

## Comparison of the CHAPPS Screening Tool & APD Diagnosis

Mary Drake, Au.D., CCC-A, Megan Brager, B.S., Jason Leyendecker, B.S., Michelle Preston, B.S., Erica Shorten, B.S., Rachel Stoos, B.S., & Louis DeMaio, Ph.D., CCC-SLP

### Introduction

An auditory processing disorder (APD) is the significant difficulty in one or more of the following auditory processes: sound localization and lateralization; auditory discrimination; auditory pattern recognition; temporal aspects of audition; auditory performance in competing acoustic signals; and auditory performance with degraded acoustic signals (ASHA, 2005).

Screening for APD is a method for identifying children at risk for auditory processing difficulties.

The *Children's Auditory Processing Performance Scale (CHAPPS)* is a questionnaire created by Smoski, Brunt, and Tannahill that is used to screen for APD by assessing a parent's and/or a teacher's judgment of a child's listening ability as compared to his or her peers (1992). CHAPPS was developed to systematically collect and quantify listening behaviors observed in children ages seven and older (Hutton, 1990).

Rated on a scale from -5 (cannot function at all) to a +1 (less difficulty), the following categories are included in this screening tool:

- Noise
- Quiet
- Ideal
- Multiple Inputs
- Auditory Memory/ Sequencing
- Auditory Attention Span

The APD diagnosis was made following the administration of a comprehensive behavioral test battery. Consistent with recommendations by Bellis & Ferre (1999), the MSUM APD test battery assesses the following processes:

- Auditory Closure
- Binaural Interaction
- Binaural Integration
- Auditory Figure Ground
- Temporal Processing/Patterning
- Auditory Attention (screening)

MSUM's criterion for diagnosing APD requires two abnormal tests in at least one ear within the same process.

### Purpose

The purpose of this study was to determine if CHAPPS, used as a screening tool, identified APD.

### Methodology

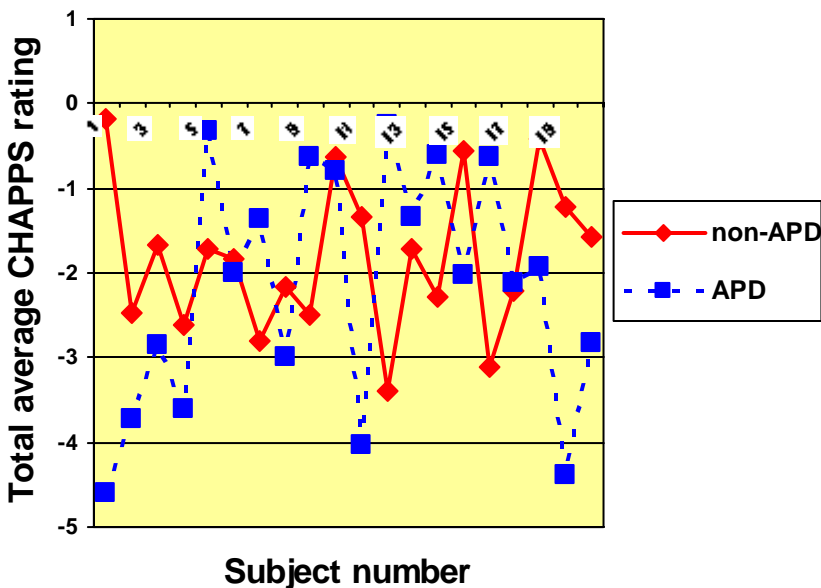
Using data gathered in the MSUM APD clinic, we selected 40 subjects ranging in ages 8-15 years. Twenty of these subjects had been diagnosed with APD; 20 subjects had not been diagnosed with APD (non-APD).

After randomly selecting the subjects, the APD diagnosis of “yes” or “no” and the CHAPPS rating of either “below normal” or “normal”, based on the numeric total average score, were compared.

### Results

We compared the APD diagnosis and the CHAPPS results of each of the 40 subjects using the *Chi-Square Test of Contingency*.

Results revealed no relationship between the screening results and the diagnosis. For the APD subjects, 15 had below normal scores and 5 had normal scores. The non-APD subjects also had 15 subjects with below normal scores and 5 with normal scores. Therefore, CHAPPS under-identified 5 subjects and over-identified 15 subjects.



## Discussion

Currently, there is no universally accepted screening tool for APD (ASHA, 2005). This study's results did not support the use of CHAPPS as a stand-alone screening tool. In fact, the authors of CHAPPS themselves identified that additional research was needed before this tool could be used for APD screening (Smoski, et. al., 1992). Beyond other questionnaires, very few formal screening tools are currently available for APD. The *SCAN-C*, a formal screening tool designed by Keith (2000), is commonly used for identifying children at risk for APD. However, research has shown concerns with the reliability of this tool (Amos & Humes, 1998). Jerger & Musiek recommended the use of a dichotic digit test or a gap-detection test (2000). Further research is needed to determine the reliability and validity of these tests as screening tools.

