SSW REPORTS . . .

What's so Special about Type-A?
INT-8 Analysis: The Ultimate

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What's so Special about Type-A
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The SSW Type-A pattern was originally called the "Dyslexic Pattern". This was because in 1966 and 1967 the first two dyslexic cases showed this unusual pattern on the SSW test (you may recall Patsy and Linda from the SSW Workshop). Fortunately, soon after that we saw a few patients who had frontal lobe lesions who also exhibited Type-A patterns, so it became apparent that it was not limited to those who had dyslexia.

FYI: You may wonder why we called it *Type-A* as this could be confused with the type-A tympanogram. Well of course, the reason is that the SSW Type-A came first.

In time it became clear that the SSW Type-A was different than the other SSW signs. For example, it did not follow the contralateral model. That is, regardless of which hemisphere was involved it was generally the left ear that showed the peak of errors. In time this peculiarity was understood because it followed pattern of corpus callosum lesions (that prevent speech from getting from the non-dominant right hemisphere to the left) on dichotic tests.

If you are not sure what the Type-A pattern is or how it is calculated, please see the Addendum on page 2.

Unique to Type-A

1. Type-A does not indicate where a lesion is in site-of-lesion cases as the peak of errors is generally in the left-competing (LC) condition, whether the lesion is on the right side, left side or in the midline.
2. Type-A is associated with the corpus callosum (CC) and/or angular gyrus in dyslexics, but it can also be found in with CNS lesions elsewhere.
3. The Type-A was found in 33% of corpus callosum tumor patients [1]. In CAP cases it was noted in ~15% of cases using the Traditional Analysis [2], and in ~20% with NOE [3].
4. The SSW is generally a robust test, but the Type-A is fragile. This is because it depends on the relationship of errors in 2 columns. Therefore, if there is an extra error or 2 in another column, it could nullify the Type-A. This is commonly seen in young children who have errors associated with immaturity of the system.
5. Type-A errors are not the same as other errors on the test. They appear to result from an inability to get to the language-dominant hemisphere and not to a failure of cortical processing. For this reason Ear/Order Effects if noted in Type-A's cannot be interpreted in the usual way, they are nullified by the Type-A pattern.
6. The Type-A pattern is the sign that designates Integration (INT) categ-

ory. Other signs may hint at an INT problem, but only the Type-A designates it.

7. In 1985-6 we studied whether the SSW could provide practical insights into CAP problems. Type-A was one of three SSW patterns because each was associated with specific learning and other problems. The research showed many more associated learning-communication problems. But Type-A cases were the most severely impaired.
8. A number of years ago when we were studying the category system we found that the most likely error in scoring the SSW was missing a Type-A [3]. It takes a concerted effort, even by experienced clinicians, to check for Type-A with each SSW that is administered. We found our errors by using an SSW computer program (e.g., SSW-Plus).
9. We see 'Integration' categories in category systems other than the Buffalo Model but not referring to CC-type problems. This can be confusing to those who use the present system. It is likely that they too test INT cases but they may not have or use indicators such as the Type-A. If we did not have the Type-A, we would not have an INT category either.
10. Other tests might well reveal the INT problem as they appear to identify CC disorders. For example, on Pinheiro's Pitch Pattern test, performance can be compared for a verbal (e.g., 'high, low, high') and a hummed response. If the person can hum but not say the pattern, this is associated with involve-ment of the corpus callosum. Logically these cases have a high probability of INT difficulty. Of course this needs to be checked out empirically.

As you can see, there are many special things to say about Type-A.

References

1. Katz, Avellanosa & Aguilar-Markulis (1980). Evaluation of corpus callosum tumors using SSW, CES, and PICA. ASHA convention , Detroit, MI.
2. Katz (1992). Classification of auditory processing disorders in Katz, Stecker, Henderson, Central Auditory Processing. Mosby.
3. Katz, Smith, Kurpita, Brandner (1996). NOE analysis of Type-A: the missing factor. SSW Reports, 18 pp 1-6.

Addendum: The Type-A Pattern

There are two ways of scoring the Type-A pattern for CAP cases. One method is the Traditional Analyses and the other the more recent NOE Analysis. For a person who has a hearing loss, the Traditional scoring is required. For most CAP evaluations the NOE is now used. Both are described below.

