SSW Reports

BUFFALO MODEL QUESTIONNAIRE (BMQ)
and
BMQ MAY HELP THE TYPE A

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What Does the Buffalo Model Questionnaire Tell Us?
Jack Katz

In health-related professions the case history is a vital element of any evaluation. Case histories and questionnaires that are filled out by parents or teachers provide us with a valuable resource. Unlike central tests, case histories and questionnaires can delve into far ranging topics in a few moments with little or no clinical time expenditure and provide us insights about "conditions on the ground".

The Buffalo Model Questionnaire (BMQ) was developed a number of years ago for my private practice. It currently has 48 items dealing with characteristics associated with APD as well as other general questions that help the clinician to deal insightfully with the child or adult. For example, parents are asked if the children had any of six therapies that could improve APD test results.

The Nov. '06 SSW Reports provided details and a copy of the BMQ. I now have data for more than 200 children & adults that I would like to share with you. I think the data are impressive. The purpose of this article is to discuss the specific questions and what they offer as well as to point out the pitfalls of BMQ and other questionnaires.

The Importance of Questionnaires

Because normal auditory processing is such a complex series of functions and because APD makes understanding processing issues even less fathomable, testing for these disorders may be challenging (less so I believe when using the full Buffalo Battery). Prior therapies the person had, current speech problems and cognitive assets/deficits can complicate matters further. I believe that it is important to compare our test results with outside criteria, just to make sure we are on the correct path. In my work the case history and BMQ are most helpful. We do not expect a one-to-one relationship between our findings and outside criteria because of the above mentioned influences on test performance not to mention the potential difficulties arising from filling out case histories and questionnaires. We are fortunate that the Buffalo Model does not rely on a single score because the 3 tests have many test indicators that look at the same problems in a variety of ways. Generally, if some indicators don't reveal the person's difficulties others will. The same is true for the BMQ. While some questions provide excellent indications of APD, other weaker ones may be just as valuable in certain cases.

Pitfalls of Questionnaires

Some parents are not interested in filling out forms; they may have reading problems themselves, may forget information or be unwilling to share it. Sometimes a parent will mention PE tubes during on the case history without noting middle ear problems on the BMQ. An item or two that was not one of the initial complaints on the BMQ may be added by the clinician after working with the child. Indeed often improvements in these skills are among the ones rated most highly by the parents.

Characteristics of the Groups

The entire APD sample of 217 was made up of 150 children (6-18 years m=8.0), 24 young children (3-5 years m=4.4) and 14 adults (>18 years m=35.2). In addition there were 29 control children (6-18 yr m=10.0) who were siblings of the children seen for evaluation whose parents indicated were free of APD. The adults and young children groups had too few participants to report. Table 1 shows the kinds of cases that were seen. I wonder how they are similar or different from the ones you see. Many factors dictate who we get to evaluate in our settings.

Table 1 Characteristics shown by the responses on the BMQ. The percentage of 'yes' responses on the BMQ for the 4 groups. The most likely APD category is shown as a general guide and my comments & interpretations are included (Ch =children 6-18 yrs, C=CAP, D=DEC, T=TFM, I=INT, M=Memory, var=various).

Problem Noted	**%Ch** n=150	Cat	**Comment/Interpretation**	%Ctrl n=29	%<6yr n=24	%>18yr n=14
Learning Disability	64	C	Mostly reading, spelling, attention	0	63	50
Otitis Media	56	C	OM/fluctuations interfere with rehab	5	46	64
Speech problem	55	D	Articulation especially /r, l/ early on	10	63	29
Anxiety	51	T	Anterior function; inefficient work	21	42	43
Allergy	45		Associated with OM/fluctuating hrg	28	17	64
ADHD/ADD	38	T	Tillery found at least TFM category	0	33	43
Eye contact	37		Various etiologies	0	38	29
Coordination	27		Motor-planning (pre-motor region)	3	38	36
Extreme Handwrit	26		Often seen in dyslexics (not pre-motor)	7	17	14
Long term memory	24		May not be basic function of APD	0	21	21
Dyslexia	23	I+	A-V(INT), Auditory(DEC), Other(TFM)	0	21	0
Hearing	21		Deflated %, confuse APD & Hearing	0	17	36
Behavior	19		Katz: incarcerated youth- DEC&ORG	0	13	0
Hypersen to touch	18		Often associated with Autism/ADD	0	0	36
Psychological	13		Some APD lit. on schizophrenia etc.	0	8	29
Autism spectrum	12	DC	Wetherby: DEC & TFM	0	21	7
Sev Visual Percept	7	I?	Could be associated with Dyslexia	0	0	0
Head Injury	6	var	Depends how severe & where	0	0	7
Mentally Challenged	4	var	Most I tested: DEC, TFM, ORG	0	0	0
Academic Issues						
Phonics	71	D	Powerful sign even w/ prior therapy	0	42	14
Rdng comprehension	62	M	Associated with short-term memory	10	21*	57
Spelling	61	D	There is also a visual component	28	8*	36
Oral reading	58	D	Word accuracy	0	8*	21
Math	47		Aspects of math deal with reading	3	4*	29
Read/Spell severe	33	I	Likely DEC & TFM & also ORG?	0	0*	0
Foreign language	12*	D	Small % had foreign languages	0	4*	43

* Only a small percentage of the first 3 groups took a foreign language. Their parents circled "not applicable". But the older APD group is more representative of the problem.

