SSW REPORTS . . .

# CENTRAL AUDITORY PROCESSING & MENTAL RETARDATION

Vol. 21 No. 1 February 1999

## CENTRAL AUDITORY PROCESSING and MENTAL RETARDATION - III

Jack Katz

*Q:* Is the diagnosis of CAPD limited only to those with normal intelligence or higher?
*A:* I believe not. Anyone who can hear can have a CAPD.

My definition of CAP is "what we do with what we hear". How effective we are in using the auditory channel (based on what we could hear in the first place) tells us if the person has normal auditory processing or not. Our test norms tell us what to expect from a person who has normal hearing. So far as I know, IQ is not taken into account on any of the CAP tests.

*Q:* Is it fair to use norms for intellectually normal individuals as the basis for evaluating those who have low IQs? How can you hold a person who is mentally retarded (MR) to the same standard as those who have normal cognitive functions?

*A:* I think it is *rather* fair or *generally* fair. While there are surely exceptions, for the most part my experience with MR cases is not very different from LD cases. This has been discussed in previous issues of *SSW Reports* (Nov. 1991; Nov. 1997).

## BACKGROUND

This is the third article in *SSW Reports* to discuss MR. The first article (1991) showed the results for 6 adults who were MR. There were two who had 41 IQs, two who had 55 and two with 60 IQ. Surprisingly, for each pair, one had a *Normal* SSW (using the Original Analysis) and the other had a Severe SSW. The three severe scores were very distinctive. One was a sharp peak in the RC Condition, one in the LC Condition and the third was very poor performance in both competing Conditions..

This helped to allay our fears that intellect alone is enough to cause failure on the SSW test.

Nevertheless in that study, for measured intelligence (MI) groups, as IQ went down, so did the SSW performance. Even this makes good sense. Those who are MR do not have normal brain function. Consequently those with the lowest IQ are likely to have the most brain involvement (or at least involvement of the most important centers). CAP functions are represented in many parts of the brain. Thus, the greater the brain involvement, the greater the risk of CAP impairment. So it is not surprising that the correlation between IQ and SSW exists.

In 1999 we reported on four children who were MR. They, just as those in the 1991 report, were found to have very poor CAP abilities. They also had some of the same unusual Qualifiers (i.e., Intrusive Words, Back-to-Back qualifiers and type-2 Smushes) on the SSW test. Overall, they fell into the Decoding category on the CAP test battery.

## PRESENT DATA & PROCEDURES

For the past semester I have been working with four high school students who are considered MR. These teenagers were referred when I described the CAP therapy plan and the Decoding characteristics that I was looking for. Once a week I and two students work 40 minutes with these youngsters on their CAPD. The work is quite exciting.

Over the summer I tested each of the students on the CAPD battery using the CTB-CD and then entered the data into the new ***SSW-Plus*** computer program (pretty high tech for an oldster like me).

Figure 1 shows the SSW NOE analysis for PM, an 18-year-old high school student who has a 49 IQ.

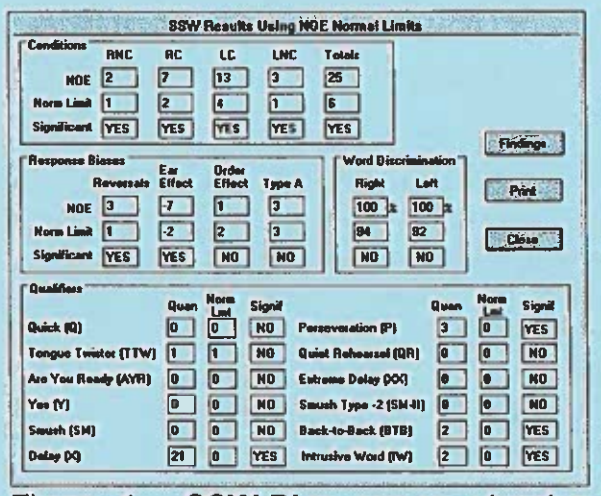


Figure 1. **SSW-Plus** screen showing SSW data, norms and interpretations for PM who is considered mentally retarded.

