

Speech-Language Pathology Services in Schools: Guidelines for Best Practice

2020 REVISIONS AT-A-GLANCE

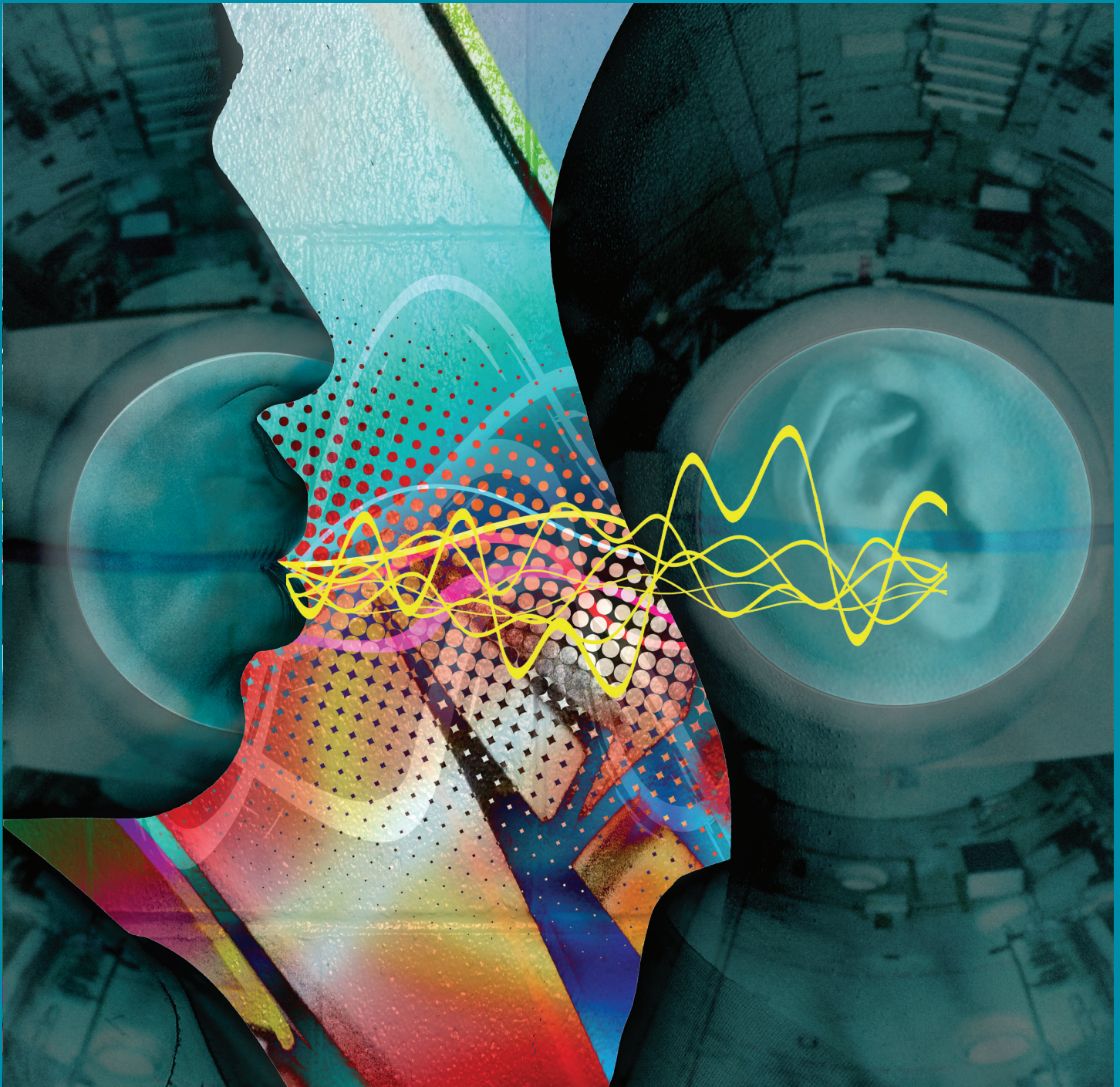
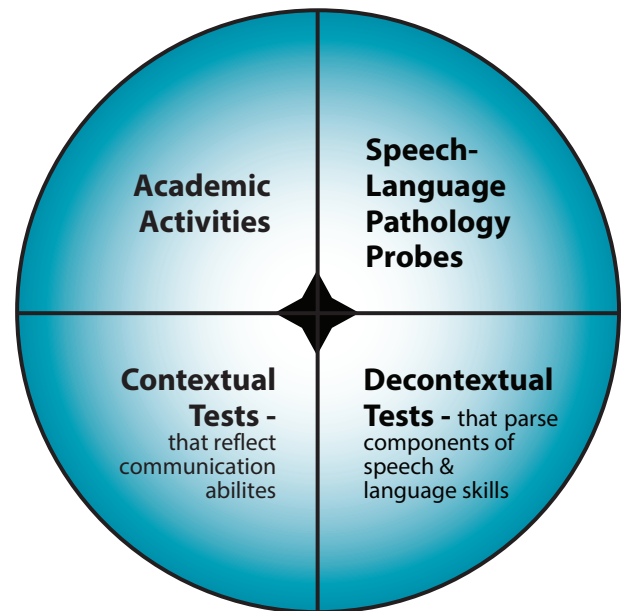