It is interesting to note that *anxiety was* among the top 4 characteristics for each of the APD groups. I do not recall that being generally mentioned when discussing APD. As you may know from my clinical observations that anxiety may be seen in many TFM kids (e.g., fearful of going into the test chamber). I believe OM data are understated in this group since parents may not have seen the problem for many years and assume it's no longer important. Often the family is unaware of middle ear issues that are still occurring. It was found

that 38% exhibited signs of ADHD/ADD and 12% with autism. (We find autistic children are quite amenable to therapy as we have seen for years with ADHD/ADD youngsters). Unfortunately, we still get precious few children with hearing loss for APD evaluation. Presumably the hearing problem is blamed for all of the child's difficulties.

The academic issues are not surprising, but it is impressive how powerful phonics turned out to be even for the kids under 6 yrs, but not for the control kids. Spelling is most likely an auditory skill but quite a few of our kids have visual perceptual deficits as well.

What We Learn From the Items Below

The items below are those most directly associated with APD (though most are not exclusively APD).

Table 2 BMQ items reflecting APD for 150 children ages 6 to 18 years as well as non-APD control children and those with APD younger than six and older than 18 years.

Problem	%Ch n=150	Cat	**Comment/Interpretation**	%Ctrl n=29	%<6yr n=24	%>18yr n=14
AP in General						
APD	98	C	As expected- all APD ages; no controls	0	92	93
Follow directions	84	C	Powerful- may be DEC/TFM &/or ORG	0	75	64
Speech in Noise						
Distracted by noise	75	N	Powerful indicator of speech in noise	0	63	86
Understand in noise	61	N	Powerful sign – especially in children	0	75	43
Hypersen. to noise	49	N	May not always be APD sign	0	48	50
Noisy child	17	N	Self defense mechanism	21	17	7
Memory						
Remem. directions	79	M	Powerful working? memory sign	0	67	71
Short term memory	54	M	APDs most specific memory concern	0	63	50
Frequently interrupts	44	M	Compensation for problem	14	42	29
Responds quickly	29	M	Compensation for problem	14	33	7
Speaks quickly	14	M	Compensation for problem- infrequent	0	29	14
Various TFM						
Attention	61	V	Anterior function	0	50	71
Uses language	51	V	Expressive language- anterior function	0	63	36
Decoding						
Understand direction	77	D	Powerful Decoding indicator	0	67	57
Responds delayed	51	D	Compensation for problem	0	46	50
Understand lang'ge	43	D	Useful sign - especially young children	0	63	50
Speaks slowly	11	D	Compensation for problem- infrequent	0	8	7
Integration						
Auditory-vis integ	37	I	A major Integration concern	0	25	21
Extreme delays	32	I	Trouble getting to Broca's area?	0	17	14
Organization						
Sequencing	57	O	Our specific Organization concern	0	50	29
Keeps in order	55	O	Associated problem (ala Lucker)	3	33	57
Messy/loses things	52	O	Not strong indicator: general population	28	33	50

Finally, prior therapies are an important consideration. For the group with APD, 6-18 yrs. of age, they had an average of 2¼ therapies (out of the 6 listed on the BMQ) before being seen for APD testing. Speech therapy was the most common one (61%) followed by reading

therapy (59%). Quite a few of the children had phonological awareness (37%) and/or intensive phonics training (33%). Although, I'm sure, all of the therapies were quite helpful, for these children; more was needed in the area of APD. Despite these prior trainings the children made very good additional gains when given auditory processing training.

This article showed that the BMQ differentiated children with APD from those who do not have APD. Generally, the data were similar for each of the APD age groups. In this sample there were more than 1/3 with ADHD and 12% with various forms of autism.

References

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Another Look at Integration Using the BMQ

Jack Katz

No aspect related to the SSW or the Buffalo Model has received more attention than the Integration (INT) category. In fact, the entire last issue of *SSW Reports*, by Larry Medwetsky, was devoted to INT.

