SSW Reports

• APD Assessments for Children with Cognitive Limitations

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Can Children with Cognitive Limitations Be Assessed for APD?

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Many times, audiologists assessing people for auditory processing come across cases in which a client may have been diagnosed with a cognitive deficit. Some audiologists believe that one cannot assess the auditory processing abilities of clients with cognitive limitations. Yet, there is nothing preventing an audiologist from completing an auditory processing evaluation on a person with a cognitive impairment. Even the ASHA Working Group on Auditory Processing Disorders in their 2005 technical report states that "The audiologist should be sensitive to attributes of the individual…..[including] other cognitive factors…." The report goes on to discuss that the audiologist should be aware of "….the influence of mental age……" Thus, there is nothing that states we cannot assess auditory processing in clients who have cognitive limitations. The following is a presentation of three cases to illustrate the value and importance in assessing APD in clients with cognitive limitations.

Considerations Needed in Assessing Clients with Cognitive Limitations

Before assessing a client who is known to have cognitive limitations, we need to take one very important factor into consideration. That is related to whether the failure on tests of APD is due to problems processing the information or to primary cognitive limitation issues. The ASHA Technical Report gives away the answer in solving this question. As stated above, we must consider the person's mental age. This is interpreted to mean that any problems on APD tests could be due to APD problems or to cognitive limitations because the person's cognitive abilities are below their chronological age, but we usually compare their findings with norms based on their chronological age. The following two cases will help demonstrate the value of using a chronological age *and* a mental age comparison when assessing clients with cognitive limitations.

The First Two Cases

As a professional specializing in assessment of children, adolescents, and adults for APD issues, I have seen a number of clients who have been diagnosed with cognitive limitations, often called mental retardation. Two cases serve as excellent examples of the value of using both a chronological age (CA) and mental age (MA) comparison in interpreting the test findings.

Both cases were male students from the same secondary school special education program for students with mental retardation. The first boy was 14 years old and was in the middle school program while the second boy was 16 years old and was in the high school program. The students were not performing up to the parents' expectations, and both sets of

parents were in a "battle" with the school district that the schools were not providing appropriate educational programs for their sons. Both the parents and teachers complained of "listening problems" with these two boys. If a special education teacher complained of listening problems, and the teacher is working with cognitively limited students, then the listening problems should be greater than those expected for other students with similar cognitive limitations and, thus this was checked out to see if any APD was present.

APD Test	Measure	Raw Score	CA Norm	MA Norm
WRS	Q/N Difference RE	20%	17%	22%
	Q/N Difference LE	20%	17%	23%
SCAN-3-A	Filtered Words	18	SS = 5	SS= 7
	AFG +8	34	SS = 3	SS = 8
	AFG +12	34	SS = 3	SS = 9
	CW-Directed Recall	27	SS = 2	SS = 8
	CS	0 could not test – unable to repeat sentence		
	TCS	0 could not test – unable to repeat sentences		
SSW	8CN = 2-3-6-2 2-8-6-1		-2SD/-1SD	-2SD/-1SD
	RNC	3	1/1	6/4
	RC	9	2/2	13/10
	LC	14	4/4	19/15
	LNC	4	1/0	8/5
	Ear Effect	LH-4	3/2	10/6
	Order Effect	0		
	Type A	LC-2	3	3
	Reversals	3	1/1	6/4
PST		0 could not test - did not understand task		

Table 1. APD test results for a 16 year old boy identified with cognitive limitations by his school district. Results are compared with norms for his chronological age (CA) as well as his mental age equivalency (MA) of 6 years old.

APD Test	Measure	Raw Score	CA Norm	MA Norm
WRS	Q/N Difference RE	40%	17%	27%
	Q/N Difference LE	44%	17%	30%
SCAN-3-A	Filtered Words	14	SS = 4	SS=7
	AFG +8	14	SS = 1	SS = 3
	AFG +12	24	SS = 1	SS = 3
	CW-Directed Recall	9	SS = 1	SS = 3
	CS	25 (all from RE)	SS = 1	SS = 7
	TCS	38	SS = 1	SS = 7
SSW	8CN = 2-10-18-4 4-21-16-4	(1-4-8-2 1-10-8-1)	-2SD/-1SD	-2SD/-1SD
	RNC	6 (2)	1/1	3/2
	RC	26 (12)	2/2	14/10
	LC	39 (18)	4/4	14/11
	LNC	8 (3)	1/0	4/3
	Ear Effect	LH-11	3/2	6/4
	Order Effect	LH-5	2/1	8/4
	Type A	LC-3	3	4
	Reversals	0		
PST		0 could not test - did not understand task		

*For CA norms used all 40 items (for MA norms used only first 20 items)

Table 2. APD test results for a 14 year old boy identified with cognitive limitations by his school district. Results are compared with norms for his chronological age (CA) as well as his mental age equivalency (MA) of 5 years old.

