

SSW Reports

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- Auditory Memory and Organization

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Phonemic Synthesis Training Program: A Speech-Language Pathologist's Secret Weapon

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Abstract

The Phonemic Synthesis (PS) therapy program has been used with great success for a long time. However, this case is particularly instructive because the child had great difficulty in overall receptive language skills including significantly decreased phonological awareness abilities that were resistant to our efforts until we turned to the PS program.

Introduction

The following is a case study illustrating one client's progress using the *Phonemic Synthesis Training Program*. This client was seen at Bloomsburg University's Speech, Language and Hearing Clinic. The clinic offers comprehensive speech, language and hearing services to the local community. The therapy in this case study was provided by graduate student clinicians under the supervision of a state licensed and ASHA certified Speech-Language Pathologist.

This case study concerns "Katie", a 9-year-old child, who has been coming to the clinic for services. Katie was initially seen at the

age of 6 for a Central Auditory Processing (CAP) evaluation. Her parents reported severe educational deficits and she subsequently repeated kindergarten. The CAP evaluation identified decoding and auditory memory issues. However, the confidence in those results was tempered because of Katie's inability to maintain an appropriate level of attention.

Results of the speech and language evaluation indicated moderate-to-severe receptive/expressive language and phonological awareness deficits along with moderate difficulties in pragmatic abilities. Speech/language intervention was recommended at the University clinic twice per week to address Katie's foundational language and auditory processing skills.

Prior to Katie's attendance at the University clinic, she was receiving learning support at school with speech and language therapy specifically concentrating on phonological awareness development to enhance literacy skills.

Initial Test Results

Initial speech and language testing at the University included administration of the *Clinical Evaluation of Language Fundamentals-Preschool (CELF-P)*. CELF-P results included standard scores ranging from a high of 8 (Formulating Labels) to a low of 4 (Recalling Sentences,

Word Structures). Percentile ranks ranged from a high of 25 (Formulating Labels) to a low of 2 (Recalling Sentences, Word Structures) for all areas tested. Informal phonological awareness abilities as related to reading and writing were conducted with extremely poor results.

Therapy: 2006 Fall Semester

In fall 2006, intervention initially focused on basic phonological awareness skills such as rhyming, segmenting and blending of words and phonemes using traditional methods (i.e., use of stimulus words given both auditorily and visually with either physical or verbal manipulation of the words or pictures). A visual support system was utilized throughout all tasks since Katie proved to be a visual learner. Auditory comprehension deficits were targeted in direction-following tasks, answering inferential/factual questions based on oral readings conducted by the clinician and identification of spatial and temporal concepts. Katie's preliteracy goals included identification of pre-primer sight words. She consistently attempted to segment sight words as opposed to utilizing her memorization skills when identifying sight words during therapy.

Therapy: Spring/Summer/Fall 2007 Semesters

Katie's hard work allowed her to meet several of her language goals; however, her phonological awareness skills remained static. Limited phonologic awareness success was achieved in therapy with little to no carryover of these skills to her general communication environments. As Katie progressed, she was introduced to various therapies, listening strategies and compensatory strategies to assist her in meeting her speech and language goals. All

of the intervention and strategies allowed her to continue making progress with language abilities. However, her phonological awareness and pre-literacy issues continued to impact her educational success.

Therapy: Summer 2008 Semester

During the 2008 summer semester Katie's graduate student clinician introduced her to the Phonemic Synthesis (PS): Blending Sounds into Words . Due to Katie's low performance on the CAP testing, Katie began lesson one of the PS program. The program was used for 15-20 minutes of each 50-minute therapy session with branching as indicated, based on Katie's level of success. A 5-minute segment of each therapy session was also devoted to verbal identification of pre-primer and primer sight words. As Katie completed the PS lessons, significant improvement in the identification of sight words was noted. Katie no longer felt she needed to "sound out" the words and was able to state each word efficiently as a whole unit.