The major pathway associated with INT is the corpus callosum (cc). The cc or related structures bring linguistic information from the right hemisphere to the left. When children have difficulty with the left competing (LC) condition on the SSW (that goes to the right auditory reception center and then it must cross to the left hemisphere) we assume that this is a sign of INT. On the SSW we are fortunate to have the strange Type A pattern that was found to be a good indicator of a cc-type disorder in those with brain lesions. For the Type A the score in column F (LC for Left-Ear-First {LEF} items) is significantly poorer than the other 7 columns.

Over the years some audiologists have been satisfied with the Type A as an indicator of INT but wondered if we were missing other cases. The problem is that we don't have a 'gold standard' for who does, and who doesn't, have INT. So how do we know that any change is a change for the better and not for the worse?

A New Approach

One advantage of doing therapy is that you can see its effect on test performance. If INT therapy changes some aspect of the SSW then we could retroactively say that what we saw initially was likely a reflection of INT. I have been working on an INT therapy, but still trying to perfect it, so I don't have those data. However, we do have test-retest data for children who had Decoding (DEC) and Speech-in-Noise therapies (but not direct INT therapy). I thought our test results might get some help if combined with Buffalo Model Questionnaire (BMQ) data. Indeed this permitted us another view of INT & a further use of the BMQ.

3 Subgroups Based on Type A & BMQ

I spent 1½ snow days studying the files for children 7-18 years of age for a pilot study and a few more days figuring out what it was saying. I chose 7 yr olds because it is harder to get significant Type A patterns in younger children and because they are not far along in school so the extent of reading and spelling problems may not be obvious (e.g., a $\geq$2-year delay in reading is often defined as dyslexia), so the SSW as well as the BMQ data may be more dependable using kids 7 years and up.

The files for those 7-18 years who had at least one round of therapy (i.e., 8-14, 50-min sessions) were studied. Forty-six files were immediately available. Sixteen had Type A patterns on the pre and/or post test and 30 did not have Type A on either test. A 35% incidence of Type A is quite high. One reason may be my private practice does not take third party payments so the families are wealthy, desperate, or both. My guess is that the families of INT cases are so desperate because of the severity of the problems. This would also make those families more likely to choose therapy for their children.

The Type A pattern was not obtained on retest for 8 children following therapy; presumably because of the benefits of the training. Even though, the therapy was not directed at INT. In the Phonemic Training Program the child listens to sounds and points to the letter. Over time this could benefit bringing auditory and visual information together (an aspect of INT).

The BMQ indicates the number INT-type characteristics the children exhibited (out of 6). Of those that did not have Type A, 13 did not have any BMQ INT characteristics, according to the parent (the No A/Q group), and 17 had 1-3 characteristics (the BMQ group). The latter group was considered *questionable* for INT. Table 1 describes the 3 groups.

Grp	n	age	BMQ INT	Total NOE Err	PS Qual Correct
Type A	16	9.1	1.6	26.9 (15.3)	11.3 (4.1)
BMQ	17	9.2	1.9	24.4 (16.5)	12.8 (4.7)
No A/Q	13	10.8	0	18.6 (8.6)	13.2 (4.3)

Table 1. N for 3 groups, mean age, #BMQ INT signs, SSW Total error & Phonemic Synthesis Qualitative score correct (Standard Deviation).

The mean BMQ INT scores for the Type A and the BMQ groups are similar. But, this may be a bit deceptive because the children in the latter group were selected because they had ≥1 INT indicators on the BMQ. For the 30 No Type As the mean BMQs was 1.1. 81% of Type A & 43% of the other 2 groups had >1 BMQ signs.

Based on Table 1 it appears that the Type A & BMQ groups have similar NOE scores, but have more errors than the No A/Q group. For the PS Qualitative score (DEC) they all seem quite similar. FYI: we used the Qualitative PS score because with all the prior therapies these kids have had, many scored within normal limits for Quantitative scores, but showed their problems with X's & QRs on the Qualitative.

What are the BMQ INT Questions?

The questions are based on my experience with INT cases. Unfortunately, they are not perfect e.g., severe reading problems may be due to DEC or visual issues and not INT and some children with motor difficulties (e.g. cerebral palsy) may have extreme handwriting problems not because of INT issues. I believe handwriting is primarily associated with only two of the four INT subtypes.

Characteristic	Type A %	BMQ %	Comb %
A-V Integration	56	41	48
Some Very Long Delays	44	29	36
Read/Spelling Severe	25	24	24
Extreme Handwriting	19	41	30
Dyslexia	12	24	18
Severe Visual Perception	12	12	12

Table 2. The % of 6 INT characteristics on BMQ for Type A, BMQ and both groups combined.

These questions have performed pretty well as an independent look at INT along with the Type A. But of course it depends on what the parents see and are willing to say.

Combining SSW & BMQ Information

The strength of the Buffalo Model is that it takes many looks at a complicated problem so we can study a person's profile instead of depending on a single test finding. We will use the same approach in studying INT, combining what we learn from the SSW & BMQ.