The Total NOE score is 25, 19 points higher than the limit of normal. With a standard deviation (SD) of 1.9. This places him 12 SD poorer than the mean for his age! Thus his overall performance was incredibly poor. Each of the four Conditions was significant, suggesting both Decoding (DEC) and Tolerance-Fading Memory (TFM) problems.

Response bias also contributed to our knowledge. PM had a significant number of Reversals indicating an Organization (ORG) problem as well. A significant Ear Effect Low/High (-7) supports the TFM signs.

His significant Qualifiers added support for the previous findings and also provided further details of the problem. Not one of the six TFM Qualifiers was significant, but four of the six DEC Qualifiers were. In fact two significant Qualifiers were ones we had reported on in the 1991 and 1997 findings.

PM had had 2 Back-to-Back responses and 2 Intrusive Words. These are rarely seen in other groups. We have no evidence to show that these are exclusively characteristics of MR cases, they do appear much more common in these individuals. It could be severity of the DEC problem and not the MR that is responsible for these peculiarities. He also had 21 Delays. Delays are found in other groups with poor DEC, but 21 out of 40 is surely a very high percentage. The norm for Delays in his age group (adult) is zero. Thus, the severity of the DEC factor is obvious.

The Phonemic Synthesis (PS) test information is shown in Figure 2. The Quantitative

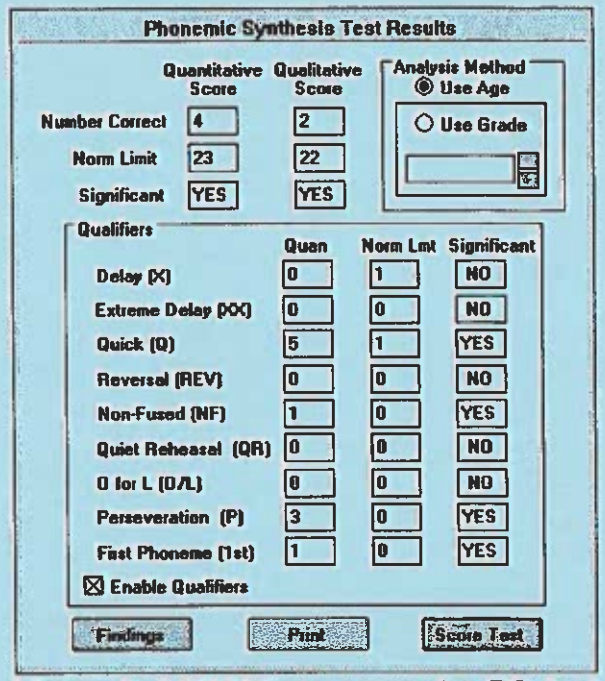


Figure 2. **SSW-Plus** screen for PS test showing scores and Qualifiers.

Score was 4 and the Qualitative Score was just 2. The norms for these 2 analyses are 23 (SD= 1.8) and 22 (SD= 1.9) respectively. This is 11 SD poorer than the mean for both measures. The Quantitative and Qualitative Scores differ only in that Quick, Delayed, Extreme Delay and Quiet Rehearsals that were marked as correct for the Quantitative Score are wrong for the Qualitative Score. PM had 2 quick responses that were correct. Because of the very poor performance the last 9, and most difficult, items were not administered.

PS Qualifiers gave further support to the two major categories of dysfunction. The Non-Fused and Perseveration responses are characteristic of DEC problems and the First Phoneme omission and Quick responses are signs of TFM.

The third test in the CAP battery was Speech-in-Noise. This test had questionable validity because of the student's articulation problem. His mother and aunt were called upon to help decode his responses and may not have used the normal criteria that we use in evaluating word recognition in quiet and noise. Figure 3 shows the **SSW-Plus** screen for Speech-in-Noise (SN).

