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SSW RESULTS FOR NORMAL AND LD CHILDREN-- WITH AND WITHOUT CONDUCTIVE HEARING LOSS

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A group of 62 children were administered the SSW test as part of a larger study. Only 2 children were excluded from the study and therefore the results can be viewed as relatively free from criteria bias.

Children were solicited for an auditory processing disorder group and for a normal behaving and achieving group. If the children had a history of conductive hearing loss, they were placed in one of two conductive history (CH) groups. Those CHs who were slated for the N group were classified CHN and those that were to be part of the auditory processing (AP) group were classified CHAP. All Ss had normal hearing and tympanograms at the time of testing. There were 20 Ns, 20 APs, 10 CHNs & 10 CHAPs. The 2 Ss who were eliminated were a normal who had negative pressure on the tympanogram (< -100 mm water) and an AP who had normal SSW and MLD results.

National Sample criteria were used for this study. The mean ages for the various groups were not statistically different from one another. The grand mean was 10.5 yrs. There were 41 boys and 19 girls in the study. The 3 major groups had approximately the same sex distributions.

NORMALS. All of the N Ss fell within normal limits for C-SSW scores. There were no Type A, Ear/Ord Effect in this group. However, 7 had one or more reversals. Only 1 child had a significant number of reversals by NS criteria (see 8/82 SSW REPORTS).

AUDITORY PROCESSING CASES. For the AP group, there were 8 Ss (40%) who had abnormal C-SSW scores and no response bias. Two others (10%) had response bias with normal scores for C-SSW and nine additional Ss (45%) had abnormal scores and response biases. One S had an entirely normal SSW (as well as the one who was eliminated from the study). Table I shows the Ss with response bias, significant errors or normal SSWs for the various groups.

GROUP	N	EAR		TYPE A	SIG REV	SIG ERR	NOR MAL
		L/H	H/L				
N	20	-	-	-	1	-	19
AP	20	2	-	2	6	18	1
CHN	10	-	-	-	3	4	6
CHAP	10	2	-	1	4	10	-

CONDUCTIVE HISTORY NORMAL CASES. Four (40%) CHN Ss had abnormal C-SSW scores and three (30%) had response bias. The RB in each case was rev's which are often associated with conductive hearing losses.

CONDUCTIVE HISTORY AUDITORY PROCESSING CASES. All 10 CHAP Ss (100%) had abnormal SSW scores and 8 (80%) had response bias. This group was the most abnormal one on the SSW.

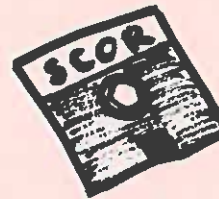
STATISTICAL COMPARISONS. The AP and CH group differed significantly from the Ns for RC and LC conditions. The APs differed from the Ns in reversals. The CHN differed from the CHAP in the RNC and LC conditions. All of the above ANOVA data were significant at the .01 level. They did not differ significantly from their respective N and AP groups on errors or reversals.

DISCUSSION. The N Ss performed very well. The only significant abnormality was reversals in 1 child. False positive reversals have been noted before or perhaps this child might have compensated sufficiently for her AP difficulty at school.

The AP group had considerable difficulty on the SSW test. 19 (95%) had one or more abnormalities. 18 had significant C-SSWs and 11 had RB. Of particular interest were the CH groups. As a combined group they were quite heterogenous for the C-SSW scores, reflecting the N and AP subgroups. This was also true for the Ear Effects but not so for the reversals. Seven of the 20 cases had a significant number of reversals (about equal for the 2 subgroups) and 15 had 1 or more reversals (without consideration for significance). By comparison there were 7 with any reversals in the for the N group and 13 among the APs.

