2010-04-01

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Oliver H. Johnston
ohjohnston@gmail.com

S. White

A. Clawson

E. Krauskopf

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Social Versus Memory Demands on Cognitive Set Shifting
S. White, O. Johnston, E. Krauskopf, A. Clawson, and M. South
Brigham Young University Department of Psychology, Neuroscience Center, College of Life Sciences

Key Terms
ASC = autism spectrum condition   TDC = typically developing comparison
PO= Person Only   CO= Computer Only   PC= Person-Computer

BACKGROUND

- Executive functions refer to brain processes needed for planning, flexibility, abstract thinking, and other everyday organized tasks.
- There remains inconsistency in executive function (EF) studies in autism. A recent review of previous studies (Corbett et al., 2009) reports overall significant deficiencies in EF for autism groups, but it is uncertain how much of this may be due to the presence of ADHD symptoms in 30-50% of children diagnosed with autism (Yerys et al 2009).
- It has been shown that children with high-functioning autism perform the Wisconsin Card Sort, a test of set-shifting and perseveration, better when it is administered via computer than by a person (Ozonoff 1995).
  - Ozonoff suggested this was due to social demands on cognition during the in-person task that interfered with performance, rather than damaged executive functioning in set-shifting.
- We aimed to investigate this hypothesis by varying the amount of social input in the administration of the WCST, across three different conditions

METHODS

Measures
1. Child ASD participants completed one of three versions of the Wisconsin Card Sort Task (WCST) to measure the effect of set shifting during various levels of social interaction. Each task was presented using standard instructions.
   a) Person Only Task (PO)- Original version of the WCST - highest social demand
   b) Computer Only Task (CO)- Computerized version of the WCST - lowest social demand
   c) Person-In-Computer Task (PIC)- Videotaped human administration of the WCST - partial social demand
Each was timed so that the time from the end of one trial to the possibility of making your next decision was about 4 seconds

1. The participants were matched with a typically developing control group for age, sex, and IQ.
2. The ASC group was much more anxious (per parent report) than the TDC group.

BEHAVIORAL RESULTS:

Overall Performance on the WCST

When all conditions were averaged together, the ASC group performed significantly worse than the TDC group on all aspects of the WCST

Task-Specific Performance on the WCST

There are no between-group differences in performance on the Person-Only task, for any variable. When the WCST was administered by computer, however, the ASC group performed more poorly than controls on a number of variables. The significant overall differences reported above are due ONLY to computer-administered versions. There is no correlation between IQ and anxiety in either group.

CONCLUSION

- Children affected with ASD performed significantly worse on both computer related tasks (CO and PIC) than on the person-administered task. This may be due to the increased demand for working memory and attention when using computer versions of the computer task, which include delays between each trial.
  - This was especially true for the number of perseverative errors, which is a hallmark symptom of executive function problems in autism.
- The TDC group performed much better, but followed a similar trend by performing better on the PO task.
- Recommendations: ASD/ADHD correlation be explored to discover relationship between working memory in each setting. Include a measure for working memory.

This work was supported by a Mentored Environment Grant, a Family Studies Center Research Grant, and a College of Family, Home and Social Sciences Research Award from Brigham Young University.

Many thanks to our study participants and their families.

Thank you to the Mary Lou Fulton Chair at Brigham Young University for supporting presentation at this conference.

Figure 1- PO Animation to make timing comparable to PIC administration
Figure 2- Screen shot of the CO version
Figure 3- Screen shot of PIC recorded administration

Correspondence address: nwhite@byu.edu