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REPORTS

A National Sample for Elderly

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SSW RESULTS IN THE ELDERLY

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The influence of age on the SSW Test has been studied in light of "central aging" effects on auditory processing. Results obtained from a group of sixty-year old adult males was found to be similar to the performance of a group of younger males with similar amounts of sensorineural hearing loss (Arnst, 1982). The present case report compared test results from three males with similar audiometric findings but distinct clinical histories; two were 65 and one was 45.

All three patients had a mild-to-moderate, gradually sloping, sensorineural hearing loss bilaterally. Word recognition scores were similar (84%-92%) in both ears. Immittance results were consistent with sensorineural hearing loss.

CASE #1 reported a severe blow to his head during a truck accident several years ago in which he "rolled the vehicle over a cliff." The patient was hospitalized and unconscious for several weeks after the accident. Subsequently, he reported problems with memory and understanding speech. The patient was 65 years old at the time of the evaluation.

CASES #2 and #3 were drawn from clinical files for comparative purposes. Neither had reported a history of significant head trauma or other potential central nervous system disorders. Both had similar audiometric results when compared with CASE #1. CASE #2 was 65 years old; CASE #3 was 45 years old.

A number of interesting points were raised:

- 1) CASE #1 showed a moderate SSW score with no significant response bias (CN: 0-11-12-4/2-16-12-1; WDS: R-88%/L91%).
- 2) CASE #2 and #3 had similar SSW scores (CN: 0-1-3-1/0-2-1-0 and 1-2-4-0/0-2-1-0).
- 3) The distinguishing factor appears to have been the history of head trauma sustained by CASE #1.
- 4) The point of discussion proposed is that the SSW can be used to identify central problems in sixty-year olds (see Arnst, 1982). Possible consideration should be given to establishing a National Sample for the Elderly (NS-E) to evaluate this issue on a large scale.

NATIONAL SAMPLE for ELDERLY

Can you aid us in gathering a sample of normal elderly individuals? They should need no audiological services.

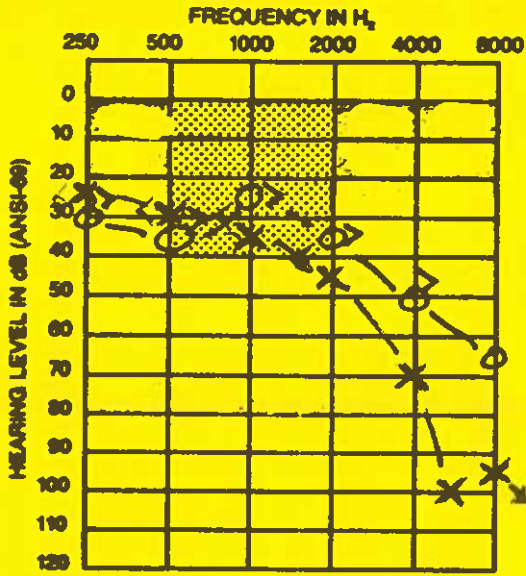


Figure 1. Puretone audiogram for 65 year old patient (Case 1) who suffered from severe skull trauma.

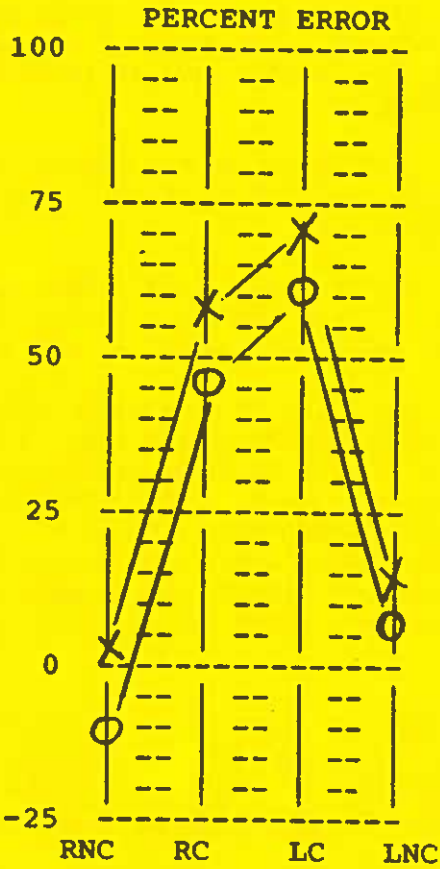


Figure 2. SSW results for Case 1.