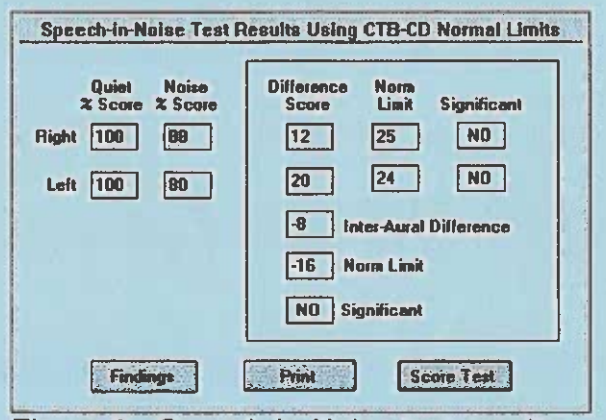


Figure 3. Speech-in-Noise test results.

Three comparisons were made for this analysis. The SN Difference (SND) score was calculated (by the computer) for the quiet - noise score for each ear. Then a SN Inter-aural Difference (SNID) score was computed by subtracting the left ear SND from the right ear SND. As can be seen from the screen none of these was significant, apparently because the scores were inflated using the opinions of the family. This was not a problem for the SSW test perhaps because of the spondaic nature of the material (that is easy for the patient to discriminate as it is for the audiologist).

I do believe that PM is distractible, but likely does not have a major SN problem. Nevertheless, his skills are probably not quite as good as the scores suggest.

## INTERPRETATION

You already have a sense of what PM's CAP difficulties appear to be. Let's let the **SSW-Plus** program earn its keep and see what it has to say.

By clicking on the findings button a great deal of material about PM is made available. There were 9 significant factors on the SSW test, 6 on PS and the SN test was entirely normal. In addition, there were indicators of 3 CAP Categories. Figure 4 shows a list of some of these information screens.

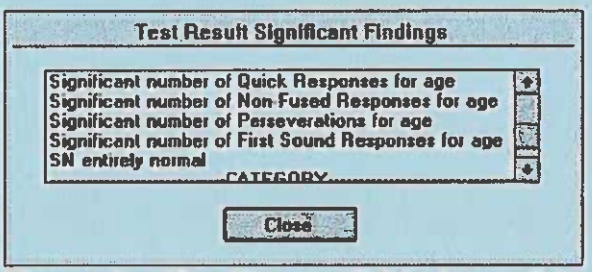


Figure 4. The files available to explain some of the PS and SN findings.

By clicking on the files of interest they are called up and provide information about the individuals who have positive findings on these factors.

Two of the factors with which you may not be familiar are the Back-to-Back and Intru-

sive Word Qualifiers of the SSW test. For this reason we clicked on *Intrusive Word*. See Figure 5 for information about Intrusive Words on the SSW test.

