SSW REPORTS.....

REVERSALS, Reversals, Reversals

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SSW REVERSALS in DIFFERENTIAL DIAGNOSES of CAPD, ADHD, and LD

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The presence of SSW reversals may provide more information than the clinician realizes. This article will review the definition and populations commonly found to exhibit SSW reversals. Three cases will be presented illustrating the use of SSW reversals in differential diagnoses.

Definition

Reversals occur when the stimuli are repeated out of order, but only if no more than one error occurs. When there are two – four errors a reversal is not marked.

The reversal strip is thought to be associated at the anterior temporal and fronto-parietal lobes. Others have stated that reversals are seen in-patients with brain damage (Katz, 1968; Katz and Pack, 1975), learning disabilities (Stubblefield and Young, 1975) and unmotivated individuals (Lukas and Genchur-Lukas, 1981).

Because this is an "anterior sign" it has been suspected that individuals with Attention Deficit Hyperactivity Disorder (ADHD) may exhibit more reversals than normals. Tillery (1992) found this to be true and replicated the results in 1997.

For Tillery's first study, she found 25 of the 30 children with ADHD to also exhibit CAPD. Of the 25 subjects, 14 (56%) displayed SSW reversals. Tillery, Katz and Keller (1997) evaluated the auditory processing function of 66 children with ADHD. They found 36 of the children to manifest moderate-to-severe CAPD, 19 with mild CAPD and 11 children without CAPD. Of the 36 children with CAPD and ADHD, 50% displayed significant SSW reversals.

Reversals Among 62 Children Referred for CAPD Evaluations

Because children with ADHD are at risk for CAPD, the author randomly examined the records of 62 children referred for differential diagnosis in the past year, with special interest to significant SSW reversals. (See chart on page 6 for findings). More children were found to display significant reversals if they had LD or ADHD.

Four children without CAPD, but with ADHD (Group # 3) displayed significant reversals, as did Group # 4 with only LD. As expected, those without CAPD/LD/ADHD (Group #5) did not have significant reversals. But look at Group # 2. For this group, the children did not have LD or ADHD, but were found with CAPD and few significant reversals.

Differential Diagnosis?

Because such a large percentage of the population of LD or ADHD display significant SSW reversals, the author considered the following: If a child passes all administered CAP tests, except for SSW reversals, then does this child have an Organization type of CAPD or does the presence of SSW reversals relate to the child's attention or learning disorder?

Case #1

C.O., age 6.3 years, was referred by the neuro-psychologist for a CAPD evaluation. C.O.'s medical history included a history of ear infections, cerebral palsy, inattention/impulsive behaviors, and constantly required repetition in directions. Because C.O. was found to exhibit mild ADHD, the referral was to rule-out CAPD.

C.O. passed all CAP tests, except for exhibiting significant SSW reversals. The neuro-psychologist recommended a trial period of central nervous system (CNS) stimulant medication. When C.O. received Ritalin she was found to exhibit 3 errors on the Auditory Continuous Performance Test (ACPT) (Keith, 1994) verses 49 errors when non-medicated.

The ACPT is a measure to assess auditory-impulsivity and auditory-inattention across time. The 20-minute test requires the child to raise his thumb when he hears the target word 'dog'. There are 20 target words included in six sets of 90 words, allowing for comparison of performance in the first set of words to the final set of words.

The audiologist and neuro-psychologist questioned whether C.O. 1) exhibited the Organization CAPD category based on her display of significant SSW reversals, while passing the CAP test battery, or 2) if ADHD was responsible for the reversals.

Case # 2

A.M., age 6.8 years, was referred for a neuro-psychological evaluation after the audiologist diagnosed A.M. with Decoding, TFM and Organization types of CAPD. The psychological referral was based on A.M.'s weak reading/ spelling/math skills, extremely high level of hyperactivity and display of significant reversals.

Clinicians may assume that individuals with an extremely high level of hyperactivity are those with ADHD. However, this is not always the case. An individual may exhibit hyperactivity from a history of otitis media, ADHD, nonverbal learning disability (NLD) or even CAPD (Keller, 1998).

