SSW Reports

• An Interesting But Not Unusual Case

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Case Study

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The Goal Is To Get It Right

I believe that it is the audiologist's job to get it right. How many of the 40 indicators would it require to say that a person has APD? By how many SDs do they have to differ? How many categories make it significant? Need I go on??? Oh okay, but just a few. How does intelligence affect the results? How much does previous training interact with our findings? Is what the parents/teachers say more important than what our tests say? Yes, of course there are a lot of personal conditions and characteristics, but let's get on with the case study.

As smart as this test battery and questionnaires are; they are not as smart as you plus the battery and questionnaires. Only you can estimate when some of these must be taken more seriously and others less so. The more experience you have the more variations you have observed and your sensitivity has been enhanced. That's why in clinical situations we depend on the clinician's experience and clinical judgment (of course, this is not the case in a research study).

History

This 11 year old boy (*Oscar*) was adopted; so much of his early history is unknown. He does have allergies as seen in roughly half of those I have tested for CAPD. Oscar has an IEP with help in reading, speech-language, and math (each for 4 years). He is also considered a bright child despite his challenges, but he tires easily. The school and an outside specialist indicated that his problems were oral language and listening comprehension for which he continues to receive help both in school and outside. Fortunately, he was also seen by an audiologist for a retest because the family thought there was more to his difficulty but they still found him to have normal hearing. For this reason the audiologist recommended that he be seen for a CAP evaluation.

Oscar's hearing tests showed normal hearing between 250 and 4K Hz (m=5dB) in each ear. SRTs were normal as well (5dB) and word recognition scores were 96% and 100% for W-22s that were given live voice. Tympanograms and acoustic reflexes were not tested.

Buffalo-Model Questionnaire-Revised (BMQ-R)

Prior to the visit his mother was asked to fill out the BMQ-R (Katz and Zalewski, 2011). Oscar had 6 out of 8 DEC items circled (e.g., *understands verbal directions* and *responds slowly/delayed*). Two out of 4 Noise items were circled as were 4 of the 6 Memory questions and 2 out of 4 Various-TFM (e.g., *understands speech in noise, reading comprehension*, and *attention*). Those observations would suggest that both DEC and TFM were likely positive. There was only one INT sign out of 6 that was circled. It was *severe reading/spelling* problem. So if I was counting; that would have suggested a somewhat weak indication of INT because there was only 1/6. If the single indicator would have been the questions *very poor handwriting* or *severe visual perception*, I would have given less weight for an INT problem. ORG was 3 for 3, suggesting that organization/sequencing was another factor. Thus, it would look like 3 of the categories were likely involved and one was questionable. On the BMQ-R the next 7 questions deal with CAP in general. Four of them were circled. One of them was *processing what is heard*, that we will be mentioning below.

Speech in Quiet and Noise

The three recorded Buffalo Model Tests were given. The first was speech in quiet. Oscar had no errors on the first 10 items given at 50dB HL (which was consistent with the audiologist's previous evaluation). However, I had noted three delays (yes, I use qualifiers on all my tests even without norms). Qualifiers can help with every test because they tell much more than if items were correct or not. In this case I had to make a decision, 1) should I give the full 25 item list or 2) should I abbreviate it to conserve his energy for the more critical and more difficult tests.

I was quite sure that Oscar would score well on speech in quiet as he had so far and had done previously with the other audiologist. Also speech in quiet is a baseline test and if he had delays on these then he would be struggling mightily on the other tests. I did not want him to tire on this test and I could always gather the other 15 items if he was seen for therapy. I felt this modification would give us more accurate results. For the left ear in quiet he had 1 error and two delays and in the right ear just 3 delays. So both ears were essentially normal and equal.

Speech in noise was next. I explained to Oscar what we would be doing. The case history revealed that instructions had to be repeated often before he would understand. However, I did not have this problem with Oscar. I was sitting right in front of him, spoke clearly and gave simple instructions. That seemed to do the trick. I thought he was not yet tired, so we continued. He scored of 68% in the right ear with 5 delays and

one extreme delay. The latter was interesting; the word was 'add'. I asked Oscar what was hard or it sounded like at first. He said 'water'. When there are extreme delays I often ask about what the person thought it was at first. Sometimes they say it wasn't hard. I then ask if they were just waiting to say the word. Quite often the response is 'yes' (and not just looking at me as though I was crazy). That sounds like it might be an integration problem. The left ear was also 68% with 9 delays and no extreme delays. So looking at the speech in noise scores it was very likely that the two ears were equivalent. Oscar had 5 of the delays on the last one-third of the test. Perhaps he was a bit tired on the final items in the left ear, but if so it was marginal with a few small breaks as needed.