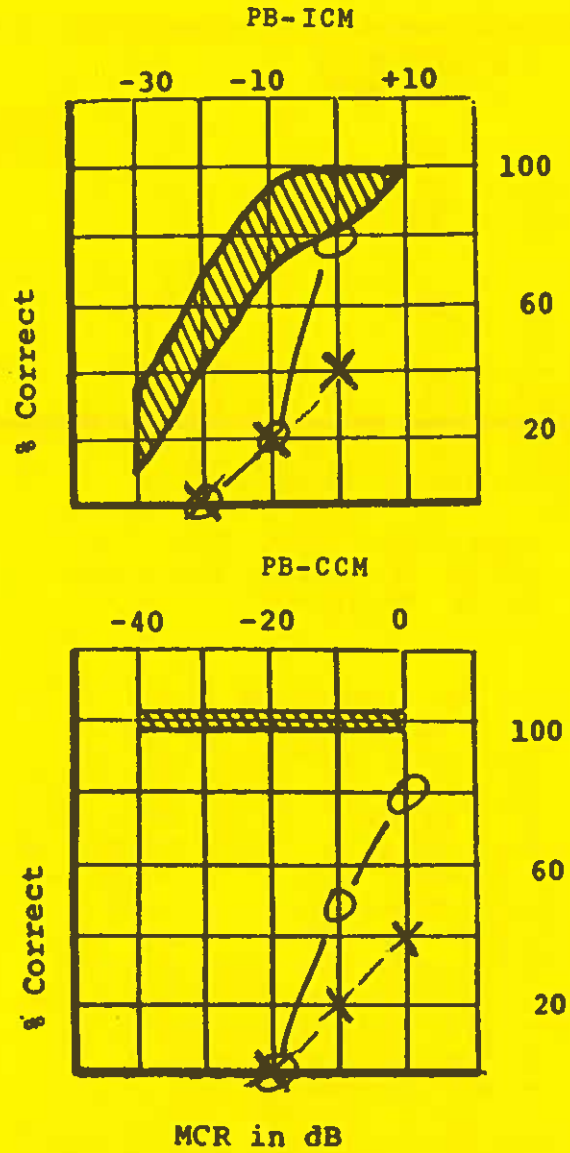


Figure 3. PB function, for Case 1, comparing ipsilateral (PB-ICM) and contralateral competing messages (PB-CCM). Performance for right (O) and left ear (X) shown.

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TYPE B FOLLOW-UP

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In the February 1982 issue of the SSW Reports, we reported on an outlandish Type B obtained from a 26 year old female "Ann". Ann was seen initially on 11-31-81 approximately 3 months after a possible left CVA. Confirmatory evidence of a stroke was not obtained as her CT Scan was completely normal; however, her EEG was abnormal showing lateralized slowing in the left hemisphere with a great deal of sharp wave activity. Although the etiology was not clear, the neurologist suggested a possible swollen infarct or tumor based on the clinical findings.

Evaluation of the peripheral auditory system revealed normal hearing in the left ear for pure tones and speech. The right ear revealed a mild sensory-neural hearing loss with the speech reception threshold consistent with the pure tone average. Ann noted increased difficulty in perceiving pure tones and speech in the right ear when they were close to threshold.

Ann's initial 8 CN's* were:

A	B	C	D	E	F	G	H
1	0	0	0	0	0	17	0

*all SSW tests were REF except as noted.