Katie's overall ability to discriminate, segment and blend sounds/words improved dramatically. In addition, her listening skills began to improve as a result of the PS training program. Katie's overall phonological awareness goals improved considerably during the 2008 summer semester especially in blending, segmenting, rhyming, and manipulating phonemes.

Further, several of the goals achieved during the summer were maintained into the fall 2008 sessions. Katie made tremendous strides during the 2008 summer session. She was able to verbally identify a minimum of 40 functional sight words at the first grade level; it must be noted during the 2008 spring semester she displayed extreme

difficulty with pre-primer words (kindergarten level). She not only surpassed all expectations for pre-primer vocabulary during the 2008 summer semester, but also primer vocabulary which brought her within normal limits for sight words at her current grade level.

Katie's reading behaviors were severely impacted as a result of her decreased phonemic synthesis skills. Prior to the 2008 summer semester, Katie demonstrated a significant negative attitude toward reading. She displayed various negative non-verbal behaviors such as fidgeting, poor posture, and increased physical tension and frustration when asked to read aloud from developmentally- appropriate literacy material. After introduction of the PS training program, literacy probes were conducted periodically utilizing the same reading material for each probe. As the summer progressed Katie demonstrated less off-task behavior and an increased awareness of her posture along with an overt increase in her level of self-confidence in reading abilities.

Therapy: Fall 2008/Spring 2009 Semesters

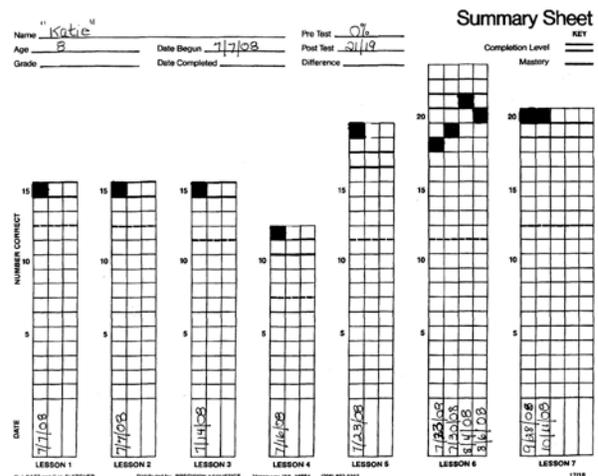
It was decided to continue with the PS program during the fall 2008 semester due to Katie's progression to Lesson 7 during the summer semester. A literacy probe was conducted at the beginning and again at the end of the fall semester. The Phonemic Synthesis test was also administered to determine her current level. Her quantitative and qualitative scores were within normal limits for her current age of 9. This was a tremendous improvement given three years previously she was unable to correctly identify any items on the test.

The fall 2008 semester allowed for Katie to make large strides in her phonological processing abilities. She demonstrated significant progress in her blending, segmenting, rhyming and manipulation of phonemes within words. Katie's parents reported that the improvements were being recognized in school.

Teachers were noting vast improvement in all of Katie's subjects (not just in language arts and reading). She was receiving grades of A's and B's which previously did not occur. During therapy sessions, Katie displayed calmness and a new level of self confidence when reading, listening to complex directions and in phonological awareness goals. When therapy concluded for the semester, Katie had advanced to Lessons 11 and 12 in the PS program, with evidence of generalization as reported by her parents and teachers.

Phonemic Synthesis Data

Figure 1: PS Summary sheet shows Katie's progress from Lessons #s 1- 7 and the number of trials within each. Mastery level was achieved in each lesson before moving to next level; the completion level was met



in #s 1-5 and again in # 7.

