SSW reports

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COMMUNICATING SSW RESULTS

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One of the biggest problems facing audiologists today is how to communicate central auditory test results to aid in the learning or therapeutic process. We who utilize the SSW are familiar with the terms Type A, Type B, Mild C-SSW, Moderate A-SSW etc. but how does the speech pathologist or learning specialist interpret these terms that are commonly found in SSW reports?

Katz (1978) reported various ways central auditory test information could be reported based on site of origin. Lucker (1983) discussed the use of Types in reporting the SSW results and correlated the use of these types with specific auditory-linguistic-cognitive processes which are in need of therapeutic intervention. Tedeschi (1983) reported on the use of central auditory tests in identifying children with central auditory dysfunction and correlated the information obtained from the central battery into five areas of auditory processing so that therapeutic intervention could be initiated.

The purpose of this paper is to describe a method of reporting the results of the SSW to professionals who help in the communication process but who may not be familiar with the SSW.

There are five basic auditory processing areas that should be considered in a central auditory evaluation (Musiek, 1980). The SSW Test is the one test that evaluates a portion of all five of the areas. The areas are as follows:

1. Selective Listening - The ability to concentrate and maintain concentration on a given auditory task. This skill is also utilized for auditory memory. The areas on the SSW to observe are omissions of the first or last word of the item. Also watch the physical state of the individual, i.e. concentrating on the task, or displaying hyperactive behavior.

2. Binaural Separation - the ability to attend and integrate information presented to one ear and supress the information simultaneously presented to the other ear.

3. Binaural Integration - the ability to combine different information presented to each ear simultaneously. This would include Ear and Order Effects, Type A or Type B patterns.

4. Temporal Sequencing - the ability to recognize the correct sequential order of acoustic stimuli. Reversals would be the area to observe.

5. Interhemispheric Interaction - normal communication function between the right and left hemisphere for optimal reception. SSW results watch for the CES/SSW comparisons, dysfunctions involving the corpus callosum, and/or bilateral ear peaks.

As the results of the SSW are given they can be correlated to one of the five areas described along with the behavioral signs of the dysfunction. One can then suggest possible therapeutic strategies to aid the specialist/therapist who will be providing ser-

vices for the individual.

The following are two case examples:

CASE 1.

A 21 year old male who had Hurler's syndrome and had been receiving language therapy for approximately 7 years was referred for central auditory evaluation. At the time of the evaluation he had shown a great deal of difficulty with auditory-visual transduction, and had not made the progress his therapist had anticipated.

Puretone audiometry (see audiogram) revealed essentially normal hearing sensitivity for the left ear and a mild high frequency hearing loss, sensori-neural in nature, for the right ear. Speech audiometry was in agreement with puretone results and auditory speech discrimination ability was excellent bilaterally. Impedance audiometry results were right ear type A, normal tympanogram and left ear type A-s, stiffness type tympanogram. Static compliance volumes were within normal limits for the right ear and within normal limits left ear via contralateral stimulation. Central auditory tests were (1) NU 20 competing message test (2) SSW (3) compressed NU 6 at 30% and 60% time compression and (4) rapidly alternating speech perception test (RASP). Central auditory tests were all within normal limits bilaterally except for the SSW. The SSW (see figure) results were moderately abnormal C-SSW and A-SSW. No Ear Effect was noted. The eight cardinal numbers were:

RNC	RC	LC	LNC	LNC	LC	RC	RNC
3	5	5	4	3	7	8	3

All forty items were given. Bilateral ear peaks were noted for RC and LC. There were four times when errors occured on both competing signals. 6 first word errors and 7 last word errors were noted. There were no reversals. Based on these results the following was reported: Results of the SSW revealed that a central auditory dysfunction exists probably involving the auditory reception area (based on the moderate A-SSW). These results indicate that there is a breakdown in binaural integration, which is the ability to combine different information presented to each ear simultaneously, also since a bilateral ear peak was noted interhemispheric interaction would be depressed which would indicate poor communication function and depressed processing abilities between the right and left hemisphere thus providing decreased reception of auditory information. There were no reversals of response sets which indicates temporal sequencing to be within normal limits for this test. Significant first or last word errors were not noted, thus indicating auditory attention and auditory memory to be within normal limits for this test. Therefore SSW results indicate difficulty in the following areas (1) binaural integration and (2) interhemispheric interaction.