Results of the CES were:

Right = 65% error
Left = 0% error
Mean = 32% error

Ann was re-evaluated on 1-6-82 to determine the reliability of the findings. The SSW results were essentially unchanged; however, the

right ear % error for the CES increased to 85% with 0% error in the left ear.

Peripheral test results were unchanged; however, speech discrimination in a sound field showed mildly impaired (80%) performance in competing noise (S/N +10). The Phonemic Synthesis test was administered as a part of this evaluation with normal results (100% correct).

As the 1-6-82 evaluation revealed no additional information, Ann was seen again on 4-1-82 and a battery of three modified SSW tests (M/SSW-1, M/SSW-2 and M/SSW-3) were administered to ascertain the influence of the non-competing words on the competing ones. The results of these tests are as follows:

M/SSW-1: omission of both initial and final non-competing words. Again Column G had 17 errors but now there were 19 errors in the other RC condition (Column B). This was much like a left AR case in which the right competing items were errored on regardless of whether the items were presented REF or LEF. The 4 CN's were:

A	B	C	D	E	F	G	H
-	19	2	-	-	2	17	-

These results suggest the initial non-competing word during REF presentation influences the right competing word possibly by linguistic cueing.

M/SSW-2: omission of the initial non-competing word. Essentially the same results as M/SSW-1. The 6 CN's were:

A	B	C	D	E	F	G	H
-	20	1	0	-	1	17	0

It is significant to note that Ann did not error in the final non-competing word in either REF or LEF presentation. It also seems obvious

that the omission of 1 or both NC words in the item causes sufficient stress as to produce errors perhaps because of increased attention and time required by the monosyllabic task over the spondaic condition.

M/SSW-3: omission of the final non-competing word. Essentially the same results as the standard SSW. The 6 CN's were:

A	B	C	D	E	F	G	H
0	4	0	-	0	0	19	-

This shows that the initial monosyllable in this patient assists in the perception of Column B words. This suggests that the final monosyllabic word is not sufficient to aid or interfere with the perception of the word in Column G with the final non-competing word.

Ann was seen again on 10-13-83 for re-evaluation of the SSW and to determine the influence, if any, of an LEF presentation. Peripheral evaluation revealed a slight improvement of the right pure tone thresholds with an air-bone gap from 1000-4000 Hz. The left ear pure tone results were essentially unchanged. Speech reception thresholds continued to be consistent with the air conduction thresholds. Discrimination under phones was within normal limits, bilaterally; however, speech discrimination obtained in sound field with competing noise (S/N +10) was slightly improved (88%).

Tests of middle ear function (immittance battery) were within normal limits bilaterally.

The CES revealed right ear score of 40% error, improved from the previous score of 85%. The SSW, both REF and LEF, continued to show essentially the same number of errors in the RC condition when presented LEF. Phonemic Synthesis continued to be normal with 100% correct.

Ann was tested again on 8-2-85. During the two years between evaluations, she returned to college and received a degree in business. There were no other significant happenings within this time period.

The results of this evaluation revealed normal pure tone air and bone conduction thresholds, bilaterally. Speech reception thresholds were consistent with air conduction findings. Speech discrimination scores utilizing recorded word lists were 84% in the right and 80% in the left. Speech discrimination using live voice was 100%, bilaterally. Ann no longer perceived a difference between right and left ears. Impedance audiometry revealed normal middle ear function, bilaterally.

SSW:

A	B	C	D	E	F	G	H
0	0	0	0	0	0	0	0

M/SSW-1:

A	B	C	D	E	F	G	H
-	0	1	-	-	1	1	-

M/SSW-2: (items 1 - 20)

A	B	C	D	E	F	G	H
-	0	0	0	-	0	0	0

M/SSW-3: (items 21 - 40)

A	B	C	D	E	F	G	H
0	0	0	-	0	0	0	-

CES: Right Ear - 0% error
Left Ear - 0% error

It was very nice to report to Ann that she made no errors on the standard SSW and none on CES. This dramatic change occurred in the almost 22 month period between the 4th and 5th visits whereas, there was essentially no change in the

first 21 month period of testing. It is interesting that the patient perceived an improvement in her ability in general listening situations by the 4th visit but did not show gains on the SSW at that time (however, CES did improve).