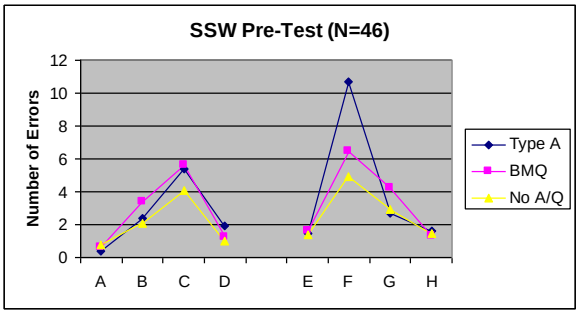

Figure 1. Pre-Test performance on SSW for the 3 subgroups.

You will see the obvious peak for column F which was the requirement for the Type A group. We can also see that the BMQ group is very similar to the Type A kids for the REF items and slightly poorer than the No A/Q group for each of the 8CNs. This encourages us to believe that some of the questionable (BMQ) group are perhaps INT cases.

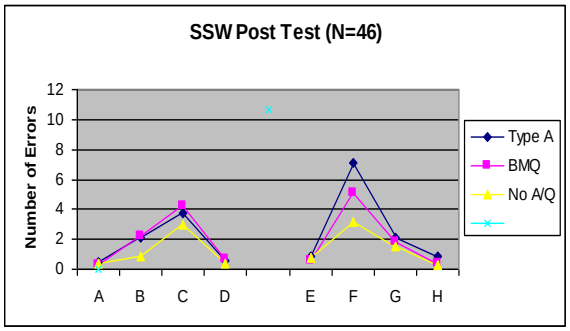

Figure 2. Post test performance on SSW for the 3 subgroups.

Following therapy each of the conditions improved but most of all column F. This makes the Type A and BMQ groups look more alike (although not far from the No A/Q. One explanation for the improved F is that the therapy received improved INT skills as well.

I suspect that this is true, the Phonemic Training Program (PTP) that was developed for DEC problems may at the same time provide INT (auditory-visual) training. In this therapy the child hears phonemes and responds by pointing to the correct letter. Over time we often see increased accuracy and speed of response that might, in part, reflect improved INT.

In order to test this hypothesis, I looked at the BMQ post-test assessment by parents/teachers. For the BMQ items that were of initial concern, the parents were asked to judge any positive or negative changes before and after therapy. If INT improved, especially for A-V & Dyslexia, that would suggest to me that the improvement might well be due to PTP.

Change following therapy was scored on a 1-7 scale (7= excellent improvement, 6= moderate, 5= slight. A-V Integration had a mean rating of 6.2, Dyslexia was 6.0 and Reading/Spelling Severe was 6.8. Thus, the apparent improvement in INT (as well as DEC) might have resulted from the PTP which, in turn, was noted by the parents and teachers on the BMQ.

To check the validity of the combined (Type A and BMQ) approach I used 3 calculations to help validate our findings. **a)** Larry Medwetsky (Feb. 2005, SSW Reports) suggested RC & LC scores be compared if the LC was beyond the limits of normal (NL). Then the 2 scores are compared to their NLs and if the LC is further (poorer) from the NL than RC it would be considered an INT sign. **b)** Because the REF items were rather similar for the 3 groups (see Fig. 3) I compared column F vs. G (criteria: 7 yr olds: F≥4; ≥8 yr olds: F≥5), **c)** & tried F vs. E, G, H (F≥EFG). Table 3 shows percent positive results for the 3 methods.

Method	a) RC/LC	b) F/G	c) F/EGH
Type A	94	100	100
BMQ	41	18	53
No A/Q	46	8	62

Table 3. Percent positive responses for 3 methods

There was a distinct advantage for methods b & c over Larry's method because the rules I used were based on this particular population and not applying them to a different group as is the case for 'a'. Nevertheless, each approach suggests additional INT (we already assume all Type A are INT) but mainly a & c. So now the question is which one looks best? My pick is b, because there were more INT cases for BMQ than No A/Q (that's logical) and because the other 2 approaches add so many INT cases. We don't know how any of these will hold up with different populations, but so far b seems to add a conservative number of INT cases and the BMQ group contributes more than No A/Qs.

Summary and Conclusions

We have depended on the Type A because we could be quite confident that it was a good INT sign; however, it might not be so sensitive as to identify as many cases as we can. Past attempts did not seem to offer the solution. We are now studying 3 approaches that might help. Because there is no Gold Standard we must proceed carefully to avoid a serious mistake.

The BMQ takes a completely different look at APD and INT. The BMQ seems to be a helpful adjunct for the Buffalo Battery. Although it is just a questionnaire, it lends support for INT by supplementing Type A. The BMQ and these new calculations, when positive, leave open the question of the INT category for further consideration even when Type A is not positive.

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