Summary Sheet

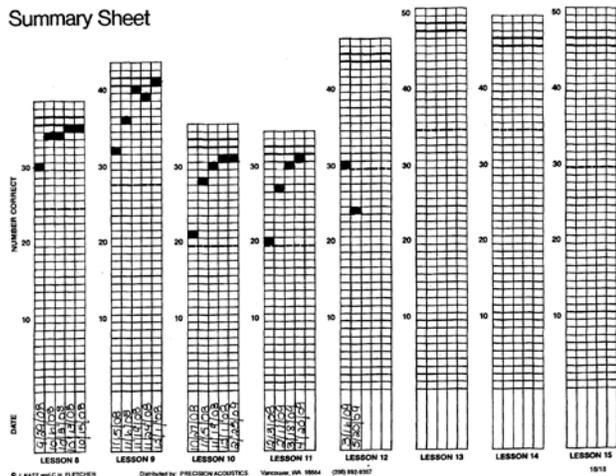


Figure 2: PS summary sheet indicating Katie’s progress for Lessons #s 8-12 and the number of trials within each lesson. Mastery level was achieved in at least one trial per lesson before moving on to next lesson. Completion level was attained in Lesson # 9.

Summary

Katie is just one of several clients that has been introduced to the PS training program as a therapeutic intervention tool at the Bloomsburg University Speech, Language and Hearing Clinic. The PS is a valuable assessment/remediation program to assist children with auditory processing deficits, especially decoding issues. The program not only facilitates improvement of phonological skills in those individuals with a decoding deficit; it has proven an exceptional tool for those with a myriad of diagnoses which include, but are not limited to neurologically-based learning disorders.

Graduate student clinicians using the PS program have provided positive feedback on all aspects of curriculum. The program allowed the student clinicians to concentrate on the client instead of the remediation methods. They were able to support the client by branching up or down in

complexity when indicated by Katie’s progress. Further, the clients enjoy the positive reinforcement, structured and predictable measured presentation of the target sounds incorporated into the PS program.

Katie’s case is simply a testimony to the success of a single individual; a great deal more research needs to be performed in regard to the use of the PS and its efficacy in treating individuals with communication disorders not limited to a primary diagnosis of a Decoding auditory processing disorder.

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Are Memory & Organization AP?
Jack Katz

Memory and Organization (sequencing) have been part of AP for a very long time and well they should be. Generally, Memory likely is only second in importance to auditory Decoding functions. I would rank speech-in-noise next and then sequencing on a par with Integration.

For these reasons I was very surprised to hear that some audiologists appear to be drumming memory and organization out of auditory processing! Why would anyone want to do that? Here is my understanding of their argument and my response.

Why they are not AP

At the Educational Audiology Association (EAA) conference in New Orleans in July; the 3rd version of the Bellis-Ferre APD Model was presented. This one specifically excludes both Auditory Memory and Organization (presumably sequencing). The rationale is that memory is pan-sensory and sequencing is an output (or efferent)

function and therefore not truly central auditory functions.

A counter argument

I think this is indeed a weak argument for discarding two such important auditory functions from AP. Larry Medwetsky (2009) points out that all of our behavioral tests in audiology and APD depend on higher order or sensory systems (e.g., language, memory, vision). So it is faulty reasoning to use as our criterion “pure” auditory because then we are left with precious little not only in AP work but in Audiology all together.

I prove to myself every day that memory and sequencing are indeed auditory processing. When I teach my patients by brief rote auditory drills to increase their memory spans for digits, words etc. I see the value of auditory training and the importance of auditory functions to auditory memory and sequencing. If these are simply pan-sensory and efferent functions and not auditory how can we be so effective in correcting these problems?

Ramifications of the “pure” approach

To follow the logic presented at the Bellis-Ferre presentation would endanger our entire profession. Most often the higher order or pan-sensory contribution makes our work meaningful in the world, but surely does not take away their central auditory nature. The other systems depend on auditory input and processing and therefore make AP important.

Is their approach not a dangerous precedent as well? What if other audiologists decide arbitrarily to remove other aspects of APD because they are not “pure” enough for them. Or, heaven forbid, what if SLPs or psychologists decide to take over other aspects of our profession using the Bellis-

Ferre rationale. They could rightly say that audiologists themselves say that “impure” auditory tests and functions are not AP or even audiology. How quickly would we lose vestibular function, educational audiology, lipreading, speech tests etc.?

