SSW reports
vol-4 no-3 * MORE NAT'L SAMPLE* 1982

THE NATIONAL SAMPLE SRTIKES AGAIN: NO BLOOD, JUST TYPE A

Jack Katz

Several reports on the National Sample for Children have come out in the SSW Newsletter: C-SSW Scores (Aug '79;Nov '81) and Ear/Order Effects (Feb '81). The present report deals with Type A patterns. Type A is scored from the 8CN. It is defined as twice as many errors in column F (or B) as the next highest cardinal number, and a difference of 3 points. The question here is, is the criterion of a difference of 3, a reasonable criterion for children? If not, what would be more appropriate?

Type A was originally noted in young adult dyslexics and then more precisely defined in adults with brain lesions. Later on it was applied to children with LD and found to be effective (Katz & Illmer, '72; Lucker,'81).

White (1977) noted a high false positive rate for Type A in her normal subjects (6-10 yrs of age). Using the "difference of 3" criterion she found 29% with Type A. To check on this finding we looked at some available data (thanke to Richard Saul and Mark Chertoff). Fourteen out of 50 normal children had Type A. This 28% false + rate supports White's finding.

It would appear that the adult criterion is too stringent for children in that it yields too many false + among normals. To establish a more reasonable criterion, comparisons were made between the 14 normals with Type A (ages 7-10) and 8 LDs with Type A (ages 7-11) who were part of a previous study. The age factor will be discussed later.

DS will refer to the difference score between column F (or B) and the next largest column of errors. Table 1A, shows the use of various DS criteria (from 3-7) for normal & LD children.

Table 1. DS Criteria for Significant Type A Patterns

GROUP	DIFFERENCE SCORE 3	4	5	6	7
A.					
NL(N=14)	14	9	3	1	0
LD(N=8)	8	8	5	5	3
B.				*	
NL(131)	14%	11%	8%	2%	2%
LD(104)	21%	17%	11%	9%	6%
C.					
5-10 YRS				*	
NL(109)	17%	14%	10%	3%	3%
LD(83)	20%	16%	11%	10%	7%
11-12 YRS*		*			
NL(22)	0%	0%	0%	0%	0%
LD(21)	24%	24%	14%	5%	0%

As the DS criterion is relaxed from 3 to 7, the number of presumed "false +" normals diminishes from 14 children to 0. But at the same time the number of "correct hits" for the LD group goes down from 8 to 3. The best practical compromise seems to be DS=6, in which only 1 normal child has a Type A (2% of normal group). Using the same criterion, 5 of the original 8 LDs remain Type A.

To check on this criterion two new groups of children were studied. The normal (NL) group(N=131)--ages 5-12, came from the National Sample. The LD group(N=104)--ages 5-12, were drawn from our LD files.

Table 1B shows the percent of children who had positive scores using various DS criteria. Again DS=6 is the best criterion because it minimizes false + cases while picking up a higher percent of LDs(2% NL & 9% LD). One might be surprised that the 2 groups are as similar as they are. This will be discussed later. The older children showed greater differences: NL vs LD.

Table 1C shows the percentage of LD children who would have been classified as Type A using various criteria, however, the results for Ss 10 yr and under are considered separately from those 11 & 12. Age 11 is usually considered as adult for the SSW and older normals rarely have Type A. Therefore we looked for a more stringent criterion for the older children.

For the younger children, DS=6 gave us 3 NL and 10 LD with Type A. This was again the best criterion to maximize hits and minimize false +. For the older children a DS=3 (or 4) provided excellent separation of the two groups(0% NL & 24% LD). Using these criteria and looking at the groups as a whole 12% of the LDs and 2% of the NLs had Type A.

The question arises, why is there so much overlap of performance in these 2 groups? If it is so prevailent among normals, why is it thought to be an abnormal sign? Regardless of which DS is used the LD group had a greater percentage of Type A. Also, the extent of the difference was greater for the LDs. Older children do not have this overlap (e.g.,we had no normals with Type A in the older group). We do not see the pattern in normal adults, either. On the other hand patients with brain lesions often show Type As.