The SSW

Before giving the SSW I thought Oscar might like to work my "computer" and helping with the evaluation. So I asked him to come around to my side of the table. Told him which buttons to push and what presentation levels to set. I tried to explain very briefly and simply why he was pressing those buttons. The kids are told that they are being trained to be audiologists, like I am. Then we were ready for the SSW.

Although we do not count errors on the 4 practice items, nevertheless it is an important part of the test when there is a problem. These items should be easy because the words are familiar and the time between the "competing words" is quite long. If there are a few errors on the practice items I would likely replay an item or tell the person the word before the replay. In this case Oscar had 5 delays and one error. He said 'plaint' for 'paint'. That is a somewhat common 'smush'. In this case it was ignored because we had more than enough evidence and this would have been slightly beyond the rules. The second word is 'plane' but we have no smush for combining the second and fourth words of an item but it showed his inability to keep the two-ear messages separate. Although I told him that he does not have to wait for me to stop the recording for him to respond. However, it was still necessary to stop the CD even for the practice items and the first 7 test items. After that the blank-look pauses were periodic throughout the test. I suspected that some of those delays were Integration Delays (waiting to be able to say the word/words).

Oscar was clearly working quite hard on these items so we took little breaks especially after difficult items. Sometimes it was just saying a word or two to Oscar or a longer pause before giving the next item. These would serve to let the person cool down and clear their brain. Oscar had no Type-A pattern but the 8 Cardinal Numbers (8CN) showed LC words were missed a bit more for the LEF items. However, he also missed a great many on REF items. Sixteen of Oscar's 22 errors were on LC words. This was a perfect case to check the Standard Integration Ratio (SIR, see SSW Reports #2, 2015).

To check SIR I quickly entered the RC and LC errors in the SIR program (see attachment) and it was 5.12 (NL $\geq$1.0)! So that was indeed an important sign of INT despite the absence of the Type-A. Another sign was 2 XX/IXs. On the SIR program I entered data for the 2-By-3 analysis (2 of 9 scores on the Buffalo Model that are $\geq$3 SDs poorer than the mean). There were 3 2B3s so it too was significant. You may remember that Type-A and SIR are the strong INT signs. If one of them and one of the

support signs (XX/XI or 2B3) is significant that indicates INT. This gives Oscar 3 of the 4 INT signs, so that's pretty strong. By the way, Type-A & SIR would also indicate INT.

The Phonemic Synthesis Test

To be sure Oscar was ready for the PS we had a contest to see if an old man or a young kid could jump up and touch the ceiling. He wanted to know if it would be fair to jump from the chair. I thought not. However, even after a few tries neither of us could touch the ceiling. So the third and last procedure was the PS test. First Oscar showed his skill with the equipment. I have the parents sit in the 'bleachers' in the back of the room with the lists of what the children are hearing so they can better understand the child's performance. I mentioned to the mom that I was impressed how facile he was with the equipment.

Like most kids on the second training item 'nose' he responded to with 'moz'. So before that word I tell the child that it is a hard one. He gave the usual response and then I said, "Now they will be easy and later get harder". Oscar was correct on the first 21 items but then erred on the last four. However, it was not a picnic for him. He had 7 delays and one extreme delay on those words. There was also an O/L confusion (more of this some other time).

Oscar was within normal limits for his Quantitative score but had only 13 correct (NL=20) for the Qualitative score. Those who have had speech therapy, reading etc. are more sophisticated, but not necessarily as accomplished as the norms would suggest. So we depend more heavily on the Qualitative score as it showed more effort to get the same results as the controls.

Observation and Summary Form

The observation-summary (O-S) form is very helpful (see Appendix for complete form).

General Behavior	Comments	General Behavior	Comments
Anxious		**K**icks chair, wall etc	
Apprehensive		**N**on-Compliant	
Angry		**P**oor eye contact	*good*
Articulation	*good*	**S**peaks quickly	
Complain		**S**peaks slowly	*I think so*
Cried		**S**ulking	
Distractible		**T**icks	
Fidgety	*only toward the end I had*	**W**hines	
Hyperactive	*him stand up behind chair*	**O**ther	
Noted: *Everything was okay with him*			
Test Behavior	**Comments**	**Test Behavior**	**Comments**
Need tell to reply		**I**ntolerant headphones	
Not speak clearly		**R**emoved headphones	
Out of chair		**S**peaks loudly	
Required breaks	*3 longer & a few shorter*	**S**peaks softly	
Noted: *Great kid - sweet, cooperative. Loves soccer*			

Information from the BMQ-R and case history are summarized on the O-S form as well.