Calculating Type-A: NOE Analysis:

1. Compare column-B and column-F of the 8 cardinal numbers (on page 3 of the SSW scoring form). Chose the one with more errors and call it 'F'.
2. Now look at the remaining 7 columns and chose the one with the most errors. Call this column-X.
3. Subtract F minus X to determine the Type-A Difference.
4. If the Type-A Difference is greater than the table value for the person's age then Type-A is significant.

Calculating Type-A: Traditional Analysis:

1. Follow procedures 1 & 2 above.
2. If F is at least twice as great as X and the difference between them is $\geq$3 points, it is a Type-A for an adult.
3. For children see age norms.

INT-8 Analysis: The Ultimate

Jack Katz and Susan Brandner

The Type-A pattern is very useful but definitely more complex than any other aspect of the SSW test. It is also less common than Decoding (DEC) and Tolerance-Fading Memory (TFM) problems among those with CAPD so we have less information about INT.

For these reasons that it has taken longer to figure out the Type-A and required more refinements than other aspect of the SSW. The most challenging part has been how to calculate the Type-A more simply (for NOE) and whether it provides valid information [1].

The INT-8 System

Integration cases are identified by the Type-A pattern. The new INT-8 system divides INT into four subtypes depending on other characteristics shown by the individual (i.e., DEC, TFM or both). The ORG category is shown by a '+' after any of the INT sub-categories. Each of the sub-categories is discussed below with their specific criteria.

INT-1: This sub-category is similar to the previous INT-1, except that it is more limited. Previously, this sub-category could include those who have significant TFM signs as long as the most prominent characteristic was DEC. Now INT-1 cannot have important TFM signs, only significant DEC along with the INT sign. INT-1+ (note the plus sign) designates that there is also a significant ORG sign(s).

In a group of 40 INT cases, 12 had INT-1 and 2 of those also had significant reversals on the SSW and/or PS test (i.e., INT-1+ cases). These latter individuals had significant findings for 3 of the 4 CAP categories.

INT-2: This sub-category is similar to the previous INT-2 except that now the person cannot have major DEC signs on the 3-test battery. Previously, INT-2 just required the person to have more TFM than DEC signs. Thus a person could have had quite a significant overlap of these problems but the DEC would not be revealed by the designation. Now the INT-2 is essentially limited to just TFM plus the INT.

Only two of 40 INT cases fell into the INT-2 sub-category. There were no INT-2+ cases.

INT-3: This is a new sub-category and presumably represents the most severe academically and communicatively impairement. Just as in other categories, INT-3 cases vary in severity. INT-3 was the largest INT sub-group. This group demonstrates three different types of CAPD - INT, DEC, and TFM - but these components are not necessarily of equal magnitude.

Note: INT-3 requires only 2 Qualifiers to show significant DEC and TFM because having one sign on an item often reduces the chances of having a second one on the same word or item (e.g., Q vs. X or XX; QR vs. Q or X; P vs. SM).

Of the 24 INT-3 cases, 11 had reversals on the SSW or PS test. These 11 were designated as INT-3+. They were indeed 'global' INT cases as they showed all four types of CAPD.

INT-4: This new sub-category is reserved for those who have INT, but not significant DEC or TFM signs. This is presumably the mildest communicative and academic INT sub-group. INT-4 is limited to those who have the Type-A but don't meet the requirements for INT-1, INT-2, or INT-3.

Two cases fell into the INT-4 sub-category. One out of the 2 cases had reversals giving the designation of INT-4+.

References

1. Katz, Smith, Kurpita (1996). NOE analysis of Type-A: The missing factor. SSW Reports, 18 pp 1-6.
2. Brandner (1999). Integration category: A second look at NOE and Traditional scoring. SSW Reports 21 pp 19-24.
3. Katz, Marasciulo (2001). Sensitivity of the Central Test Battery-CD. SSW Reports 23 pp 1-6.

INT-8 Table (See last page)

The last page of this issue of SSW Reports has a table that will enable you to quickly determine the INT sub-category. Those who are familiar with the Buffalo Model will recognize the indicators and the 4 associated categories (if you are not sure of them, check your tester's manual, SSW Workshop manual, SSW-Plus program, or Katz, 1992).