Based on the SSW results recommendations would be to initiate language therapy by utilizing.....(give specific therapeutic suggestions). Postscript, therapy was initiated and directed at these specific target areas and he was making progress until he had to leave therapy due to back surgery.

Case 2

An 8 year old female was referred for a central auditory evaluation due to poor performance on a speech and language evaluation which indicated a possible central auditory processing dysfunction. Initial referral was from school because of an inability to concentrate and poor progress despite tutoring (note that

school and tutorial sessions were in an open classroom). Speech and language evaluation demonstrated a score of 10% on the "Quiet" sub-test of the Goldman-Fristoe-Woodcock Test of Auditory Discrimination and a 2% score on the noise sub-test. Hearing sensitivity was within normal limits bilaterally. Auditory speech discrimination test results were 100% for the right ear and 96% for the left ear. Normal tympanograms were obtained bilaterally. Central auditory tests were given which consisted of (1) NU competing message test which she could not complete, (2) compressed NU 6 at 60% compression, which was within normal limits, (3) RASP test, which was within normal limits and (4) SSW which was abnormal.

The SSW demonstrated bilateral peaks and processing ability below the five year level for the SSW. The eight cardinal numbers were:

RNC	RC	LC	LNC	LNC	LC	RC	RNC
1	10	12	3	0	8	15	1

There were no reversals, relatively few first word errors or last word errors. Six times both competing items were missed. Neither Ear/Order Effect nor A-SSW was computed due to age. Forty items were utilized. Results were reported as follows: The results of the SSW and competing message test indicate central auditory processing dysfunction. The competing message test indicates poor function for selective listening , the inability to zero in on a specific signal, and difficulty with binaural separation, the ability to tune out unwanted stimuli. The SSW indicates difficulty with binaural integration and interhemispheric interaction based on the bilateral peaks. Also, the bilateral ear peaks confirm the binaural separation dysfunction as identified by the competing message test. The SSW results were at the five year performance level which would indicate auditory processing abilities, based on the SSW, to be depressed by approximately 3 years.

Based on the central auditory test information, it is apparent that the open classroom is a poor educational placement for this child, and since her tutorial sessions were held in a similar environment we should expect her progress to be limited. Recommendations were: (1) speech and language therapy with concentration on binaural separation, selective listening and interhemispheric interaction. (2) A change in classroom placement and preferential seating to eliminate as much as possible extraneous background noise.

It is important that as we report results of the SSW to other professionals that we define our results in a manner that can be understood and by which a therapeutic plan can be initiated.

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DIAGNOSIS AND MANAGEMENT OF A LEARNING DISABLED CHILD

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Mike, a 10 year 4 month old male was referred to the Howard University child development center because of learning problems in school. He was in the fourth grade at the time of referral.

The patient is the product of a full term, uncomplicated pregnancy. Birth weight was 7 pounds 7 ounces. The neonatal period was complicated by jaundice. Developmental milestones were achieved within normal limits and general health was reported to be good. There is a history of allergies, asthma, and earaches intermittently from 6 months to two years of age. Mike was seen for physical examination at Howard University Child Development Center (HUCDC) on 4-4-83. The gross physical examination was within normal limits except for a dull tympanic membrane. The neurological evaluation revealed mild clumsiness of fine motor skills. Laboratory studies reported low blood glucose.

Psychological testing was done on 1-24-83 and 2-28-83. The test protocol included the Wechsler Intelligence Scale for Children - Revised, Wide Range Achievement Test, Bender-Gestalt, Human Figure Drawings, and the Thematic Apperception Test. Mike functioned in the average range of measured intelligence. Optimal performance was inhibited by specific learning disabilities and preoccupation with emotional concerns. Mike evidenced auditory processing and visual motor delays. Emotional concerns, including feelings of inadequacy and need for affection, were predominant and interfered with Mike's ability to perform effectively. He was frequently distracted by his own thoughts, and it was felt that his attention and availability in the classroom were compromised by this intense preoccupation with his own feelings.

The child development specialist saw Mike on 1-20-83. Language functioning was in the high average range. Concept development and learning were good for his age. However, he had problems processing, retrieving and expressing ideas. The Stanford Achievement Test and reading and spelling scores were at the second grade level. Reversals, transpositions, omissions, substitutions, additions, visual closure and auditory differentiation problems contributed to difficulty in reading and spelling. His arithmetic skills were on the third grade level.