Nonverbal learning disorder is characteristic of 'gifted' language ability (left hemisphere performance), but weak nonverbal performance (right hemi-sphere performance). Hence the child with a NLD will be analytical, and gifted in understanding details, but unable to

master the 'whole picture'. Math, and nonverbal activities are weak areas, as are social interactions, because the child is unable to utilize information from facial expressions or gestures. The NLD profile is often confused with the ADHD profile, as hyperactivity is a behavior seen in either disorder.

In A.M.'s case, the clinician recognized that the presence of significant SSW reversals, put A.M. at risk for ADHD or LD. A.M.'s psychological evaluation revealed a NLD. She continues to receive CAPD therapy, targeting phonemic awareness.

Case # 3

J.A., age 7.5 years, was referred for CAP re-evaluation to ascertain the effects of maturation and therapy. J's CAP evaluation (6.4 years of age) revealed Integration (Type A) and TFM types of CAPD. J.A. exhibited weak reading/ spelling abilities, poor receptive language ability and a slow response manner to auditory information.

His 2 SSW reversals were within normal limits on the first CAPD evaluation and the 20 SSW reversals on the second CAPD evaluation were 5 SDs above the mean. (The same clinician administered both CAP evaluations). J.A. received intensive CAPD/language therapy in the year between testing. Because he had so many errors (40 SSW errors) on the first evaluation verses the second CAPD evaluation (16 SSW errors), the initial errors may have masked his tendency to reverse.

J.A. was found to display a subtle reading disability over the course of the year, but not ADHD. He continues to receive CAPD/language therapy and reading tutorial services.

SUMMARY

A review of 62 CAPD evaluations revealed that children with CAPD/LD or CAPD/ADHD produced significant SSW reversals than children with only CAPD. Three cases illustrate that the presence of more than normal SSW reversals may assist with differential diagnoses of CAPD, ADHD, or LD. One child exhibited significant SSW reversals, but not other problems associated with CAPD. The reversal display is thought to be associated with her diagnosis of ADHD. Some clinicians may inquiry if the reversals have been reduced when this child receives her medication. Tillery (1992) found the SSW reversals to be less when the children were under the influence of their medication, however, this was not replicated in a more controlled, double-blind study with a larger sample population (Tillery, 1997).

A second child, with significant SSW reversals, was found to exhibit CAPD and a nonverbal learning disorder. A third child, without SSW reversals on the initial CAP evaluation, was found to have CAPD. However, after receiving one year of CAPD/language therapy the child was found with fewer NOE on the SSW (post therapy), but significant SSW reversals (post therapy). Possibly, the excessive NOE masked the SSW reversals on the first CAP evaluation.

Katz and Smith (1991) published an article, "*A ten-minute look at the CNS through the ears: Using the SSW test*". The author is in agreement with Jack Katz. The SSW provides an essential

peek into the brain and those SSW reversals may be an important piece of the puzzle in differential diagnoses.

Dear Ackie:

Our clinic recently hired a colleague who was formerly employed as a speech-pathologist in another state that did not mandate state licensure for audiologists or speech-pathologists. The colleague diagnosed individuals with CAPD and Learning Disabilities (LD) in that state. What information can you provide me regarding ASHA's position on CAPD? Sincerely, Anxious

Dear Anxious: This is a timely question. ASHA's web page lists the most frequently asked questions about protocol in evaluations and other pertinent information regarding audiology and speech-pathology practices. One of the five-audiology questions is *"What is ASHA's position on Central Auditory Processing Disorders?"*

They refer the reader to 1) ASHA's Scope of Practice for Audiologists and Speech-Pathologists and 2) the technical report, *"Central Auditory Processing: Current Status of Research and Implications for Clinical Practice"* (ASHA, 1995).

The Scope of Practice in Audiology stipulates "Evaluation and management of children and adults with CAPD."

The Scope of Practice in Speech-Language Pathology states, "Collaborating in the assessment of CAPD in cases in which there is evidence of speech, language and/or other cognitive-communication disorders; providing intervention for individuals with CAPD."

ASHA's technical report on CAPD was developed after a ten-member Task Force on Central Auditory Processing convened in Albuquerque, New Mexico in 1994. The Task Force's mission was to develop a "consensus statement" on the best practice related to the evaluation and remediation of adults and children with CAPD.

The Task Force requested clinicians and researchers to present information on four general issues:

1. What does basic science tell us about the nature of CAPD and its role in audition?
2. What constitutes an assessment of CAP and its disorders?
3. What are the developmental and acquired communication problems associated with CAPD?
4. What is the clinical utility of a diagnosis of CAPD?

