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Literature review / Revue de la littérature

The effectiveness of semantic feature analysis: An evidence-based systematic review

L'efficacité de l'analyse des traits sémantiques : une revue systématique fondée sur des preuves

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Abstract

Objectives. – This review examines the effectiveness of semantic feature analysis as an intervention to improve naming abilities for persons with aphasia.
Method. – A systematic search of the literature identified 11 studies that met the pre-determined inclusion criteria. Two independent raters evaluated each study for methodological quality and assigned appropriate levels of evidence using the Single Case Experimental Design scale. To determine clinical effectiveness, effect sizes using Cohen's *d* were calculated if sufficient data were available. Alternatively, percent of non-overlapping data was calculated.
Results. – Results indicated that methodologically sound research has been conducted to determine the effectiveness of semantic feature analysis for persons with aphasia using single subject research designs. When using Cohen's *d*, the majority of participants showed a small effect size. However, when percent of non-overlapping data was calculated, a large treatment effect was present for the majority of participants.
Conclusions. – Semantic feature analysis was an effective intervention for improving confrontational naming for the majority of participants included in the current review. Further research is warranted to examine generalization effects.

Keywords: Semantic feature analysis; Aphasia; Anomia; Treatment; Systematic review

Résumé

Objectifs. – Cette revue examine l'efficacité de l'analyse des traits sémantiques comme intervention visant à améliorer les capacités de désignation de personnes atteintes d'aphasie.
Méthodes. – Une recherche systématique de la littérature a repéré 11 études correspondant à des critères d'inclusion prédéterminés. Deux évaluateurs indépendants ont noté chaque étude en termes de qualité méthodologique et de niveau de preuve en utilisant l'échelle Single Case Experimental Design (SCED). Afin de déterminer le degré d'efficacité clinique, des ampleurs de l'effet utilisant le *d* de Cohen étaient calculées à condition de disposer d'un nombre suffisant de données disponibles. Sinon, le pourcentage de données mutuellement exclusives était calculé.
Résultats. – Les résultats ont indiqué que des recherches méthodologiquement valables avaient été conduites en vue de déterminer l'efficacité de l'analyse des traits sémantiques chez les aphasiques, analyse qui appliquait des plans de recherche centrés sur un sujet unique. Lors de l'utilisation du *d* de Cohen, la majorité des participants n'ont présenté qu'une petite ampleur de l'effet. Or dès que le pourcentage de données mutuellement exclusives a été calculé, un effet traitement important a été constaté chez la plupart des participants.

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Conclusions. – L'analyse des traits sémantiques a constitué une intervention efficace dans le cadre de l'amélioration de la désignation par rapport au mot cible (*confrontational naming*) de la majorité des participants figurant dans cette revue. D'autres recherches pourraient examiner des effets de généralisation.

Mots clés : Analyse des traits sémantiques ; Aphasie ; Anomie ; Traitement ; Recherche systématique

1. English version

1.1. Introduction

Anomia is the most frequent and persisting symptom of aphasia [1,2]. Anomia occurs secondary to a neurological event (e.g., stroke, brain injury) and inhibits the ability to formulate language, even at the most basic word level. Anomia is a defining feature of aphasia; it extends across multiple subtypes of aphasia and is observed for all grammatical word forms (e.g., nouns, verbs) [3,4]. Word naming deficits negatively affect people's ability to communicate their wants and needs and engage in important social settings and activities. In fact, prior research indicates that people with aphasia (PWA) tend to be more troubled by impairments in speaking than in reading, writing, or listening comprehension and impairments in speaking have important effects on how PWA are regarded by others in daily life [2,4]. Therefore, identifying an effective treatment for the improvement of naming deficits in PWA is critical.

There are a variety of treatment approaches focused on improving expressive language abilities, specifically anomia, in PWA. It is believed that anomia typically results from overarching semantic impairments and reflects an insufficient engagement of the critical features that distinguish concepts from one another [5]. Typically, semantic approaches to treatment are used to target anomia as opposed to phonological approaches. Examples include circumlocution-induced naming [6], personalized cueing [7–9], and semantic feature analysis (SFA) [10–13]. The focus of the current review is the clinical effectiveness of SFA for the treatment of anomia in adults with neurological injury.

SFA was first introduced by Ylvisaker and Szekeres [14] and later refined by Massaro and Tompkins [15]. It is a commonly used treatment to improve naming and expressive language abilities of PWA by providing an organized method of activating semantic networks [16]. SFA uses a systematic cueing technique whereby PWA are asked to produce words semantically related to the target word they cannot recall [5]. For example, if the target word is ''cup'', the cues might involve questions related to its use (e.g., What do you do with it?), its properties (e.g., What does it look like?), where it might be used (e.g., Where do you find it?), what category it belongs to, and what might be associated with it (e.g., What are other things that are similar to it?). Because it is suggested that anomia results from an impaired semantic network, the goal of therapy is to alter the semantic network connectivity through refinement of the damaged network [5]. Hypothetically, SFA improves the retrieval of conceptual information by accessing and refining semantic networks [15]. Increased activation of the semantic network surrounding the target word elevates the likelihood the word will be retrieved and may also aid to repair the damaged semantic system [5,12,15].

A recent review by Boyle [17] examined the effectiveness of SFA. The review included seven studies, and all studies reported positive outcomes for the effectiveness of SFA for improving anomia for individuals with neurological impairments. However, only three reported the magnitude of the treatment effect [18–20]. A significant limitation of Boyle's [17] review is that there was no attempt to calculate magnitude of effect using data reported in the included studies. The absence of effect size calculations in the remaining studies made it difficult to conclude the effectiveness of the treatment. Therefore, the aim of the current study is two-fold. First, we extend Boyle's [17] review by including new research. Second, we apply statistical methods to investigate the magnitude of treatment effect for the included studies in an effort to answer the following clinical question: *For patients with non-degenerative aphasia, does semantic feature analysis improve confrontational naming abilities?*

1.2. Methods

A search of the literature was conducted to identify studies that investigated SFA as the primary intervention for anomia for PWA. Seven electronic databases were searched through June 2013: Academic Search Premier, AgeLine, CINAHL, ERIC, Medline, PsycInfo, and Linguistics and Language Behavior Abstracts. An additional search was performed within the American Speech-Language and Hearing Association (ASHA) journals, and references from all relevant articles were examined to identify any other applicable studies. A combination of search terms included: *aphasia*, *semantic feature analysis*, *language disorder*, *semantic cues*, *anomia*, *language treatment*, and *naming treatment*.

Eighty-eight articles were identified through the search process and the first author subjected these to a title and abstract review, which eliminated 70 articles. A study was excluded from the review if it was not experimental in nature, did not address SFA as a treatment and did not include adults with neurological damage. Studies were considered for review if they were written in English and published in a peer-reviewed journal between 1980 and June 2013. The first author reviewed the remaining 18 articles and an additional 7 were excluded as they combined SFA with other treatment methods (e.g., group therapy or semantic priming therapy) or used a hybrid approach to SFA. To be true to the objective of this review, only those studies that used SFA as initially designed by Massaro and Tompkins [15] were included. The process for identifying