On the Valett Tasks of Perceptual Motor Abilities, auditory coding, processing, retrieval and sequencing were below expectation for his age. Visual acuity was questioned and problems in perception were apparent. Visual motor fine muscle coordination was significantly lagging.

The speech pathologist evaluated Mike on 2-17-83. It was noted that language functions had been adversely affected by auditory processing problems, probable periods of fluctuating auditory acuity secondary to ear infections and visual perceptual/visual motor difficulties that were greater in the managment of linguistic materials than with numerals. Vocabulary and oral reading skills were at grade level, but if Mike was required to write similar material, performance lagged significantly.

He was referred to Gallaudet College Audiology Clinic (GCAC) for testing. Mike was seen for

audiologic evaluation and central auditory nervous system evaluation (CANS) at the GCAC on 3-16-83.

Pure tone testing revealed hearing within normal limits bilaterally. Speech reception thresholds were within normal limits bilaterally. Speech recognition ability was excellent bilaterally.

Immitance measurements demonstrated normal Type A tympanograms bilaterally with static compliance within normal limits bilaterally. Contra and ipsilateral acoustic reflexes were present at all frequencies tested. No reflex decay was observed.

The following CANS Tests were given: SSW; Competing Sentences; Filtered Speech; Binaural Fusion; Alternating Sentences; Time Compressed Speech.

Mike's performance was normal (within $\geq$ minus one standard deviation)range on the following tests: Competing Sentences (right ear); Binaural Fusion (left ear); Alternating Sentences (both ears). His performance was not within $\geq$ -1 standard deviation range and featured significant response bias on the following tests: Competing Sentences (LE); Binaural Fusion (RE); Filtered Speech (both ears); Time Compressed Speech; Left-Competing Condition on the SSW Test; Pattern 1B (Lucker) SSW-Gram.

Recommendations:

(1) CANS test results revealed sufficient evidence to indicate a probable CANS dysfunction. In view of these findings it was recommended that he be considered a candidate for a self-contained language -learning disabled classroom, be tutored by a learning disabilities specialist or other qualified professional to improve attention, listening and auditory processing skills, be seen back at the GCAC or other audiology clinic for hearing reevaluation as needed and to do academic work at home and school in an environment with a minimum of auditory and visual distraction.

(2) ENT and audiological monitoring.

(3) Attendance at the Lab School of Washington.

(4) Medical follow-up for low glucose and TSP levels.

(5) Participation in structured group activities; Increased exploration of cultural environment.

(6) Psychotherapy at D.C. Institute of Mental Health or other area mental health clinic.

(7) Parent counseling as an adjunct to Mike's therapy.

(8) Re-evaluation one year after placement.

Postcript:

Mike was referred to the Lab School of Washington. This school is designed to serve the needs of learning disabled children. The school offers individualized reading, writing, spelling and math programs. Auditory/visual perceptual training is planned individually according to the needs of the child.

Mike began attendance at the Lab School in July, 1983 and has completed a full year in this program. An individualized educational program was developed to address specific learning disabilities in the areas of auditory and visual processing. Specific auditory comprehension goals for teaching/treatment were outlined as follows:

(1) Improvement of specific skill areas related to listening and attention;

(2) Increase ability to understand increasingly long and complex linguistic units;

(3) Develop and strengthen recall and retrieval skills for better language comprehension and production;

(4) Establish use of available cues to aid comprehension.

Mike has been taught through a multisensory learning model.

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The auditory and visual modes of teaching/learning were reinforced by tactile and kinesthetic modes. According to Mike's mother and school personnel, Mike has demonstrated improvement in auditory and visual processing.

Mike's learning needs were addressed in a variety of ways. The program curriculum included special "clubs" which are specifically designed to teach auditory decoding skills through programmed social/play activities. Mike's parents specifically cite improvements in gross motor and self-help skills and in independence. For example, Mike was once unable to travel by public transportation, however, he can now travel using the public bus without difficulty. His parents have also noted gross motor skill improvement which they attribute to adaptive physical education strategies and activities in the school such as learning "break dancing".

Mike has made improvements this past year. He is presently in the summer program at the Lab School and is continuing to progress well.