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Attention Treatment for People With Aphasia: Language-Specific vs. Domain-General Neurofeedback

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Abstract : Attention deficits are common in people with aphasia (PWA). Two treatment approaches address these deficits: domain-general methods like Play Attention, which focus on cognitive functioning, and domain-specific methods like Language-Specific Attention Treatment (L-SAT), which use linguistically based tasks. Research indicates that L-SAT can improve both attentional deficits and functional language skills, while Play Attention has shown success in enhancing attentional capabilities among school-aged children with attention issues compared to standard cognitive training. This study employed a randomized controlled cross-over single-subject design to evaluate the effectiveness of these two attention treatments over 25 weeks. Four PWA participated, undergoing a battery of eight standardized tests measuring language and cognitive skills. The treatments were counterbalanced. Play Attention used EEG sensors to detect brainwaves, enabling participants to manipulate items in a computer game while learning to suppress theta activity and increase beta activity. An algorithm tracked changes in the theta-to-beta ratio, allowing points to be earned during the games. L-SAT, on the other hand, involved hierarchical language tasks that increased in complexity, requiring greater attention from participants. Results showed that for language tests, Participant 1 (moderate aphasia) aligned with existing literature, showing L-SAT was more effective than Play Attention. However, Participants 2 (very severe) and 3 and 4 (mild) did not conform to this pattern; both treatments yielded similar outcomes. This may be due to the extremes of aphasia severity: the very severe participant faced significant overall deficits, making both approaches equally challenging, while the mild participant performed well initially, leaving limited room for improvement. In attention tests, Participants 1 and 4 exhibited results consistent with prior research, indicating Play Attention was superior to L-SAT. Participant 2, however, showed no significant improvement with either program, although L-SAT had a slight edge on the Visual Elevator task, measuring switching and mental flexibility. This advantage was not sustained at the one-month follow-up, likely due to the participant's struggles with complex attention tasks. Participant 3's results similarly did not align with prior studies, revealing no difference between the two treatments, possibly due to the challenging nature of the attention measures used. Regarding participation and ecological tests, all participants showed similar mild improvements with both treatments. This limited progress could stem from the short study duration, with only five weeks allocated for each treatment, which may not have been enough time to achieve meaningful changes affecting life participation. In conclusion, the performance of participants appeared influenced by their level of aphasia severity. The moderate PWA's results were most aligned with existing literature, indicating better attention improvement from the domain-general approach (Play Attention) and better language improvement from the domain-specific approach (L-SAT).

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