SUMMARY AND CONCLUSIONS. It seems reasonable to conclude from this study that a) the SSW yields few false positives in the evaluation of children who are considered to be satisfactory learners and no AP disorder, b) almost all the children in the AP group were identified by abnormalities in the score or by the response bias. This supports Lukas and Eschenheimer's (1978) finding that in order to identify language or LD children, that both the SSW score and response bias must be considered. c) This also supports the sensitivity and discrimination ability

of the NS criteria in separating normal children from those with AP problems. d) The effect of a history of conductive loss despite essentially normal hearing and tympanograms at the time of test may be noted (e.g., CHN group) on the C-SSW and reversals. e) Children who have a history of conductive loss as well as AP difficulties appear to have the greatest difficulty on the SSW. Every child in the CHAP group had 2 or more reversals and significant errors on the C-SSW conditions.



SSW COMPUTER PROGRAM AVAILABLE

There are some of us in the trenches of audiology who still struggle with the rules and regulations of using and scoring the SSW test. A computer program called SCOR has been developed for the Apple II Plus (48 K) and/or the Apple II with at least one disk drive (printer optional). SCOR will prompt you for the twenty to forty SSW scores and then provide you with a complete analysis (that can be copied onto a SSW form in less than three (3) minutes! Eight (8) minutes will be required from the time you start the program to the final print-out if you want the results printed on your printer. Each test entered into SCOR is automatically saved on the disk for later retrieval and review.

The time you will save between manual scoring and using the SCOR program will more than justify the \$50.00 charged for unprotected program disk and manual. To order send \$50.00 to Gary J. Glascoe, Ph.D. CCC-A, Route 1, Box 464A, Waupaca, WI 54981.

SSW TEST RESULTS OF BLACK AND WHITE LEARNING DISABLED CHILDREN
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Examiners are often concerned whether the tests they employ are culturally or racially biased. Audiologists may find the need to use the SSW Test with children who are not the "average American child". The population I work with consists of many black children who are referred for central auditory-language processing evaluations. In order to determine whether the SSW Test will yield different results for black and white children, I compared the SSW performance for 79 learning disabled children enrolled in resource programs in an integrated school district with an overall enrollment of about 40% black and 60% white children.

My sample consisted of 43 (54%) black and 36 (46%) white learning disabled children ranging in age from eight to thirteen years. Table 1 presents the numbers of children at each age level. Table 2 presents the C-SSW results for these two groups of LD children with normal hearing (20 dB HL or better). None of these differences were significant on t-tests ($p > 0.05$) indicating that both

TABLE 1
NUMBER OF BLACK & WHITE LD CHILDREN AT EACH AGE LEVEL

AGE LEVEL	# BLACKS	# WHITES	# TOTAL
8	8	8	16
9	8	7	15
10	12	9	21
11	8	6	14
12	5	4	9
13	2	2	4
TOTALS	43	36	79

TABLE 2
MEAN, SD AND C-SSW RESULTS FOR t-TEST SCORES

GROUP	RNC	RC	LC	LNC
BLACKS M	-1	7	29	3
SD	(5.0)	(9.4)	(13.8)	(4.7)
WHITES M	-4	4	30	1
SD	(8.6)	(12.8)	(20.0)	(6.6)
t VALUE	1.932	1.199	-0.262	1.569

groups yielded similar C-SSW results. Table 3 presents a breakdown of the two groups by SSW-gram pattern according to Lucker criteria revised from 1981. There were apparent differences between groups. To determine if these differences were significant, chi-square analyses were performed. Table 4 presents the results of these chi-square tests which revealed no significant ($p > 0.05$) differences between these black and white learning disabled children for SSW-gram patterns.

TABLE 3
COMPARISONS OF SSW-GRAM PATTERNS

LUCKER'S	TYPE 1	TYPE 2	TYPE N
BLACKS M	28	6	9
SD	(65%)	(14%)	(21%)
WHITES M	21	10	5
SD	(58%)	(28%)	(18%)
TOTALS	49 (62%)	16 (20%)	14 (18%)

TABLE 4
CHI-SQ ANALYSES OF SSW-GRAM PATTERNS COMPARISONS CHI-SQUARE VALUE p

TYPE 1	0.149	>0.05
TYPE 2	2.319	>0.05
TYPE N	0.271	>0.05

Table 5 compares these two groups with regard to response biases. Most comparisons appear to be different, yet further chi-square analyses (see Table 6) yielded no significant differences ($p > 0.05$) for all comparisons.