At the New Orleans conference the presenter pointed out that it is likely that this is not the last iteration of the Bellis-Ferre Model. It is therefore my hope that in their future improvements that they will consider reconnecting with Auditory Memory and Organization.

Summary

- a) Auditory Memory and Sequencing are vital auditory functions that we depend heavily on for communication, learning and day to day living.
- b) They have been parts of audiology for many years even though we appreciated that they were not “pure” auditory but rather they involved other functions (just like other aspects of audiology).
- c) Audiologists should not jettison Memory and Organization because we may lose far more by those who follow such a narrow definition of auditory processing. And
- d) Auditory training has a potent effect in improving poor memory and sequencing function. I do not know if other forms of training will improve these auditory skills but I do know that auditory training does.

Some Recent Questions from our Readers

1. *Can an item have 2 (or more) Qualifiers?*

Yes, e.g., I think a person could have one word that is both a smush (sm) and perseveration (P). If it’s in a nearby item that would likely be a (P) and if there’s a combination of 2 item words then it would

also be a (sm). You may not be sure of such things so you need to use your best judgment.

2. *For those who are intellectually challenged; do you use mental age (MA) or chronological age (CA) when scoring?*

I use the regular CA because IQ accounts for very little of the SSW variance and some people with low IQs have normal SSW and SN scores (see Katz, 2009)! I think it's because the SSW and SN tests just require an echoic response. Usually, it makes no difference which one is used because their scores are so poor on the test battery. On the other hand, I believe that the PS test does require higher cognitive abilities so you could use the age norms based on MA if you wish, but in most cases it makes little difference.

3. *When a person has normal hearing, but a reduced WRS and a poor SN score, and when you subtract the noise from the quiet score the difference score is within normal limits, how do you handle that?*

If a person does poorly on the SN test we have good reason to believe that they have significant difficulty understanding in noise in life situations. That's what we are trying to find out. Now if the person with normal hearing also has a number of errors in quiet, it would be hard to blame it on a peripheral hearing loss, so the more likely possibility is that the WRS is a false positive or is due to a central problem (e.g., DEC). It is good form to recheck the quiet and/or the noise score at a time when you feel the person is not too fatigued or inattentive. This may resolve the problem. If not then it is a judgment call. I generally use the SN score without subtracting it from the WRS. My rationale is this: if the WRS errors are due to central factors then it would be counterproductive to 'correct' a central sign (SN) using another central sign as it makes the person look normal or more normal. What we can do is

use the SN score with the caveat that it might not be a TFM sign. If the BMQ or case history indicates little or no concern regarding SN then it might well be DEC or some other factor.

4. *If a person says for 'race horse street car' – 'street car race' and doesn't say the word 'horse' is that still a reversal?*

Yes, for about 10 years we scored *Reversals, Probable Reversals and Questionable Reversals* because we did not know if there was an error or an omission if it was still a reversal. Over that period of time we were convinced that the two error variations were very likely reversals, just there were other APD issues going on to cause the substitution or omission. The only accommodation is that we do not number the omission as there is nothing to number.

5. *If the person says 'snow fight foot ball' for 'snow white foot ball' would you consider that a smush or just an error?*

Either way it's an error, but whether the person was smushing and then got the next word 'foot' correct or that 'snow fight' was simply a logical substitution cannot be known. So you are left to your clinical judgment on that one. Most of the time, I assume that the /f/ was influenced by the other competing word. This would be a smush. If there was another smush on the test that would lend further support.

6. *What is the biggest diagnostic problem that you face?*

I would have to say it is when the person does quite well on the test battery, but the BMQ and Case History indicate that the person is having significant problems that we see in those with APD. The worst thing is to say 'he's basically okay' just because the person likely 'beat' the test. We see this in bright, hardworking people usually older children or adults. Delays and other compensations usually save the day. This question deserves a more thorough discussion.

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