Summary Table for Buffalo Model Questionnaire - Number of Questions

	DEC	Noise	Memory	Various	TFM	INT	ORG	APD	General
N items	~~9~~/ 7	4	6	4	(14)	6	3	7	9
Patient	6	2	4	2	(8)	1	3	4	3
Significant						read-spell severe			
Case Hx	3 /4	/3	2 /2	/4	(5 /9)	---	/1	1 /1	---
	Local= /1					BMQ	CAP= 22/39		Total= 25

None	Audit Trng	Speech Ther	Phono Aware	Phonics	Reading	Sensory-Integ
	yr	4 yr	yr	yr	4 yr	yr

In addition to the summary of the basic hearing results I'm given (that most of you get your own) we have a summary of the significant findings on the 3 Buffalo Model tests.

SSW											
DEC						TFM				INT		ORG
RC	LNC	E HL	O LH	X		E LH	O HL	TTW	LC	LC	Tp-A	REV
P	QR	BTB	SM-2	IW	XX	SM	Q	Y	AYR	XX/ IX	SIR	
PS												
Quant	Qual	X	NF	QR		Q	1st			ALL		REV
										2B3		
O/L	P	XX										
SSW - Various			WRS-Quiet			SN				DOM/CLT		
Total	RNC		RE	LE		RE	LE*	IA		LC	Tp-A	REV
										did	not	do
VAR	1	DEC	9			TFM	5		INT	3	ORG	1

**Note: I counted LE SN Difference score to be significant even though it was just at the limit of normal. This was in order to get it ~~right~~/correct. My rationale was that the LE raw score was equal to the right ear and the delays were about equal so in noise we can expect both ears to be below normal but not involve the additional problem due to a significant interaural difference. Had I scored it either way the number of significant factors would have been the same, but it would have been incorrect to suggest that the left ear was significantly better in noise and that the interaural difference would likely give Oscar additional difficulties. If it was a bigger deal and not based on 1 percentage point I would have mentioned this change in my report. But since it was a miniscule change I felt it would cause more confusion to mention it. My point to you is that I believe the professional should try to get it right occasionally when there is a high probability that they know better than the test.*

Further Interpretation

Does Oscar have CAPD after all? Yes, of the ~40 indicators on the Buffalo Model, Oscar had 19 that were positive. Even if each one was just at the .05 level; it would be extraordinarily improbable that he did not have CAPD. Thus, the audiologist and ENT doctor did the family a great service by referring them despite the nay-sayers. Does that agree with the mom's information? Yes, she noted 22/39 CAPD related characteristics.

What about affected categories? We found between 9 to 3 positive factors for DEC, TFM and INT, but only 1 out of 2 possible ORG indicators. One out of 2 makes it probable but not so strong. However, when the BMQ-R says that he has all 3 characteristics of ORG (i.e., *trouble maintaining proper sequence, messy/tends to lose things and keeping things in order*) that greatly increases the likelihood of ORG. I would say if there was no BMQ-R support that we could not rule out ORG and that it is not critical that we determine it now because it is a higher level disorder and the therapy would start with the more basic factors (DEC and TFM). If ORG showed up on reevaluation it could be addressed at that time. Quite often carrying out the basic therapies takes care of ORG (at least the auditory characteristics) so that specific therapy is generally not needed.

Is That It?

Pretty much. The purpose of this issue was to share with you some of the approaches that I use in order to increase the chances that I got it right. Doing therapy has so many benefits for the person, their family etc. But it also let's us know if we did it right or not. When we see big improvements that are associated with our therapy and retests support it and the family/school sees the improvement as well; we become more and more confident that we got it right.

Some people make huge gains in therapy (usually those with the most severe problems) and some more modest. Generally the family and school concur, but even when not it is hard to see how the improvements on the therapy materials, the retest improvement and the changes we observe (e.g., speaking more clearly, greater self confidence) are not related to performance at school and home. Fortunately that is very uncommon.

Please Feel Free To …

Use the attachment as you please. Also if you do not use SIR and 2B3 to support INT, I know you will be most pleased with them. These programs are also attached.

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