Using the original adult criterion, 14% of the cross validation sample of normal children had positive results while 21% of the LDs had this sign. While the difference may be small, one should consider how many additional cases may have had some of the same underlying characteristics, but too many additional errors to meet our criteria. Thus children with the type of processing that leads to Type A may have this fact hidden behind other errors. For example, an 8 yr old had: 1 8 6 1 1 14 3 0. This is not a Type A but you can see the tendency. With maturation we might see a Type A 6 mo/1 year later.

Type A is too important to ignore either in children or adults. Lucker (1980) has discussed this pattern as it relates to spelling and reading. Katz, Avellanosa and Aguilar-Markulis (1980)reported on the high incidence of Type A in their corpus callosum cases. Perhaps we need to consider criteria which can be used to help identify the Type A trend in an indivigual who has many errors.

REFERENCES

Katz & Illmer, 1972. Handbook Cl Aud.
Katz,Avellanosa,Aguilar-Markulis,1980. ASHA Convention.
Lucker, 1979.SSW Newsletter.
Lucker, 1980. Aud & Hear. Ed.
White, 1977. Central Aud Dysf.

DEAR ACKIE

Dear Ackie (who ever you are):

I have become increasingly concerned about myself since reading the September 1979 Newsletter. You referred to a child who stepped out of a car which had not stopped. Well Ackie, I too made that drastic reversal at the age of three. I also have difficulty distinguishing right form * left. Or is it left from right? *(As well as reversals-- I didn't learn my lesson).

Maybe I need to take the SSW. Worse yet, could I possibly be reversing the results I am getting on the SSW tests I administer? Am I imperfect merchandise? If so, I guess I should inform my husband. What should I do?

SSW (Surely Switched and Worried)

P.S. If there are any other audiologists experiencing these problems, please speak up.

(Ackie responds page 6)

THE NATIONAL SAMPLE LOOKS AT REVERSALS

Jack Katz
State U. of New York at Buffalo

Reversals have been noted in LD children for many years. While Myrick's (1964) data have provided useful norms for C-SSW Condition scores, her findings were not appropriate for Response Bias (becuase the 20 item C-EC list was used). Therefore we have had to depend on normal adult data until 1977 (White). The National Sample (NS) can contribute greatly to our understanding of normal performance in children, especially with regard to Response Bias.

This report deals with SSW Reversals, based on 131 children from the NS and 103 LDs who were drawn from our files. Both groups ranged from 5-12 years of age. The normals were nearly equally divided between boys (53%) and girls (47%), whereas, the LD group had the characteristic ratio of 3 boys to one girl.

The data for normals were inspected to yield the fewest "false +" cases for the fewest number of Reversals. A cutoff point of 6 Reversals seemed appropriate for significance for the 5-7 year olds, in the NS. Using 6 as significant, 5 normals were positive out of 42 (12%). Most of the 8 year olds had 4 or fewer Reversals, but there was a subgroup of them that had 10 or more. Using a criterion of 5, there were significant results for 15% of them. Only a criterion of 11 Reversals would reduce the significance rate, but this seemed too lax. For the Ss 9-12 years of age, 3 Reversals was first used, but 9 out of 62 (15%) seemed slightly too high a rate. Using 4 reduced the positives to 11% and a criterion of 5 lowered it to 10%.

The criteria and results for each age group will be shown, comparing normal and LD children:

REVERSALS

Percent of children with positive Reversals for normal (NL) and LD groups, by age and the number of Reversals used as the criterion for significance.

