

Evaluation of sound and working memory intervention in autism spectrum disorder (ASD) children using auditory brainstem response (ABR) with psychological task

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Objective:

To investigate the effectiveness of sound-working memory therapy (SWMT) in improving sensory gating (SG) of ASD children using Auditory Brainstem Response (ABR) with psychological task through Stroop task (ST).

Participants and Methods:

Twenty-three ASD children were divided into three experimental and a control group. The experimental groups received S-WMT once a week for a month. Assigned sounds (waterfall, white noise, and Quranic recitation) is presented during the session. Simultaneously, they were trained with working memory training. All participants did pre- and post-intervention using ABR with cognitive load in four conditions: no cognitive load, congruent, incongruent, and neutral. Stroop interference (SI) and ABR sensory gating (ABR SG) were calculated by subtracting the result of the incongruent condition from the neutral condition. Results between groups was compared using ANOVA. Two-way RM ANOVA were used to investigate the improvement of intervention. The gain scores were calculated to compare the sounds type influence on ST conditions.

Results:

The Quran SWMT show improvement in percentage score (CR) and response time (RT), while white noise SWMT shows improvement in RT after SWMT. Those in white noise and Quran SWMT demonstrated significant increase in the SI CR after SWMT. Instead, those in waterfall and white noise SWMT shows a decrease in the SI RT. These coincide with the gain score between group analysis. The highest SI CR was obtained from white noise SWMT followed by Quran SWMT. The lowest RT was from waterfall and white noise SWMT. None of the ABR results were significant. This suggests an improvement in the SG among ASD children after SWMT.

Conclusions:

Waterfall and white noise are effective in SWMT to address the SG issues among ASD children as revealed by the ST test. It can be used to measure changes and provide a useful information on the status of the cognitive function in ASD children. ABR SG did not shows efficacy in measuring SG function thus, future modification is needed.

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