The consensus statement may be found in ASHA's technical reports or in the *American Journal of Audiology*, July, 1996, Volume 5:2, (41- 52). Some highlighted areas consist of a detailed definition of CAPD, suggested auditory deficits to assess, future research directions and to not confuse language use with CAPD.

The report dictates: the diagnosis of a CAPD is accomplished using a variety of indices, including: 1) case history, 2) non-standardized, but systematic observation of auditory behavior, 3) audiologic test procedures and 4) speech-language pathology measures (ASHA, 1995).

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The consensus statement further elaborates, " The impact of CAPD on language use is particularly evident in spoken language comprehension. Because spoken language comprehension is determined by a number of different factors, clinicians should be cautious in attributing spoken language comprehension difficulties to CAPD in any simple fashion. Audiologic considerations, as well, play a role. Thus, a diagnosis cannot be made solely on the basis of poor comprehension of spoken language (pg.148)".

Other important statements include:

1. "Specific principals are provided on the manner to reliably diagnose CAPD, with regards to the duration of the test battery; test sensitivity and specificity; the clinician must have theoretical and practical knowledge and must be qualified to interpret the central auditory processing test battery; speech-language pathologists may collaborate in the assessment of CAPD, in cases in which there is evidence of speech and/or language deficits or other communication disorders (pg. 148)".

2. "Professional educators have a responsibility to students, to their program, and to themselves, to ensure that the practices they advocate are thoroughly motivated by the BEST OF CURRENT SCIENCE. This requires continuous scholarly effort, resources for faculty development, and ongoing curriculum/course revision. One such revision might be to create advanced graduate seminars, or continuing education programs, that revisit the basic sciences and examine the student's/ professionals' clinical experiences from a scientific perspective. Other revisions might lead to seminars that cross professional boundaries and enroll students from both audiology and speech-language pathology, as well as from other related professional programs. CAP would be an excellent topic for either of these ventures (pg. 158)".

So Anxious, as I read it, it is improper for a SLP to diagnose CAPD (and there are ethical and legal concerns regarding the diagnosis for LD as well).

Dear Ackie:

Recently, an insurance company denied me payment for providing CAP therapy. Their stated reason was that this practice was not under the scope of audiology. HELP!

Dear Help,

I sure hope you have since realized that someone in the insurance company did not know the laws in the state of New York. First, you must have full knowledge of the laws in ***your state*** and ASHA's scope of practice. Secondly, you must be aware of the fact that there was a revision in 1996 for the CPT codes regarding insurance coverage practices between speech-pathology and audiology.

The revision involves ***CPT code # 92507,*** which deals with: ***treatment of speech, language, aural rehabilitation and auditory processing.*** Obviously, the treatment of speech and language falls

under the practice of speech-pathologists, however, aural rehabilitation and management of CAPD may be administered by either audiologists or speech-language pathologists. The revision highlights that audiologists may provide treatment involving aural rehabilitation and/ or auditory processing.

This may be a good time to also discuss the CPT codes for CAPD evaluation. **CPT Code # 92589** Central Auditory Function Test(s) should be utilized for ALL of the central tests that you administer, including the SSW. Most insurance companies will reimburse you for each test, depending on your city or state allocations for that third-party.

You must write the name of each CAP test, and circle the number of tests employed with the charge for each. Many of the insurance companies will not notice that you employed three, four or five central tests *UNLESS you highlight this on your charge statement.*

I am constantly asked as to what audiologists should charge for a CAP evaluation. ***YOU MUST RESEARCH*** what your colleagues charge in your city or state. The average charge for each central test ranges from 24.00 – 35.00 in this region. Lastly, it doesn't matter what you charge when submitting to 3rd party billing, as the insurance company will reimburse you based on their reimbursement allocations.

TABLE 1. Examination of SSW reversals among 62 CAPD children referred for CAPD evaluations.

Group #	Group Type	# N	% with Significant Reversals	Mean
1	CAPD/ADHD/LD	22	100%	13
2	CAPD only	16	12%	5
3	ADHD only	4	100%	10
4	LD only	4	100%	16
5	No CAPD/ADHD/LD	16	0%	0