DID YOU SEE THE DISTRACTOR?
A MOXO CONTRIBUTION TO ADHD DETECTION
Increased vulnerability to distraction is a key feature of Attention-Deficit Hyperactivity Disorder (ADHD) and is included in the DSM-V criteria of the disorder (APA, 2013). In contrast to hyperactivity, distractibility symptoms often persist into adulthood and contribute to interpersonal, social, family, academic, and work-related difficulties (Eakin et al., 2004; Biederman et al., 2006). Thus, identifying distractibility in ADHD patients and clarifying the distractibility features for individual patients can have significant clinical and diagnostic value.

The failure of existing studies to consistently show that ADHD patients are more sensitive to distractors than their non-affected peers (Huang-Pollock et al., 2006; Mason et al., 2005) has led some researchers to question the cognitive performance of children with ADHD (APA, 2013). Another limitation is that most CPTs involve competition of potential responses in which there is a need to inhibit a response to irrelevant stimuli. This paradigm has been criticized for its low ecological validity (Blakeman, 2000) because in everyday life, individuals are required to ignore a stimulus that is external to the task and not conflicting with task demands (e.g., a child doing schoolwork while someone talks in the next room). These limitations may explain the loose association between CPT performance and behavioral measures of inattention and hyperactivity, such as those reported by parents and teachers in symptoms rating scales (McGee et al., 2000; Weis and Totten, 2004).

MEASURING DISTRACTIBILITY USING THE MOXO-CPT

The MOXO-CPT (Neuro Tech Solutions Ltd) is a standardized computerized test designed to identify ADHD-related behavior (Berger & Goldzweig, 2010). As in other CPTs, the MOXO task requires a participant to sustain attention over a continuous stream of stimuli and to respond to a pre-specified target. However, the MOXO paradigm also includes intentionally distracting visual and auditory stimuli which appear during specific phases of the test and are typical in their content to items in everyday life. As distractors external to the task (i.e., they do not conflict directly with task demands), they provide a context for measuring a patient’s susceptibility to irrelevant periodic stimuli in the environment rather than ongoing background stimuli or distractors that are part of the cognitive task itself (Van Mourik et al., 2007).

In both child and adult versions of the MOXO Test, distractors can be exclusively visual, exclusively auditory, or multi-modal. In addition, there are two levels of distraction intensity: low-level distraction, where one distracting stimulus appears at a time, and high distraction intensity, where two distracting stimuli appear simultaneously. A number of studies have been conducted to test the use of this paradigm in different populations.

Distractibility in children

A study conducted with 663 children ages 7-12 years (345 with diagnosed ADHD and 318 controls) used the MOXO Test in order to examine the effect of the distractors on performance of ADHD and control subjects. This study used the rate of omission errors as an indication of attention difficulty. Results showed that while children with ADHD were negatively impacted (i.e., made more omission errors in the presence of all types of distractors), the performance of control subjects was affected only by the most intensive distractors – the combination of visual and auditory stimuli. This result underscores the relative susceptibility of ADHD patients to environmental distraction (Cassuto et al., 2013).
SUMMARY

Traditional Continuous Performance Tests used to evaluate attention have been viewed as lacking ecological validity and clinical utility due in part to the absence of external distractors. Furthermore, recent attempts to include distractors CPT paradigms have been limited by the inclusion of non-salient or task-competitive stimuli.

The MOXO test has been designed to include salient stimuli that are independent of the core task with the goal of identifying distractibility as well as improving overall sensitivity and specificity of attentional results. In support of this, studies have demonstrated that children and adolescents with ADHD are more susceptible than age-matched controls to salient distractors. Furthermore, research using MOXO has also indicated that the developmental trajectories of attention and distractibility may be distinct from each other in teens with ADHD, suggesting that measures of attention alone may not be sufficient for predicting functional disability in adolescent ADHD.

REFERENCES