Figure 4. The Components of Comprehensive Assessment



environment and how their speech and language abilities impact educational achievement. For preschool-age children who do not participate in a formal school program, these data will be gathered with parents and caregivers. Preschool data should focus on participation in the home and community and developmentally appropriate activities.

The remaining two assessment sources, SLP probes and decontextualized tests, are specific to the field of speech-language pathology. Within the category of school-based data sources, half of the assessment information will be gathered through systematic observations in a variety of settings, while the remaining half will be gathered by examining measures of academic achievement that are common to all children as part of the education system. Within the category of speech-language pathology specific data sources, half of the assessment information should come from systematic observations of communication functions, while the remaining half may be comprised of tests of specific speech-language skills. The use of both observation and measurement for the four data sources is shown in Figure 5. Gathering data from each of these four sources will be described further in the next sections.

A comprehensive assessment provides a picture of a student's functional speech and language skills in relation to the ability to access the academic

and/or vocational program, and to progress in the educational setting. It does not rely solely, or even primarily, on norm-referenced assessment instruments to determine a student's communication abilities. Spaulding, Plante, and Farinella report, *"The practice of applying an arbitrary low cut-off score for diagnosing language impairments is frequently unsupported by the evidence that is available....(2006)"*

Instead, a variety of data sources should be used to gather valuable information about the student's use of his/her communication skills in school. A comprehensive speech-language assessment includes performance sampling across multiple skills, with multiple people using different procedures from varied contexts. It is essentially developing a database of a student's abilities across tasks and settings (Secord, 2002) to examine a student's communicative functioning in an educational program. Therefore, it is the responsibility of the school-based speech-language pathologist to assess the student using a variety of methods completed in a variety of contexts. For preschool through high school students, a comprehensive assessment should include evaluation of discourse skills through one or more of the

Comprehensive Assessment

A thorough and balanced assessment is mandated by special education regulation. This process is critical to determining the existence of a disability and necessary for educational planning for the student. "Assessment" refers to data collection and the gathering of evidence, whereas the term "evaluation" refers to the process of interpreting assessment evidence and determining the presence or absence of an impairment to inform eligibility decisions.

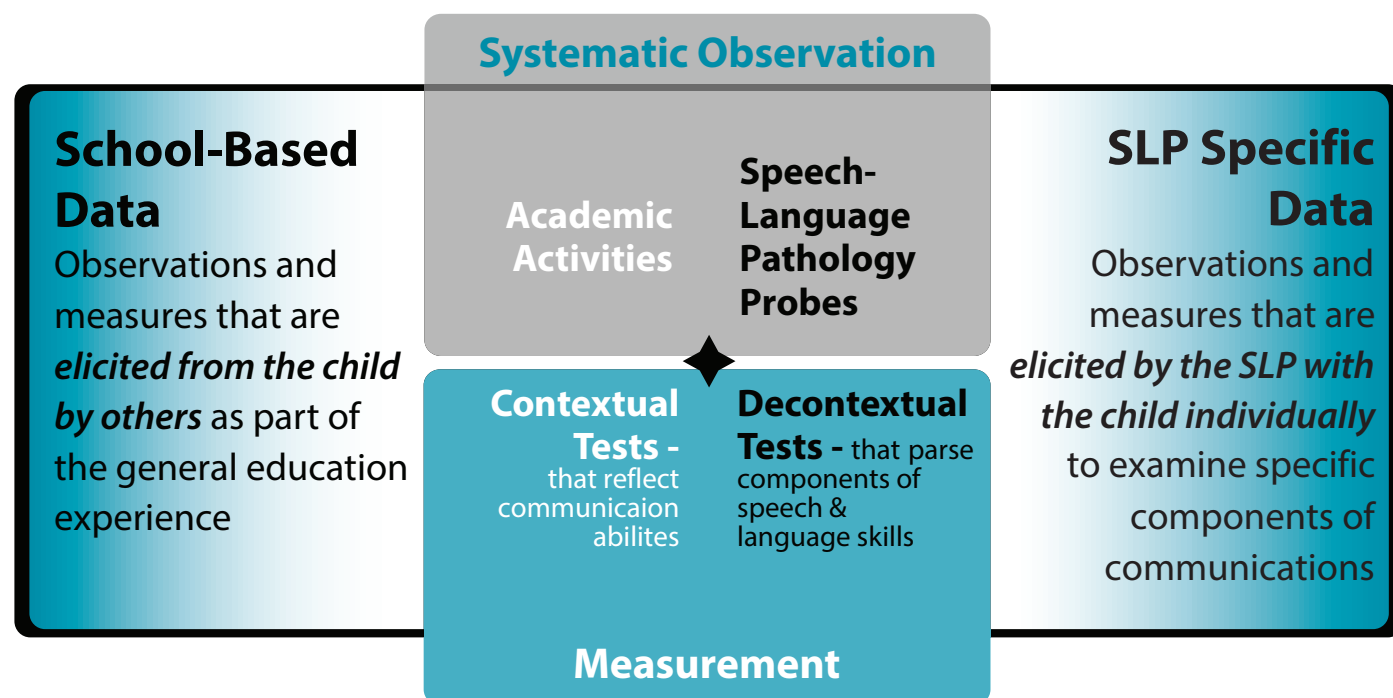
A comprehensive assessment requires four sources of information as shown in Figure 4. Two sources, academic activities and contextual tests, provide information that is available through every student's general school experiences. These school-based sources document how a child communicates in the school