Try a Case or More

John B. had a Type-A on the SSW plus RC and LNC. He also had significant SSW Reversals, X, and TTW. On the PS test he had Quantitative, 1st, OL, and NF signs and on the SN: RE and IA were significant.

Eyeballing the data, it looks like there are both DEC and TFM problems (as well as ORG). Therefore, the first consideration is INT-3 (INT, DEC & TFM). So take a look at that section of the table on page 6.

Criteria*	Significant Findings	Sig
INT	Type-A	Yes
≥1 Prim DEC	RC, LNC, Quant	Yes
≥2 Qualifiers	X, OL, NF	Yes
≥1Prim TFM	SN-RE & IA	Yes
>2 Qualifiers	TTW, 1ST	Yes

* See INT-8 table on page 6

'Prim' refers to Primary indicators.

As in most cases it is a matter of over-kill. Usually there are more significant factors than are needed to indicate a classification. Either of the 2 DEC criteria would have been enough and either of the 2 TFM criteria would have been enough. So it is an INT-3 sub-category. When we take Reversals into account it shows an ORG problem also. So John is classified as having INT-3+, showing that all 4 CAP categories are significant.

The INT-8 system may seem complicated but it is pretty easy to master. Just a few cases will familiarize you with the procedures and concepts. You will be able to sub-categorize INT cases quickly and designate each of the CAP problems that need to be considered.

Procedure: Look at the patient's significant test findings to get a sense of what the problems are. If almost all are DEC signs consider INT-1 and INT-3; if almost all are TFM check out INT-2 or INT-3. Very soon you will home in on the right subtype the first time. FYI: hopefully, the next version of SSW-Plus will have the INT-8 system built to provide the information automatically. Classify these cases:

#	Significant Signs and Type A	INT
1	SSW: Q, SM PS: NF, X SN: RE,LE	
2	SSW: RC, Rev, P PS: Quant, QR, Q	
3	SSW: Rev, Y PS: X	
4	SSW: LNC, Q PS: Quant, XX, Q SN: LE	

See answers below.

NOE vs. Traditional

How often were each of the sub-categories found in the present sample using the NOE or Traditional Analysis and of those how many had significant Reversals showing ORG (+)?

In this study cases were chosen because they met the NOE Type-A criteria. Of course a person could have a significant Type-A by the Traditional criteria, but pass the NOE. If so we did not pick up those cases. Those cases would have made Traditional look better than in this study and NOE not as good.

Signif INT	Of 40 NOE	Of NOE % ORG	Of 20 Trad	Of Trad % ORG
INT-1	30%	5%	30%	0
INT-2	5%	0	10%	0
INT-3	60%	28%	55%	25%
INT-4	5%	0	5%	0

(Answers: 2, 1+, 4+, 3)

Whether we use NOE or Traditional Analyses INT-3 is the most likely category, followed by INT-1. Thus among those with Type-A, 90% had significant DEC problems. A high percentage of DEC is expected because the posterior portion of the CC is right next to the auditory cortex (decoding region). The posterior CC is associated with dyslexia as is the adjacent angular gyrus.

In this sample 65% of the cases had significant TFM signs. That would imply the central involvement often extends anteriorly from the INT and DEC regions (if we view it anatomically). In 10% of the Type-A cases there were no significant DEC signs. This would suggest a narrow anatomical locus (INT-4) or likely the problem involves the anterior CC region (INT-2). Also, of the 40 cases, 13 had significant reversals on the SSW/PS.

Because Susan Brandner and others sought out their Type-A cases for this study, we cannot infer the percent of INT cases among those tested for CAP. That will require another study. However, there was a big difference between the number of cases identified by NOE vs. the Traditional method. Although NOE is surely more sensitive it is not twice as sensitive as suggested by the numbers. We did not give Traditional a fair chance to show it's stuff because we chose cases who failed by NOE. So of course it looks like NOE got all of them and Traditional got only half. That is not the case. We would not be surprised if NOE had a 20% or greater hit rate among those seen for CAP testing.