TABLE 5
COMPARISONS SHOWING NUMBER OF
SUBJECTS WITH EACH TYPE OF RESPONSE
BIAS

GROUP	TYPE A	ORDER	EAR	REVERS.
BLACKS	M 16	3	3	15
	SD (37%)	(7%)	(7%)	(35%)
WHITES	M 10	5	3	9
	SD (28%)	(14%)	(8%)	(25%)

TABLE 6
CHI-SQ ANALYSES OF RESPONSE BIASES

COMPARISONS	CHI-SQ VALUE	p
TYPE A	0.420	>0.05
ORDER	2.677	>0.05
EAR	0.052	>0.05
REVERSALS	0.497	>0.05

The results revealed that the SSW Test, in general, is not biased when white and black learning disabled children are compared. The C-SSW gram patterns and response biases do not differ significantly between black or white LD children. It is felt that the SSW Test is appropriate in its present form for use with both black and white children. The results for children can be analyzed using the standard measures and/or according to the procedures developed by Lucker (1981).*

*NOTE: Lucker (1981) described four SSW-gram patterns as types 1,2,3 and 4, respectively. Since that time, the patterns have been relabeled Lucker Type 1 (single peak, LC); Lucker Type 2 (double peaks, RC & LC); Lucker Type N (normal); Lucker Type R (reversed or single peak, RC).

**The author expresses his thanks to MARTIN DECERE for assistance provided for the statistical analyses performed on the data.

REFERENCE

Lucker, J.R. Interpreting the SSW test results of learning disabled children. SSW Newsletter, 5-81.

ADD 5 YEAR OLDS TO NATIONAL SAMPLE

Jack Katz, SUNY Buffalo

National Sample I provided us with some excellent information which can be used to evaluate children 7 to 11 years of age. Those of you who helped out by contributing data on normal children might wonder, what happened to the 5, 6 and 12 year olds that were sampled. We still lack 12 year olds (we need 3 more to finish off the sample).

The 5 year old sample was rejected because I had made a tactical error in setting up the criteria for this group. Criteria: a) normal in their learning abilities, b) no significant neurological/hearing loss history nor a speech/language problem. These were fine, but I also expected c) Hirsh W-22 recorded WDS and all 40 SSW items (as we expected for each of the other age groups). Unfortunately, 5yr olds are different. They did not do well on the recorded WDS and perhaps the vocabulary was a further handicap. To make a long story short, they had poorer WDSs than any other group and therefore had a much greater correction. This made their C-SSW scores too good.

No doubt another problem was the 40 items. Only the super kids of that age would finish all 40 items, and perhaps the clinicians looked for 5 year olds they thought could do the task. If this is so, it turned out to give us a biased sample. The 5 yr olds turned out better than the 6 year olds (a very improbable result) and, in fact, they were as good or better than the 7 year olds !

A second sample of 5 year olds was needed. There was also some question of whether the 6 year olds were too poor. We will deal with the latter issue soon when we compare NS-II with the original sample (do you have any normal 6 year olds you can spare?).

The table below provides the means, SD and tentative upper normal limits (mean + 1 SD) for 5 yr olds (thanks to Joel Hartinger of Enid, OK and other kind folks out there!).

