Abstract
The primary goal of the present study was to investigate the efficacy of a multisensory reading approach (Lindamood Phoneme Sequencing Program) for the treatment of clients diagnosed with acquired alexia. All three participants improved their decoding skills as an effect of the LiPS program but with distinguishable characteristics believed to relate to their type of acquired alexia. The participant with surface alexia demonstrated the greatest learning curve as compared to the participants with deep or phonological alexia. All three participants showed a positive effect on cognitive-communicative abilities other than reading. Findings will be related to the connectionist approach to reading.

Full Text

Acquired alexia is a reading disorder caused by neurological damage and is usually the result of small, left-hemisphere, inferior parietal lobe lesions involving the angular gyrus.   It is often associated with aphasia and there appears to be some relationship between the severity and nature of aphasic auditory comprehension problems and the severity and nature of alexia. The variables effecting comprehension include word frequency, part of speech, emotionality, personal relevancy, syntactic complexity and length and degree of inference required for interpretation.   Individuals with acquired alexia can be classified into four groups: deep alexia, surface alexia, phonological alexia and pure alexia. Error patterns, as they relate to semantics, orthographic length and word frequency distinguish the types of acquired alexia. Some have suggested that phonological alexia is on the continuum of deep alexia (Friedman[1]).

Several approaches have been implemented to facilitate rehabilitation of reading skills. The Multiple Oral Reading (MOR) approach utilized repetition of oral reading to facilitate whole word recognition (Beeson[2]) whereas the Cross Modality Cueing approach combined kinesthetic and visual information to access the lexicon (Seki[3]). The Brief Exposure approach appealed to implicit learning suggesting that even brief exposure to words resulted in a degree of word recognition (Rothi and Moss[4]). In contrast to the whole word approach, some approaches have sought to strengthen the grapheme to phoneme conversion. Such approaches included the key-word approach as reported by Hillis and Caramazza[5] and the Cued Oral Reading by Hillis and Caramazza[6]

The approach used for the purpose of this study was The Lindamood Phoneme Sequencing Program (LiPS) (Lindamood & Lindamood[7]). LiPS is a three way sensory feedback process which utilizes input from the ear, the eye and the mouth and then integrates that information to monitor and verify the correspondence between spoken language and the system of symbols used to represent that language. It is designed to stimulate sensory-cognitive function and changes how the sensory information is processed. This process first teaches the client the visual, auditory and oral movements that are associated with every phoneme in the English language, providing a foundation for accurate discriminations among the different phonemes. The clients are then engaged in activities that require them to identify and segment phonemes within spoken syllables. This allows the clients to use their knowledge of distinctive features to increase their phonological awareness skills. Clients are then taught to use the phonological awareness skills learned to self monitor and self correct errors during reading and spelling.

After University IRB approval, three participants were selected. Participant #1 met criteria for surface dyslexia with Participant #2 being classified as a deep dyslexic and Participant #3 as a phonological dyslexia. The following evaluations were administered: Western Aphasia Battery, Clinical Test of Phonological Processing, the Lindamood Auditory Conceptualization Test-Edition 3, and the Grey Oral Reading Test: Edition 4. After pre-test baseline data was obtained, participants were trained using the LiPS program to track syllables, words and pseudowords. This exercise was implemented at two week intervals throughout treatment. Each participant attended biweekly sessions over the duration of the study, one being an individual two hour session and the other was a one hour individual session in addition to a one hour group session. After four weeks, the focus of treatment was shifted away from the LiPS program, and it concentrated on more aphasia oriented goals such as answering questions. After two weeks of aphasia treatment, LiPS was resumed for the remainder of the semester. It is important to note that this process was continued over the span of one year and three different semesters.

Pre and post-test results revealed positive gains in overall language function, phonemic recall, tracking of syllables, blending and segmenting of words and pseudowords, and the repetition of pseudowords. All three participants exhibited an increase in both phoneme (sound to symbol) identification and the ability to learn tracking exercises and was able to maintain newly learned skills during off periods, especially the four week break in between semesters.

In this study, we addressed three research questions. The first question asked if persons with acquired alexia will improve decoding skills as a precursor to reading as an effect of the LiPS rehabilitation program. This question was answered positively. One task used to monitor progress in this area was the tracking exercises (VC, CV, CV/VC, and CVC). All participants demonstrated the ability to blend, segment and decode various syllables. Participant #1 completed the study with perfect scores in each category. Participant #2 exhibited gains in each category and showed the most improvement in the CVC category, which indicates better decoding for word reading. Participant #3 demonstrated the most overall progress, especially in the category of VC and CV syllables. These results indicate the increased ability to decode syllables as a precursor to reading.

The second question asked if the effectiveness of the LiPS reading rehabilitation program is greater with persons with acquired surface alexia then acquired deep alexia? This was answered positively. Participant #1 exhibited more success in decoding, blending and segmenting the pseudowords when compared to Participant #2 or Participant #3. The difference between decoding pseudowords and words in deep and phonological alexia was attributed to a strong persuasion for the pseudoword to become a real word.

The third question asked if the instruction of LiPS will have a positive effect on cognitive/communicative abilities other than reading with persons with acquired alexia. This was answered positively. Results of the WAB, CTOPP, LAC, and GORT validated this answer.

The Lindamood Phoneme Inventory Sequencing Program proved to be successful in helping patients with acquired alexia learn new skills. Through the study, these participants were able to maintain the newly learned skill and exhibited to increase in both phoneme (sound to symbol) identification and the ability to learn tracking exercises. One drawback of the LiPS program, however, is that the program is very intensive. During this study, the majority of time spent in treatment consisted of the LiPS program entirely, placing the most emphasis on the phonemic recall and tracking exercises.

Results of this study revealed that while each participant exhibited positive gains as a result of the LiPS program. Participant #1, with surface alexia, exhibited the most progress in decoding, blending and segmenting words/pseudowords.   It is recommended that future studies be completed in order to monitor the effect that the LiPS program has on every day functional reading in this population.

This poster presentation will graph the treatment, generalization and control probes as well as relating results in favor of the simultaneous interaction of orthography, phonology and semantics as hypothesized by (Plaut[8]) in the connectionist approach to reading.

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