

## Auditory Processing Disorders, Visual Auditory Response Time Integration

**From:** International Mail List for Pediatric Neuropsychology [mailto:PED-NPSY@LISTS.UMN.EDU] **On Behalf Of** Teresa Bailey  
**Sent:** Monday, February 02, 2009 22:24  
**To:** PED-NPSY@LISTS.UMN.EDU  
**Subject:** Re: [PED-NPSY] Auditory Processing Disorder p.s.

I agree with all of you about the problems of persons diagnosing only what it is they offer treatment in, and not referring for more comprehensive evaluations. I've seen many neurologists refer to OT, but never have seen an OT suggest neurological evaluation, even when there are some concerning findings, although I'm sure must happen. When I refer my patients to an audiologist for APD evaluation, I tell the family that some of the treatments they may be offered doesn't have much real research behind them, and that no one has ever called me back to say it changed their kid's life.

On the other hand, I often get excellent feedback about how the APD evaluation results and report explain things that otherwise weren't hanging together. Families are relieved to learn that it's not a matter of poor motivation on the kid's part, and that there's nothing "wrong" because the kid failed to respond as expected to stimulant medication (which is usually why they're referred to me to begin with). The behavioral changes implemented by the adults toward the child often make things go very well once there is a coherent context for understanding why the kid is not taking in orally presented information very well, given that they have good vocabularies and can read.

My point in pushing for careful assessment of auditory processing, whether by audiology or neuropsychology is to deal with the differential diagnoses of ADD/ADHD, receptive language disorder, and language-based LDs? By much of the argumentation, and the cases on which I see for 2nd and 3rd opinions, neuropsychology is as guilty as any other profession, only we wield the ADD/ADHD/LD hammer more frequently than other professionals. Yet most of what we recommend doesn't cure any better than the other questionable therapies-- we just describe it from a more integrated position and don't often use the word, "cure". Many of the neuropsychological and psycho-educational reports I review gloss over important data, either burying moderate to extreme outlier subtest scores within an "average" index score, or simply failing to address data that doesn't fit and even argues against the proffered diagnosis.

Steve points to the difference in auditory and visual response times, and

they are important on several levels. First we are anatomically configured as sight-based predators with eyes facing forward, responding on average more quickly to visual stimuli than to auditory stimuli. We can't shift our ears to localize ambiguously located sounds, except by turning our heads, which takes quite a bit of time. On the IVA, there is a histogram of response times that includes a vertical red line showing the average response time for the individual's age and gender, and it has always been slower for listening than for looking. I am assuming since it is an integrated audio/visual task, that the times are co-normed on the same group, but I don't know for sure.

Also, there is a caveat for testing younger children, that prior to a particular age-- I think it's around 10, that kids may choose one modality over the other, because they aren't developmentally capable of switching sensory input modalities as efficiently as older kids and adults. So, when testing 6 year olds, it's not unusual to see one of the modalities appear with questionable validity, mostly because of omission errors when called upon to switch modalities. I think this has enormous implications for classrooms where kids are being required to take more notes at earlier and earlier ages, because they are being asked to do something-- look, listen, and write, that they may not be developmentally prepared to do. I find this data to be very compelling when making a case for a note-taker in 504 and IEP meetings.

Also, when I see histograms showing a kid routinely taking a second or more to respond to the auditory stimuli, it's pretty easy to see why they fall behind on following multi-step instructions given at a normal speaking pace, and can't take notes worth a darn.

I don't want to push my developing understanding of auditory processing to the extreme here. I think there is compelling evidence that there can be measurable abnormalities in the processing of auditory sensory signal input that result in interpretable test behaviors, with correlates in everyday educational, social, and employment functioning. If the information is going in incorrectly or inefficiently, I think that is a compelling scenario for explaining problems with academic, employment, and social output. If the auditory sensory signal input is incorrect, then the comprehension of language, and the behavioral response to language is not going to be what is expected.

We are clearly a long way from setting the lines of demarcation between signal input, language comprehension, expressive output, and behavioral responses, based on a degraded signal. Audiologists no more agree on an APD battery than neuropsychologists do about a consistent npsych set of tests, although having fewer tests from which to choose, they likely have a more consistent core battery than we do. They don't have any cures, and neither do we. Most of what we offer our patients are accommodations to

their reality. How many dysfluent readers ever achieve fluency? How many dyscalculic students ever automatize their arithmetic or understand basic algebra? How many ADD/ Exec. Fx. impaired students ever achieve consistent focus, planning, and organization? What happens when the medication and/or external supports are removed?

