Introduction
Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most prevalent neuropsychiatric childhood disorders and research is ongoing regarding the organic and environmental contributions to this condition. Sensory and motor deficits have been identified in children with ADHD (Iwanaga, Ozawa, Kawasaki, & Tsuchida, 2006; Piek, Pitcher, & Hay, 1999; Yochman, Ornoy, & Parush, 2006).

Research has demonstrated that standardized and norm-referenced sensory-motor measures have the ability to differentiate between healthy patients and those with ADHD (Finch, Davis & Dean, 2010). The connection between sensory and motor functioning and cognitive processing has also been established in individuals with ADHD (Davis, Pass, Finch & Dean, 2009).

The purpose of this study was to determine if a newer statistical technique, Boosted Tree Methodology, could differentiate between a group of children with ADHD and a healthy comparison group and if it would achieve a better classification rate than logistic regression.

Methodology
Participants were 118 individuals diagnosed with ADHD (mean age = 12.4 years; SD = 5.5) and 118 healthy individuals (mean age =12.6 years; SD= 5.6) who were matched by age and gender to the clinical sample. All participants were administered the Dean-Woodcock Sensory Motor Battery (DWSMB; Dean & Woodcock, 2003).

Analysis
The DWSMB is a measure of sensory-motor functions that employs many classical tasks yet has the advantage of adopting a standardized and norm-referenced approach. Boosted Tree (BT) Analysis is a new statistical technique that improves upon Classification and Regression Tree (CART) analysis in that multiple decision trees are created with each subsequent decision tree drawing upon the previously fitted tree to improve prediction accuracy. The predictors were 35 scores from the DWSMB.

Results and Summary
Results of the analysis indicate that the BT method correctly predicted group membership for 96.6% of cases, compared with logistic regression, which accurately predicted group membership for only 67.8% of individuals. The significance of these results is magnified when it is considered that this statistical technique was able to predict group membership using only measures of sensory-motor functioning without consideration of attention, executive functioning, intelligence, memory or other indicators of higher-order cognitive functioning typically assessed in individuals with ADHD.

These results suggest that BT analysis is a promising new statistical technique for improving diagnostic classification rates when compared to more traditional methods. The most important predictors included measures of simultaneous tactile localization, auditory perception, and finger-to-nose tasks. In sum, the BT analysis suggested that individuals with ADHD may have more significant sensory-motor concerns than previously considered by using other more common statistical techniques.

References