The Type B-RC pattern seen in this case differed from the more symmetrical pattern of a left AR case presumably because of the linguistic and/or cueing help of Column A. If Ann had AR involvement (to some significant extent) perhaps Column A provided enough information to conceal it. We suspect the AR involvement, if any, was not complete because such cases do not benefit from the NC word and typically are not fully aware that there is a RC word at all.

Because the Type B became a symmetrical pattern when the linguistic aid and/or attentional one (Column A) was removed, it remains to be seen if Type A-LCs become more symmetrical when there is no LNC word on the REF items (Column D).

Finally, the prediction that Type B was due to a timing relationship was not supported by the data.

DISCUSSION:

1. Consistency: There was remarkable consistency on the first 4 SSW tests over a 21 month period. This was not altered whether given REF or LEF and despite the additional modified versions of the test that were administered.

2. Recovery: It is most infrequent that we see a perfect SSW and CES test. It is particularly surprising that after 22 months of consistent errors that the patient performed so beautifully on both central tests. It is interesting to note that Ann reported improved listening ability prior to the 4th visit yet no significant change was noted on the SSW (but, CES did improve) at that time.

3. Asymmetry: We have never seen such asymmetrical results as Ann's Type B. The results of the modified SSW tests suggest that the RNC (Column A) preceding the RC word (Column B) is responsible for maintaining the high level of performance. Without Column A, on the two modified versions in which the first words were omitted, the score fell precipitously. The 4th monosyllable (Col. D and H) had little effect on the test performance in this case.

4. Is Type B an AR case in disguise? We think not, or surely not a complete AR. AR cases are often completely unaware of the competing word in the opposite ear. A recent case (Ted) missed all 40 RC words and denied hearing them at all. Even when there is some knowledge of the competing word the NC word is insufficient to permit a good score for the competing word. (AR cases do not benefit much from the NC at the end of the item either). Another reason for thinking that Ann does not have a major dysfunction of the L-AR region is that Phonemic Synthesis was excellent. Ted who had a L-AR involvement got no words correct on a PS test.

5. Why did Column A seem to help Column B but Column H did not seem to help G? In this case, the prior knowledge of A appears to have served as a preparatory set so that the remaining Column B information was sufficient for 100% accuracy. Obviously H was not sufficient to help G nor did it seem to hurt G when it was removed. Is it usually the case that without the anticipation of a few alternatives that the RC word is lost so completely? It is not possible to say at this time. Logically speaking the prior knowledge would seem more valuable than the cueing after the competing word. Would this explain Order L/H in some cases? That is, is the frequent finding of better results on the first half of the item related in part to anticipation of the competing word?

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G. Is a Type B like a Type A or is there a different basis? The answer to this question will become clearer (we hope) once some Type A cases are tested using the modified types. One thing seems obvious, however. The NC word preceding the error column is no help for the Type A case. Let's look at Patsy's data (she was the first recognized Type A case). Her 8CN were: 0 0 0 0 0 14 0 0. Like the majority of Type A's, her peak was in Column F. Thus, E was not a major help to her whereas (if the asymmetry is due to the benefit of the NC word), D must have helped C. This is not a likely explanation because the Type A's seem more associated with corpus

collosum dysfunction than AR (with a LE peak rather than a RE). And because it is difficult to understand why the 4th word would be of such a great help whereas the 1st one was not.

7. Hypothesis: There is little support for the notion that this Type B was caused by a time delay in either the right or left channel. The data are more compatible with a distortion somewhere in the left cerebral pathway or in some manner affecting the RE channel. Because of the abnormal EEG in the left temporal region, the former hypothesis seems more likely.