A comprehensive battery of APD tests was used with each of these boys. They were the usual tests of APD most of us use that involve repeating words or sentences. However, neither boy was able to complete any phonological processing tests such as the Phonemic Synthesis Test (PST) even after numerous examples and practice items were tried. Thus, it was identified that neither student was able to complete these tests so that phonological processing was not able to be assessed. Even the use of a picture pointing phonological processing test (the picture pointing version of the PST) was not able to be completed without random guessing. The task was too complex for the boys to comprehend. This went along with the fact that only sight reading was being used in the educational program since phonics based reading, even at the preschool and kindergarten level, was found to be too difficult for either boy to handle.

Results of baseline measures (e.g., WRS in quiet), using CA norms, were completed. The boys passed the WRS in quiet task and one boy (14 years old) passed the sentence repetition task (BKB Sentences in quiet with no distortion) making no errors in repeating these sentences. Thus, problems on the APD tests that involve word recognition and repetition would not be related to either boy's inability to repeat words. However, only the 14 year old was able to be assessed validly using sentence material.

Using their CA values and comparing their results for the valid APD tests, both boys failed all of the measures of APD. If we merely used this normal procedure for assessing APD, we could conclude that both boys have APD problems in all areas assessed. However, if we try to pull out cognitive factors we could see whether the problems were due to cognitive limitations or true APD problems.

To do this, I then compared their test findings to norms based on their mental ages (MA). This was done by taking their best IQ values and completing the following simple formula: IQ multiplied by the chronological age divided by 100 equals the mental age. For example, the IQ for the 14 year old and the 16 year old were the same, 40. Thus, 40 divided by 100 = .40; and .40 times the CA yielded the following. The 14 year old boy had a MA of 5.6 years while the 16 year old had a MA of 6.4 years. I then re-evaluated all of the valid APD scores compared with these five year and six year old norms.

Results for the 16 year old indicated that he passed all of the APD tests using six year old norms. Thus, it was concluded that his failure on the APD tests reflects his cognitive limitations. In contrast, the 14 year old passed all of the APD tests except for tests of speech-in-noise and tests of auditory integration. Thus, he has problems with auditory processing related to listening with background noise and because of lexical (word) integrative processing. Furthermore, these problems are not considered due solely to his cognitive limitations, but to specific APD problems that are present even using his mental age value. Therefore, the school program for the 16 year old is likely providing him appropriate education related to his cognitive limitations, while the school program for the 14 year old is not appropriate since it provides absolutely no support and training services (such as speech-language services) to work on lexical integration and the boy is functioning in a typically noisy special education class.

The first thing the school did was to provide this 14 year old with a personal FM system. Within weeks after using the system, all of the teachers saw very significant improvements in his performance and functioning.

The Third Case Study

The writing of this article was prompted by this third case. This was of a 20 year old high school student diagnosed at the age of six by her school district as meeting the criteria for mild mental retardation and, thus, having her placed in a special education program for students with cognitive limitations. Periodically since the age of six, she had other psychological assessments which all confirmed the cognitive limitations. Her most recent psychological testing indicated an overall IQ of 56 with a performance or visual/visual-motor performance IQ of 64. Thus, her best IQ is 64, and, using the formula from above, her MA would be about 12.8 years. What is important to note, then, is that the norms for most of the APD tests do not differ for a 20 year old vs. a 12 year old.

APD Test	Measure	Raw Score	CA Norm	MA Norms*
WRS	Q/N Difference RE	12%	17%	17% (21%)
	Q/N Difference LE	16%	17%	17% (22%)
SCAN-3-A	Filtered Words	25	SS = 7	SS= 8 (same)
	AFG +8	38	SS = 9	SS = 10(same)
	AFG +12	39	SS = 11	SS = 13(same)
	CW-Directed Recall	30	SS = 3	SS = 6 (same)
	CS	64	SS = 8	SS = 10(same)
	TCS	57	SS = 8	SS = 12(same)
SSW	8CN = 1-2-5-2 2-7-2-2		-2SD/-1SD	-2SD/-1SD
	RNC	3	1/1	1/1 (1/1)
	RC	4	2/2	2/2/ (3/2)
	LC	12	4/4	4/4 (6/4)
	LNC	4	1/0	1/0 (2/1)
	Ear Effect	LH-3	3/2	3/4 (4/2)
	Order Effect	0		
	Type A	LC-2	3	3 (3)
	Reversals	6	1/1	1/1 (2/1)
PST	Quantitative	20	23	23 (21)
	Qualitative	19	22	22 (20)
CTOPP Elision		4	1	2 (2)
	Blending Words	6	4	5 (5)
	Blending Nonwords	4	4	5 (6)
	Segmenting Words	2	4	5 (5)
	Segmenting Nonwords	2	2	4 (4)
	Nonword Repetition	10	7	8 (8)
	Phoneme Reversals	1	3	5 (5)

Failed Order L/H
ALL conditions on SSW – FW – CW – NOT CS – Reversals – PST + CTOPP
*Norms presented for 12 year old (11 year olds)

Table 3. APD test results for a 20 year old girl identified as mentally retarded by her school district. Results are compared with norms for her chronological age (CA) as well as her mental age equivalency (MA) of 12 years old.

