to assess generalization effects. The authors' concluded that a combined semantic/phonologic cueing treatment did result in slight improvements in naming ability, however it did not generalise to untrained items at any of the post treatment probes.

The selection criteria of the participants was very detailed and included gender, months post onset, language, education, absence of neurological problems, health and mental status, and hearing. As with the previous studies, there is a large range of the months post onset of the participants. However, with the inherent limitations of the population, the researchers did attempt to control for many variables.

The researchers provided rationales for the measures they were using and reasoning for treating word finding deficits in connected speech. One inherent problem with the story retell measure is that it has never been used, nor was it designed, as a measure for word finding abilities. Also, the treatment was administered in a clinic environment which is not natural and may not reflect the true ability of the participants. The measures used for the treatment of word finding deficits did not use words as the measure, but instead looked at Information Units (IU).One novel aspect of this was that it focused on various word types in addition to the more typical noun studies of previous research. The use of IU as an outcome measure, while having some advantages, does not focus on specific words. One unfortunate problem with with this novel approach is that comparison with previous research and generalization is limited. The researchers did establish a four item baseline using three parallel story forms and one "exposure control" form. The measure of IU's produced correctly was relevant to the treatment being administered and for the question the researchers were attempting to answer. Probes, identical to those used at baseline, were repeated throughout the treatment phases which had the potential to show small changes over the different sessions. An appropriate statistical analysis, an ANOVA, was completed based on the study design and the treatment administered.

This study provided a moderate level of evidence based on the type of design, the baseline established and the statistics used. Based on the weaknesses of the measures used and the procedures followed, this type of treatment should be studied further before applying to the clinic setting.

Case Study Designs

Case studies are often used when studying a small cohort and can be beneficial in directing further research. They are weak in level of evidence because of the single sample size, and therefore generalization to larger populations is limited, however, a particular treatment method, can gain further credibility if the findings of a case study are then used to develop a larger study.

Francis, Clark and Humphreys (2002) conducted a case study investigating whether active participation in a semantic based treatment method would result in generalization. The participant, a 79 year old female with aphasia and word finding deficits based on an assessment battery, completed 13 therapy sessions in which a circumlocution-induced naming treatment was delivered. The results of the study showed small, but significant improvements in picture naming, immediately following treatment cessation, and treatment effects were maintained at a reassessment two and a half weeks later.

The authors acknowledge the inherent limitations of a single case study, and the possibility of spontaneous recovery, due to the participant being only 2-3 months post onset. However, they did attempt to control for those effects by implementing a multiple-baseline across-behaviours design. In addition, the authors caution the use of this treatment for all people with word finding deficits, as the participant's anomia was only moderate.

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Despite the limitations of a case study design, the methodology used has many strengths. This includes the multiple-baseline across-behaviours design that attempted to more clearly demonstrate the link between treatment effects and outcome. The study would have been strengthened further, if probes were used during the treatment phase to determine improvements from session to session. The measures used were appropriate and related to the treatment, as the authors recorded both number and type of errors.

The appropriate nonparametric statistics, chi-square analysis, was used to measure significant difference in naming performance between baseline and post therapy levels.

Discussion

Overall, the findings from the studies indicate that treatment for word finding deficits are effective and the effectiveness is increased when the participants actively participate and has a semantic component. However, inherent weaknesses of the methodology, subject selection, and study design, reduce the strength of evidence and the ability to confidently apply the findings to a clinical setting.

Future research considerations:

It is recommended that further research be conducted to confirm the most effective treatment methods for word finding deficits, including whether generalization occurs and if there are maintenance of treatment gains. In future studies of word finding treatments, the following recommendations should be considered to strengthen the level of evidence:

a) Future research studies should employ study designs that lend stronger levels of evidence and incorporate larger sample sizes to increase the confidence of clinical implementation.

b) Treatment methods should include active participation of the client through cognitive involvement to increase naming ability.

c) For maintenance of treatment effects and generalization to untreated items, participants should be taught how to create their own cues, and then encouraged to apply to other words.

d) Researchers should utilize both statistical analyses and visual interpretations of graphed results to compensate for limitations of both types of analysis.

e) The type of stimulus used for treatment should include various word categories and access at both word and discourse levels should be studied to determine whether treatment effects are limited to confrontation naming tasks or expands to conversation.

Clinical Implications

Although the level of evidence provided by the articles reviewed has limited strength, they did provide important findings for which to direct future research. Based on the findings of the review, caution should be used when applying the findings clinically at this time until further research is completed.

While the current critical review did not identify one effective treatment for all word finding deficits, clinicians must understand the heterogeneity of the disorder and therefore a single treatment may never be the solution. Clinicians should accept that word finding treatments can be effective, although it may involve trialing different treatments to determine the most effective method for the client. Based on the potential impact of word finding deficits on quality of life, it is imperative to continue studying treatment effectiveness, generalization and maintenance.

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