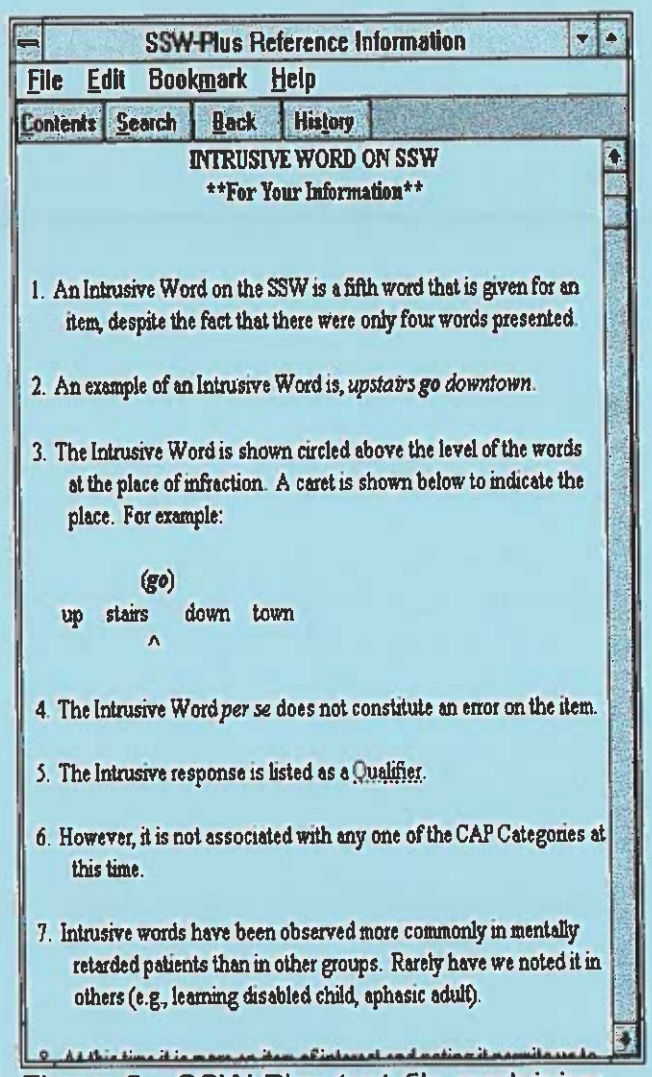


Figure 5. SSW-Plus text file explaining the Intrusive Word Qualifiers noted in PM's SSW results.

He also had first sound omissions on the PS test which are described in Figure 6.

It should be noted that PM's results were similar to the cases from North Carolina, mentioned earlier, in that DEC was the primary category of dysfunction. While this may not be the case for all retarded individuals, it is for many. In particular we requested to work with students who had poor speech, receptive language, difficulty with phonics as well as reading and spelling. This increased the likelihood that we would work with poor Decoders.

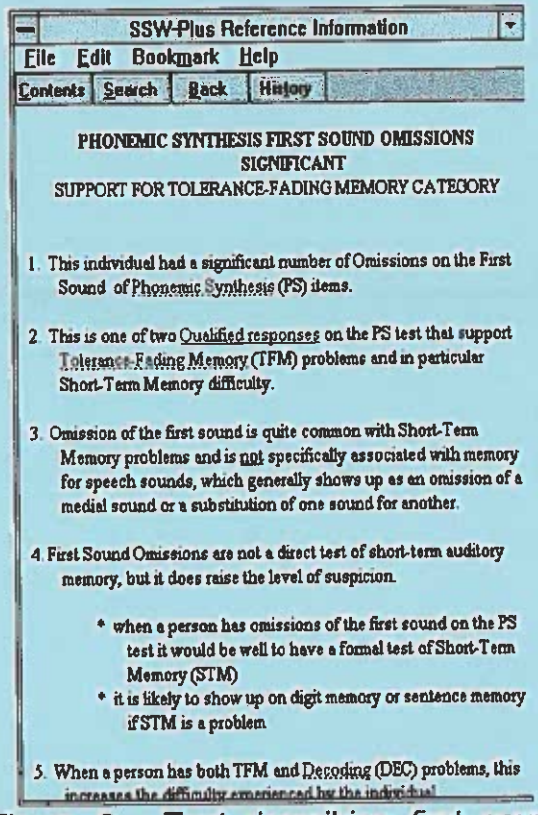


Figure 6. Text describing first sound omissions on the PS test.

## SUMMARY OF FINDINGS IN FOUR HIGH SCHOOL STUDENTS

Table 1 summarizes our information on four High School students who have low IQs and evaluated for CAPD. Because of their poor performance showing DEC problems and their symptoms suggestive of DEC, they were given auditory training. The training was directed primarily at their poor DEC skills. However because of their very poor reading and other weak skills, it was necessary to work on reading and vocabulary to give them the knowledge needed for the therapy program.

| Age | Sex | IQ |
|---|---|---|
| 17 | Male | 63 |
| 16 | Male | 74 |
| 18 | Male | 49 |
| 17 | Female | 46 |

Table 1. Demographic information.