On the baseline measures, this young woman passed all of the measures using the adult norms. She was able to recognize and repeat words, sentences and phonemes with no problems. Thus, all of the APD tests were felt to be able to be administered with valid results.

My first expectation was that she would fail all of the APD tests. I was surprised! She passed many including the measures of speech hypersensitivity and auditory distractibility (i.e., speech-in-noise); she demonstrated no organization problems, no basic phonological processing problems (using other measures not merely the PST). What she did fail were assessments tapping into areas this professional called lexical extraction which would be a part of the "decoding" area in other models such as the Buffalo model. However, where the decoding category is typically viewed as a problem at the phonemic level, I developed a model/approach that differentiated decoding at the phoneme level vs. decoding at the word or lexical level calling both "extraction" instead of decoding. She also failed in the category of phonemic integration which involves higher level phonological processing not merely the blending assessed by the PST (a test she passed). She also failed for the order effect L/H which is interpreted to be a problem getting information into the memory store and, in this woman's case, a problem secondary to the lexical extraction deficit found. Thus, the primary reason for her having problems processing auditory-verbal information is because of the deficits with lexical extraction and related memory and with phonemic integration. All, yes, all of the other areas of auditory processing were found to be normal using the adult norms.

To be on the safe side, I decided to look at her results as if her MA were 11 years, at least one year below her calculated MA. The findings were the same. She passed with slightly better results all of the same tests and areas of APD she passed using the adult norms, and failed still all of the measures of lexical extraction, phonemic integration, and memory input. Thus, it was concluded that her APD problems were **not** due to her diagnosed cognitive deficits.

Then came the interesting part of this case. The school district refused to accept my assessment and conclusions because the district's audiologist claimed "You cannot assess auditory processing in a student who has cognitive limitations, even mild mental retardation [M.R.]. All of the findings are merely a reflection of her mild M.R." The woman's attorney decided to sue the school district under the IDEA. I was called in as an expert witness.

I presented essentially the same arguments put forth in this paper. I explained that my report reflect analyses of her findings using both her CA and one year below her MA. The school district's attorney then asked me, "Then, why does the school district audiologist testify that you cannot evaluate a student who has cognitive limitations including mild M.R.?" My answer was simply, "I don't know from where she got that idea?" I even cited the ASHA information presented earlier in this article. Then, I made a statement to explain the cognitive factors and how I chose to use her MA. I discussed that psychological tests of intelligence (IQ) are based on two factors. Half the test is verbally based and the other is visual and visual-motor based. Then I said what I could not believe, "But, even the visual/visual-motor parts of the IQ measures use verbal instructions and verbal feedback…." The school district's attorney then said to me, "Are you saying that all of the IQ measures are verbally based and would require normal verbal comprehension?" It then struck me what I really was saying, and I responded, "No, the actual test items and responses may not require listening or speaking, but often the psychologist

says to the person, 'Which one is different?' for example when measuring visual discrimination tasks on so-called non-verbal IQ measures."

Yes, we have to remember that even so-called non-verbal IQ measures often involve the abilities to process what the evaluator is saying during the instructions for the subtests, during practice items, and even when presenting some of the test items. Fortunately, the lawyer for the young woman caught on, and during his re-examination asked me to clarify how a person with an auditory lexical processing deficit might fail IQ measures even so-called non-verbal IQ measures. My response was that the presence of an APD, especially with lexical extraction, could lead to a lower test finding than the person's actual cognitive abilities.

The conclusion of this case was that the hearing officer found in favor of the school district, ordered a total, complete non-verbal IQ measure to obtain an evaluation of the young woman's "true" cognitive abilities. I received an email from the woman's mother. She went to a colleague of mine for the non-verbal IQ testing and was found to have her best IQ being 79, lower than normal, no question, but much higher than the best IQ of 64 from the school district's IQ measure or one standard deviation higher.

So, should we measure APD in clients with cognitive impairments? Yes, to identify whether cognitive or APD factors really are the cause of their listening and processing difficulties. Also, our test outcomes might help push school districts to obtain appropriate, non-verbal cognitive measures for these clients. In this young woman's case, she has been enrolled in an intensive, one-on-one educational program to bring her to the level where she will be entering a vocational training program in the fall preparing her to enter the workforce in some area of medical assistantship. She will be achieving her dream!

Reference

ASHA Working Group on Auditory Processing Disorders (2005). (Central) Auditory Processing Disorders: Technical Report. Rockville, MD: ASHA. [Available on-line at: http://www.asha.org/docs/html/TR2005-00043.html