 NATIONAL SAMPLE II--5 YEAR OLDS
 (N=18)

MEAN C-SSW SCORE						
RNC	RC	LC	LNC	RE	LE	T
5.2	35.8	40.3	7.4	20.3	24.6	21.8

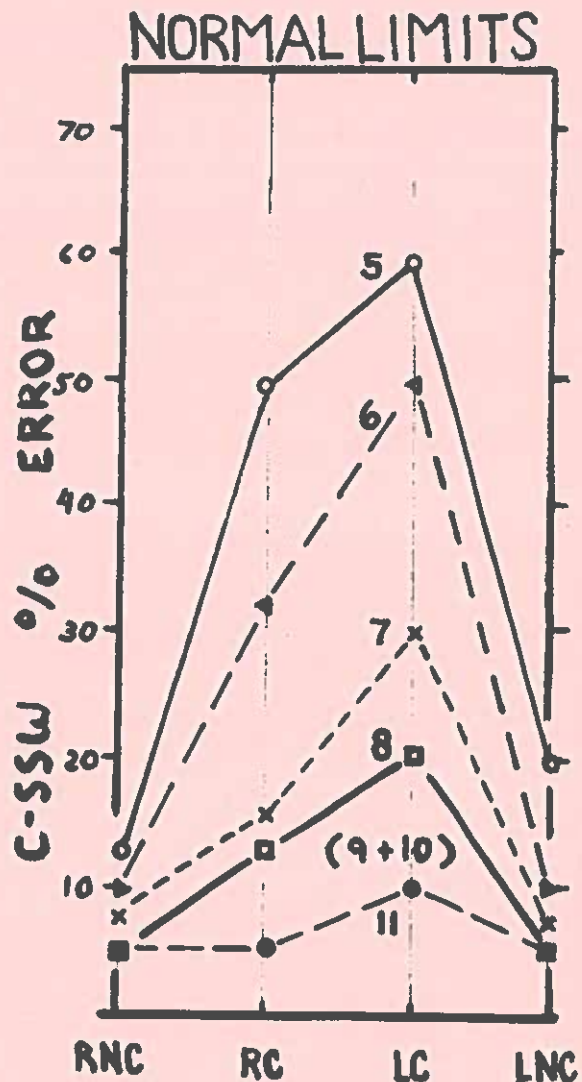
STANDARD DEVIATIONS						
8.1	14.6	19.1	13.1	9.4	14.6	11.3

TENTATIVE UPPER LIMITS OF NORMAL						
13	50	59	20	30	39	33

The figure shows the extreme limits of normal for 5 yr olds (NS-II) thru 11 yr old children (NS-I). To keep the figure clear, 9 and 10 year olds were omitted. Their upper limits fell between the 8 & 11 year scores. Although these are not means, we can see a general relationship between right and left ears. The competing conditions are of particular interest. As we suspected, 5 yr olds and presumably younger children should have less laterality for language than older children and therefore more bilaterally symmetrical scores.

It appears that the 5 year olds do not show a strong laterality effect. Although, the LC condition is poorer than the RC, the relative difference compared to the overall % error is small. For example, the RC score of 50 is 85% of the LC of 59. This is relatively much greater than in the older groups. The table below shows the % of LC error represented by the RC condition. The larger the % the more similar the laterality (or more similar the ears 'facing' the 2 hemispheres).

RELATIONSHIP OF RC TO LC CONDITION							
5yr	6yr	7yr	8yr	9yr	10yr	11yr	
85%	65%	59%	65%	53%	41%	40%	



Another point of interest, that we find in the 5 year olds is that they have a large % of non competing errors. This suggests that perhaps the number of NC errors is related to fact that Heschl's gyrus is not fully matured at this age (Lecours, 1975). Thus, any word that is processed thru this region, especially if rushed (as in the SSW) might show such a deficit. I would guess that older children having this pattern would also have abnormal Phonemic Synthesis scores (Katz, 1983). This would follow if Luria (1970) is indeed correct that the mid-posterior temporal region is the phonemic zone. (References on page 6).

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REFERENCES

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A Lecours, Myelogenic correlates of the development of speech and language, in Lenneberg and Lenneberg, Foundations Lang. Devel., Academic Press, 1975.

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