**CAP TEST RESULTS FOR YOUTHS CONSIDERED MENTALLY RETARDED WITH NORMAL HEARING**

| SSW RESULTS | PHONEMIC SYNTHESIS RESULTS | SPEECH-IN-NOISE RESULTS | OTHER |
|---|---|---|---|
| Total NOE 11 SDs poorer than mean. DEC, TFM & ORG. Unique Qualifiers: BTB and IW. | Score 7 SDs below mean. O/L Qualifiers. Recently benefited from Orton-Gillingham training. | (testing error) Inter-Aural Difference okay. | History of middle ear pathology. Word Recognition Scores = 96 & 100%. |
| Total NOE 7 SDs poorer than mean. DEC, TFM. No Unique Qualifiers. | Score 7 SDs below mean. O/L, NF + other Qualifiers. | Right ear significant (2 SDs poorer than mean). Inter-Aural Difference significant (3 SDs poorer than mean). | History of middle ear pathology. Word Recognition Scores = 96% in each ear. |
| Total NOE 12 SDs poorer than mean. DEC, TFM & ORG. Unique Qualifiers: BTB and IW. | Score 19 SDs below mean. NF + P Qualifiers. | Left ear significant (< 2 SDs poorer than mean). Inter-Aural Difference okay. | History of middle ear pathology. Word Recognition Scores = 100% in each ear. |
| Total NOE 15 SDs poorer than mean. DEC & TFM equally poor and ORG. No Unique Qualifiers. | Score 9 SDs below mean. O/L Qualifier. | Left ear significant (> 3 SDs poorer than mean). Inter-Aural Difference significant (>2 SDs poorer than mean). | History of middle ear pathology. Word Recognition Scores RE = 92 (significant) & LE = 96% (okay). |

## DISCUSSION

What is so striking is not that these four students have CAPD and poor DEC. Many youths who are learning disabled have such problems as well. What is so remarkable is the severity of their deficits. It is not surprising to see such poor scores in the brain damaged population but not in those who simply have LD, a speech-language problem or ADHD. The results we got do not seem to be false positive findings as the symptoms and academic difficulties of these youths are consistent with their very poor DEC skills.

If it was simply a matter of low intelligence there would not be this great emphasis on DEC signs. TFM would be equally at risk. Only one of the students had comparable TFM signs to their DEC deficit. Even the Qualifiers of these four students were overwhelmingly DEC in nature.

Another indication that this is indeed their major problem is that when we provided therapy for DEC problems they respond so well. Despite their initial difficulty, they continue to make significant progress. At this time we have not retested the students on the CAP tests, so we don't know how they fared, but they have picked up so much information and decoding skills that we see considerable progress.

Their special education teacher has seen academic progress in at least three of the four students. We have seen progress in all four, so it is hoped that this improvement will begin to find expression in his school work.

## THERAPY PROGRAM

Unlike teenagers, or even 5 or 6 year old children, who have CAPD, we could not begin therapy at the level of Phonemic Synthesis. It took us two months before they were able to blend sounds together. Thus we started with teaching them individual speech sounds and associating them with printed letters. This helped the students to retain the information as their visual skills appear better than their auditory. Much repetition has been necessary and forgetting has been more rapid than for CAPD cases.

Unlike other groups with which I have worked, it was more difficult to explain to them what they were to do and why. Obviously their reading, vocabulary and concept formation are less well developed than in the general population. Nevertheless, I must say how surprised I was that these students are considered mentally retarded. They do not *appear* any different than our typical LD youngsters with CAPD.

What is so surprising is that they speak quite well (except for PM), they dress nicely and neatly, two of them have a very good senses of humor and all of them have good social skills for the most part.

At times these fine youngsters tend to be a bit immature and a bit inappropriate in what they may say. I can't give their parents, special education teacher and social worker enough credit for how well they are doing in life. It is my hope that with the CAP-type intervention that they will have a boost in their academic and communicative skills.