Effects of Age

It was interesting that no children 5 or 6 years of age were identified with Type-A. Two explanations might account for this. One is that young children have errors associated with immaturity etc. and these could reduce the difference enough to make the comparison non-significant. The other is that for 6-year olds especially, it is easier to show a Traditional Type-A than an NOE, so they might have been missed.

For 7 year olds the Traditional Analysis missed 3 of the 6 cases. All of them were due to the 2-times rule (F must be at least twice as great as X). For 8 and 9 year olds Traditional missed quite a few cases that NOE picked up. Traditional picked up only 4 out of 14 cases. For those 10 years and older Traditional and NOE agreed on 10 out of 13 cases. It is interesting, in general most aspects of the SSW and many other central tests are less effective for those 10 and older, but with Type-A, as noted in the past, this sign is more sensitive than in younger patients. This is the other side of the coin. In young children a few extra errors can hide a Type-A and in older individuals there are generally very few errors so Type-A stands out. Please remember that this study did not provide equal opportunity to the Traditional because all cases were chosen based on NOE.

Summary & Conclusions

Type-A is a very important sign. It is the only one we have on the 3-test battery that provides a strong indication of an Integration (INT) problem. Although INT problems are likely present from birth, they are much less likely to be shown by this test battery until about age seven. These children are generally identified as having CAPD, but the INT factor may not be revealed. For this reason the Traditional Analysis or other tests such as Pitch Patterns might be employed.

INT is often overlooked unless one keeps alert to a possible Type-A. The INT-8 system will benefit those cases by clarifying the types of CAPD and then help in formulating an appropriate management plan.

Reference

1. Katz (1992). Classification of auditory processing disorders in Katz, Stecker, Henderson, Central Auditory Processing. Mosby.

INTEGRATION - 8 SYSTEM

Primary indicators are generally the most researched indicators, Qualifiers are important but less researched.
For any category add a plus (+) if SSW and/or PS Reversals are significant (e.g., INT-1+).

If the person has a Type-A and DEC signs but few or no TFM signs see if INT-1 criteria apply below

INT-1: INT & DEC			
Significant Indicators	SSW Significant	PS Significant	Speech-in-Noise Significant
Primary INT *plus*	Type-A		
≥1 Primary DEC *or*	RC, LNC	Quant/Qualitative Score	---
≥3 DEC Qualifiers	X, P, QR	X, XX, NF, QR, O/L, P	---

If the person has a Type-A and TFM signs but few or no DEC signs see if INT-2 criteria apply below

INT-2: INT & TFM			
Significant Indicators	SSW Significant	PS Significant	Speech-in-Noise Significant
Primary INT *plus*	Type-A		
≥1 Primary TFM *or*	---	---	SND-R, SND-L, SND-IA
≥3 TFM Qualifiers	Q, TTW, Y, AYR, SM,	Q, 1ST	---

If the person has a Type-A and both DEC & TFM signs see if INT-3 criteria apply below

INT-3: INT & DEC & TFM			
Significant Indicators	SSW Significant	PS Significant	Speech-in-Noise Significant
Primary INT *plus*	Type-A		
≥1 Primary DEC *or*	RC, LNC	Quant/Qual Score	---
≥2 DEC Qualifiers &	X, P, QR	X, XX, NF, QR, O/L, P	---
≥1 Primary TFM *or*	--	--	SND-R, SND-L, SND-IA
≥2 TFM Qualifiers	Q, TTW, Y, AYR, SM,	Q, 1ST	---

If the person has a Type-A and few or no DEC or TFM signs see if INT-4 criteria apply below

INT-4: INT Only			
Significant Indicators	SSW Significant	PS Significant	Speech-in-Noise Significant
Primary INT but	Type-A		
No Primary DEC or	RC, LNC	Quant/Qual Score	---
<2 DEC Qualifiers &	X, P, QR	X, XX, NF, QR, O/L, P	---
No Primary TFM or	---	---	SND-R, SND-L, SND-IA
< 2 TFM Qualifiers	Q, TTW, Y, AYR, SM,	Q, 1ST	---

It is not clear at this time whether an SSW extreme delay is a DEC or INT sign. It may depend on the manner in which the audiologist scores it, so SSW XX is not included above. RC can be DEC, TFM or both so it is not included above. BTB, SM-2 and IW are thought to be DEC signs but they have not been carefully researched so they are not included above.