AGE	CRITERION	NL(N=42)	LD(N=27)
5-7	6	10%	41%
8	5	15%	33%
9-12	3	15%	36%
	4	11%	25%
	5	10%	24%

Taking the 3 age groups together (but considering each of the criteria for the oldest group) the following "hit/false +" ratios are obtained:

AGES			GROUPS	
5-7	8	9-12	NL	LD
6	5	3	14%	37%
"	"	4	12%	31%
"	"	5	11%	30%

Although these criteria must be considered tentitive these cutoff scores identify two to three times the number of LD children as normals in the present samples. While one might feel that 10-15% is too high a false + rate, we must also consider: a) it could be more significant to pass over such a problem in an LD child; b) some of the "normal" children in the study might have similar problems as the LDs but compensate with other skills in school, c) normal children taking a test"for fun" may not approach the task with the same seriousness as a child who is referred because of a problem.

These results should be cross checked on other normal and LD populations. If you have or can gather such data, please get in touch.

ARE SSW REVERSALS RELATED TO DEFICITS IN SELF ORDERING?

Floyd Rudmin
McGill University

Because each item consists of two spondaic words and because the first one begins about 800 msec before the other there is a proper order of response. Correct responses with improper ordering are called reversals. Apparently, patients with lesions of the anterior temporal lobe or of the pre- and post-central gyri tend to have ordering errors on the SSW test (1,2). Similar findings have been reported with other auditory sequencing tasks (3,4). Also, some learning disabled children make SSW reversals (5). All of these studies have been correlational, and it is reasonable to be concerned and skeptical because no neuro-physiological account has been forthcoming. Particularly so because the cortical areas included in the "reversal strip" seem to have little in common anatomically or physiologically.

Some light may have been shed on this in a recent seminar by M. Petrides on "Memory and the Medial Temporal Lobe" given at the Montreal Neurological Institute (6). The role of the hippocampal structures in memory was reviewed (7,8,9,10,11,12). Apparently, memory deficits associated with hippocampal lesions derive, not from the lesions per se, but from disconnection of the hippocampal structures from the frontal cortex. Such deficits show up most clearly on a self-ordering task (13). With rat studies, this may entail placing the rat in a chamber with many dead-end passages radiating out like spokes around a wheel hub. The rat's task is to get the food at the end of each passage, remembering which passages he has already cleaned out so as not to make the error of re-entering an empty passage. With humans, self-ordering may be tested with a cardboard having an arrangement of different pictures on one side and another arrangement of the same pictures on the other side, then turn the card over to find the same picture on the other side, remembering which pictures have been pointed to so as not to make the error of pointing to a pair of pictures twice.

What do errors in self-ordering have to do with SSW reversals? First, both are deficits in short term memory for sequentially ordered material. But more interestingly, both types of deficits may derive from lesions of the same areas. The tracts connecting the hippocampal structures and the frontal cortex underlie the anterior temporal lobe. From animal lesion studies and from clincial cases, it is not yet clear exactly what areas of the frontal lobe are crucial for self-ordering, but it seems to be the posterior and superior frontal lobe areas. Near enough to the "reversal strip" for this hypothesizing. It would be most interesting and fruitful to determine whether or not there is a significant correlation between SSW reversals and errors in self-ordering. If there is, a neuro-physiological account of SSW reversals might be available.

References

1. Katz, Differential diagnosis of auditory impairments. In Fulton and Lloyd, (Eds.), Audiometry for the Retarded: With Implications for the Difficult-to-Test. Baltimore: William & Wilkins Co., 1970.

2. Katz and Pack, New developments in differential diagnosis using the SSW test. In Sullivan (Ed.), Central Auditory Processing Disorders. Omaha: University of Nebraska Press, 1975.

3. Efron, Temporal perception, aphasia, deja vu. In Mischelevich and Chase, (Eds.), Interdisciplinary Seminar Program Temporal Lobe Function in Man, II. Language and Speech. Part 2, Neurocommunications Laboratory, Dept. of Psychiatry. Baltimore: The Johns Hopkins University School of Medicine, 1965.

4. Luria, Traumatic Aphasia, pp. 104-141, 267-268. The Hague: Mouton, Co., 1970.

5. Stubblefield and Young, Central auditory dysfunction in learning disabled children. J. Learn. Disabil., 8: 89-94, 1975.