Except for tests expected to bring the publishers piles of money from large purchasers such as school districts, our scientific study sample sizes aren't all that different from theirs. We would all like to do the ideal study and settle the issue, but we are left doing the best we can with what we have to work with. My larger point is that just because we weren't taught about this area in graduate school or in our post-docs, doesn't mean that we shouldn't be looking at it now, and mine it for how it can inform our thinking about those all-too-frequent patients for whom ADD/ADHD/Dyslexia just doesn't fit the standard model, and look further to see if there is a sensory signal processing problem that is precisely at the brain-behavior interface. We probably can't fix it any better than we can anything else, but if we can provide a more coherent explanation for what is happening, we can help our patients and their families tell themselves a more coherent story about what they are up against, and find more focused ways of dealing with it than what is currently under the huge umbrellas of attention deficits, dyslexia, and executive functions. I'm for anything that gives us more diagnostic and explanatory precision. I'm hopeful that with more precision, we will be more likely to start curing some things for real, one of these days.

I know there are some audiologists and speech pathologists on the list-- it would be good to hear from them, too.

Best,

Teresa

Teresa Bailey, Ph.D., Ph.D.

Hi Karen!

Yep--you nailed it. I think we all see this sort of thing.

There was a time in our clinic at the U of MN when Audiology decreed that they wouldn't see a child for a "CAPD" eval until they'd seen us in neuropsych first--too many simple ADHD cases were getting referred to them for "CAPD evals." They, at least, were willing and able to discern ADHD

from something more auditory processing-based. Indeed, most of the cases sent to us for "pre-CAPD neuropsych evals" had simple ADHD, some had receptive language issues, and some relative few had something that we agreed was some kind of CAPD.

As I recall, the auditory T.O.V.A. was sensitive to that which we determined was CAPD--slower and more variable Response Time compared to more normal visual T.O.V.A.s, but I don't think this was ever examined systematically and I was not living and breathing T.O.V.A. at the time, so my memory may be selective. The task seems to become an auditory processing test for these cases, as the stimuli in the auditory TOVA are simple high and low-pitched tones and not words. We do see cases in T.O.V.A. clinical support where there is a history of attention problems, the Visual T.O.V.A. is normal, and the real impairment shows up on the Auditory T.O.V.A. I am inclined to call that evidence for something language or auditory processing related and recommend referral for that kind of assessment if the clinician is not equipped for it

I'd love to work with someone to do a more systematic study of receptive language, auditory processing, and the visual and auditory T.O.V.A. What a simple and useful dissertation project THAT would be! Do you know somebody who might be interested?

Related to this, I recently graphed the T.O.V.A. auditory and visual norms to compare the developmental curves and--WOW--it is very interesting to see the difference in RT across the two forms of the test. Lots more processing going on for the auditory T.O.V.A. in younger (less so in really young) children, but then you see the RTs converge by late adolescence. What's up with that!? I wonder how this relates to other aspects of development. I'll attach a graph of the means (should have +/-1 sd for each in here too, but I'm writing a "case of the month" for the T.O.V.A. newsletter right now, and am catching a plane early tomorrow, so here's something minimal).

Do note that it's two different samples (not normed at the same time), so there is that, but both are quite decent samples. This data spans age 6 to age 25 (which is where the TOVA-A norms end--Visual norms go from age 4 to 85).

Anyway, I think this is pretty interesting. Different curve-fits too, which I find quite interesting.

Regards,

Steve  
Director of Education and Research  
The TOVA Company

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On Feb 2, 2009, at 6:46 PM, Karen Wills wrote:

The major problem with this "diagnosis" is the "if you only have a hammer,  
everything looks like a nail" issue... If a particular kid happens to get  
evaluated by an audiology clinic in our area that specializes in providing  
(expensive) "APD therapy", the kid gets diagnosed with APD... if the same  
kid is seen by certain optometrists locally, he gets diagnosed with  
"convergence disorder" and billed for Vision Therapy.... if the same kid is  
seen by certain OT's locally, he gets diagnosed with "Sensory Integration  
Disorder" and billed for SI therapy... None of these professionals ever  
seems to consider the functioning that is "assessed" by any of the others.

Eventually, the kid may end up in neuropsychology, and (one hopes) will be  
evaluated from a more comprehensive perspective and get a diagnosis that  
factors in vision, speech, language, and movement... a diagnosis that, going  
by the base rates alone, is quite likely to be ADHD or LD, with or without  
fetal alcohol exposure... although sometimes something more exotic.

- Karen

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