It is important to note that the APD diagnosis was based on the MSUM APD clinic protocol, which may be considered more stringent than other APD protocols. Therefore, the results of this study may have been different if a more lax interpretation criterion were used, such as recommended by Bellis (2003).

CHAPPS is a questionnaire and should not be used as a stand alone screening tool. Children who are rated as *normal* by CHAPPS may still have APD and need further testing. It can also be stated that children that are rated as *below normal* by CHAPPS may not have APD, resulting in inappropriate referrals. CHAPPS could be used as an informational tool for the clinician to gain insight into parents' or teachers' views of the child's difficulty with auditory tasks or in combination with other screening tools. As with any APD screening tool, CHAPPS should not be used to diagnose APD.

Other sources related to screening for APD:

- Jerger & Musiek (2000) identified that screening for APD may include observation, screening by test, screening by questionnaire, or any combination of the three. They also noted that checklists and questionnaires, which are often influenced by non-auditory factors, may result in over-referrals.
- Musiek, Gollegly, Lamb and Lamb (1990) supported the need for an (C)APD screening program. They wrote that accurate screening for (C)APD could potentially increase parents' and teacher's awareness of the disorder, enhance educational planning, reduce anxiety related to the difficulties associated with (C)APD, assist in identifying medical issues and reduce the "shopping around" for other disorders.
- Bellis (2003) listed audiological options available for (C)APD screening, including the *SCAN-C Test for Auditory Processing Disorders in Children-Revised* (Keith, 2000), the *Auditory Continuous Performance Test (ACPT)* (Keith, 1994), the *Dichotic Digits test* (Musiek, 1983), the *Children's Auditory Performance Scale* (Smoski et. al., 1998) and *Fisher's Auditory Processing Checklist* (Fisher, 1985). She also noted the need for behavioral observation in both classroom and non- classroom environments. Bellis (2003) recognized the need to use several tools in the screening process.

## References

- American Speech-Language-Hearing Association (2005). (Central) Auditory Processing Disorders. Available at <http://www.asha.org/members/deskref-journals/deskref/default>
- Amos, N.E. & Humes, L.E. (1998). SCAN test-retest reliability for first-and-third-grade children. *Journal of Speech Language Hearing Research*, 41: 834-845.
- Bellis, T.J. (2003). *Assessment and Management of Central Auditory Processing Disorders in the Educational Setting: From Science to Practice*. Thomson Learning, Inc: Canada.
- Bellis, T.J. & Ferre, J.M. (1999). Multidimensional Approach to the Differential Diagnosis of Central Auditory Processing Disorders in Children. *Journal of the American Academy of Audiology*, 10, 319-328.
- Fisher, L.I. (1985). Learning disabilities and auditory processing. In R.J. Van Hattum (Ed.), *Administration of speech-language services in the schools* (pp. 231-292). College Hill Press: San Diego.
- Hutton, C.L. (1990). Case study examples using self-assessment. *Ear and Hearing*, 11, 48S-56S.
- Jerger, J., & Musiek, F. (2000). Report of the Consensus Conference on the Diagnosis of Auditory Processing Disorders in School-Aged Children. *Journal of the American Academy of Audiology*, 11, 467-474.
- Keith, R. (1994). *ACPT: Auditory continuous performance test*. San Antonio, TX: The Psychological Corporation.
- Keith, R. W. (2000). *SCAN-C Test for Auditory Processing Disorders in Children-Revised*. San Antonio, TX: Psychological Corporation.
- Musiek, F.E. (1983). Assessment of central auditory dysfunction: The Dichotic Digits Test revisited. *Ear and Hearing*, 4, 79-83.
- Musiek, F.E., Gollegly, K.M., Lamb, L.E., & Lamb, P. (1990). Selected issues in screening for central auditory processing dysfunction. *Seminars in Hearing*, 11, 372-384.
- Smoski, W. (1990). Use of CHAPPS in a children's audiology clinic. *Ear and Hearing*, 11, 53S-56S.

Smoski, W.J., Brunt, M.A., & Tannahill, J.C. (1992). Listening characteristics of children with central auditory processing disorders. *Language, Speech, and Hearing Services in Schools*, 23, 145-152.

Smoski, W. J., Brunt, M. A., & Tannahill, J. C. (1998). *Children's Auditory Performance Scale*. Tampa, FL: Educational Audiology Association.