6. Petrides, Memory and the medial temporal lobe. Presented Montreal Neurological Institute, December 21, 1981.

7. Mishkin, Memory in monkeys severely impaired by combined but not by separate removal of amygdala and hippocampus. Nature, 273: 97-98, 1978.

8. Milner, Complementary functional specialization of the human cerebral hemispheres. In Levi-Montalcini (Ed.) Nerve Cells, Transmitters and Behavior. Amsterdam: Elsevier, 601-625, 1980.

9. Milner, Corkin and Teuber, Further analysis of the hippocampal amnesic syndrome. Neuropsychologia, 6: 215-234, 1968.

10. Rosene and Van Hoesen, Hippocampal efferents reach widespread areas of cerebral cortex and amygdala in the rhesus monkey. Science, 198: 315-317, 1977.

11. Becker, Walker and Olton, Neuroanatomical bases of spatial memory. Brain Res., 200: 307-320, 1980.

12. Olton and Feustle, Hippocampal function required for nonspatial working memory. Exp Brain Res., 41: 380-389, 1981.

13. Petrides and Milner, Effects of frontal- and temporal-lobe lesions on performance on self-ordering tasks. Soc. for Neuro. Sci. Abs., 7, Nov. 1981.

Editor's Note: It seems reasonable to assume that sequencing errors on the SSW should be positively correlated with sequencing errors in various life activities. It is important to remember though that the SSW may be less sensitive to this type of disorganization because these reversals may be more subject to control. The inhibition of reversals could be accomplished by increased vigilance that is possible because the test requires this effort for a relatively short period of time. Also, there are linguistic aids to keep the spondees intact. The individual spondees may hold together better because one goes to each ear. Thus, we could expect writing and reading reversals to be more apparent than SSW reversals.

PITCH PATTERN PERCEPTION & SSW TESTS

Floyd Rudmin

A 14 year old boy with CP (mostly in lower limbs) was referred because of learning problems. Peripheral hearing was normal except for WDS: LE= 88% vs RE=100%. The SSW was normal except LC C-SSW=16% and 10 reversals. On the Pitch Patterns (PP) he had 60% correct in each ear for hummed responses, but for verbal ones, LE= 36% and RE=32% with 4 reversals AU.

We tentatively concluded he may have posterior frontal lobe involvement, possibly deep, affecting the basal ganglia and corpus callosum (CC). The reasoning follows:

1. The SSW reversals point to the lower pre-central gyrus.
2. The poorer LC SSW and LE WDS may point to the CC, since both tasks require some crossover from the non speech to the speech hemisphere.
3. CP may involve the basal ganglia with major weakness in the motor humunculus adjacent to the CC.
4. The PP was below the 90% norm in each ear for both verbal and hummed responses. This may suggest weakness of the speech motor system. The poorer verbal responses which require more motor organization than humming, could point to the lower motor strip.
5. Since hummed responses on the PP may be carried out completely in the non speech hemisphere, while verbal ones require cross over to the speech regions, the poorer verbal behavior may suggest CC involvement.

In sum, the CANS tests along with the case history point to a common conclusion. Since the suspected region could well encompass Broca's area, additional language tests have been recommended. This information might be very useful in setting up goals and guidelines for rehabilitation.

SSW REPORTS
4226 Ridge Lea Rd.
Amherst, NY 14226

(Ackie, continued from page 2)

Dear Surely:

Your concern about switching a non-reversal to a reversal or reversing a reversal to whatever is a real one. Be careful.

As for telling your hubby, why bother? Reversals are the least of your problems, Honey--your response time is much more severe. If it has taken you 3 years to respond to my 1979 column (which Ackie, unlike her sisters Abby & Ann, never reruns), then he's probably still waiting for last month's request to pass the salt.

Ackie

Let Ackie or Ann Slanders help you with your problems as we have helped so many others. Or send for my booklet, "How to Punish Nasty Patients While Under Headphones" or Ann's ever popular one, "Tips to the Impedence Bridge".