Stimulants Effect on Behavioral and Nonbehavioral Auditory Measures Among ADHD Students

Michal Kleiner*¹,², Matan Negbi*¹,³, Rotem Or*¹, Carmel Zuaretz*¹, Leah Fostick¹

¹Department of Communication Disorders, Ariel University Center of Samaria, Israel
²The Zusman Child Development Center, Soroka medical center, Ben-Gurion University, Beer-Sheva, Israel
³Hillel Yaffe Medical Center, Hadera, Israel

Aim.

To examine the effect of ADHD and stimulant medication on auditory temporal order judgment (TOJ) and on suppression of transient evoked otoacoustic emission (TEOAE).

Method.

Participants. Twelve students diagnosed with ADHD (age 18-40, mean 26.91).

Tasks.

Auditory TOJ. Two 1kHz pure tones which were presented diotically (one to each ear), at 40 dB SL. Participants were required to reproduce the order of the tones.

TEOAE suppression. A TEOAE recording from the tested ear was followed by a TEOAE recording from the same test ear accompanied by speech noise in the other ear.

Procedure. Two sessions, with and without stimulant medication, in a random order.

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Results.

Figure 1. Auditory TOJ thresholds for students with ADHD with and without stimulant medication, and for non-ADHD students. TOJ threshold for ADHD without stimulant medication was significantly higher than for ADHD with stimulant medication ($t_{(10)}=4.93$, $p<.01$), and for non-ADHD participants ($t_{(57)}=3.09$, $p<.001$). No difference in TOJ threshold was found between ADHD with stimulant medication and non-ADHD participants ($t_{(57)}=.77$, $p>.05$).
Figure 2. TEOAE suppression with and without contralateral masking for performance with and without stimulant medication. TEOAE suppression was within normal range. In addition, no medication effect was found for TEOAE suppression, either with ($t_{(11)}=-1.87$, $p>.05$) or without contralateral masking ($t_{(11)}=-1.1$, $p>.05$).
Conclusions.

1. High auditory TOJ thresholds were previously found for groups with language difficulties, among them are (1) aphasic patients (von Steinbuchel et al., 1999; Fink et al., 2006); (2) dyslexic readers (Ben-Artzi et al., 2005; Fostick et al., 2008; Fostick and Zukerman, 2010; Reed, 1989; Tallal, 1980); (3) elderly adults (Fink et al., 2005; Fitzgibbons and Gordon-Salant, 1998; Fostick et al., 2007; Fostick and Zukerman, 2010; Szymaszek et al., 2006, 2009); and (4) sleep deprived young adults (Babkoff et al., 2005; Fostick and Zukerman, 2010).

High auditory TOJ thresholds for students with ADHD without stimulant medications suggest that **without stimulant medications this group might also experience language difficulties.**

2. No ADHD and stimulant medication effect on TEOAE suppression point on normal low-level auditory processing among students with ADHD, as opposed to high level auditory processing (Ozgad et al., 2004).
References.