following: 1) language sampling, 2) narrative sampling, and 3) assessment of students' metalinguistic/metacognitive skills. Methods of assessment for each of these three elements include criterion-based and norm-referenced measurements, observations, including in the classroom, and artifact analysis such as class worksheets and students' assignments. These assessment elements provide a baseline of performance, contribute critical information to how a student's communication skills affect his/her access to learning and the curriculum across the grades, and provide a means to document qualitative changes in the student's communication skills over time. Because learning in school is a highly metalinguistic and metacognitive environment, a student's ability with metalinguistic and metacognitive tasks should be assessed as part of a comprehensive assessment. Additional information on meta skills is provided on pages 24-25.

A comprehensive speech-language assessment is student-centered, descriptive, and functional. It should answer the following questions:

- What is the student's current level of communication development?
- Is there evidence of a language difference or dialect?
- What can the student do without supportive prompts and what can the student do with appropriate support and scaffolding? That is, what is the student's ability to learn speech and/or language, learn to communicate effectively for needs within an academic environment, and use speech and/or language effectively to access curriculum content across all grades in an educational environment?
- What is the functional result of the student's current speech-language difficulties as demonstrated by performance in classroom activities and assignments, curriculum benchmarks, and academic testing?
- What language skills does the student need to be successful in his/her educational setting?
- What challenges does the student have in the educational environment? In what situations do they occur?
- How do the speech-language skills adversely affect the student's educational performance?
- What strategies are in place to assist the student to develop his/her speech-language skills? How does use of these strategies affect the student's academic performance?

Figure 5. Comprehensive Assessment of School Communication Abilities



Auditory Processing Disorders

The central auditory nervous system develops and matures at least through age 12. Generally, persons with auditory processing disorders generally develop symptoms at an early age and may continue to experience difficulty with auditory tasks as they mature. Auditory skills build on one another, as shown in Figure 9. Auditory processing disorder is not one of the 14 federal disability categories outlined in IDEA. To qualify as a “child with a disability,” the student must have the characteristics of one of the existing 14 disability categories, demonstrate an educational impact as a result of the disability, and require specialized instruction. Students with auditory processing disorders must meet the Virginia criteria for eligibility in at least one disability category.

It is important to note that auditory processing is separate from language comprehension and is not a hearing acuity impairment. While children may have a clinical diagnosis of Auditory Processing Disorder or Central Auditory Processing Disorders (CAPD), Characteristics of Auditory Processing Disorders: A Systematic Review (de Wit et. al., 2016) concluded that current empirical evidence does NOT support APD as a specific auditory condition. The authors reviewed 48 published studies and suggest that intervention efforts should be “focused on cognitive or language skills rather than only auditory functioning” (p. 408). Auditory processing disorders and language disorders often share common characteristics, including

difficulties with attention, academic achievement, and social interaction (refer to Table 18). Due to the overlap between these impairments, evaluation teams should be mindful that these deficits may or may not be indicative of language disorders, auditory processing disorders, or co-occurring disorders of both language and auditory processing.

A student with a potential auditory processing disorder may have difficulty in one or more of the following areas:

- **auditory attention** – the ability to focus on an auditory signal (speech or nonspeech),
- **auditory memory** – the ability to remember information presented auditorily, either immediately or after a delay,
- **auditory discrimination** – the ability to hear differences between sounds (speech or nonspeech),
- **auditory figure-ground problems** – the ability to attend to the primary auditory message in the presence of competing auditory signals (e.g., background noise, other speakers), and
- **auditory cohesion** – is the ability to integrate information gathered auditorily.

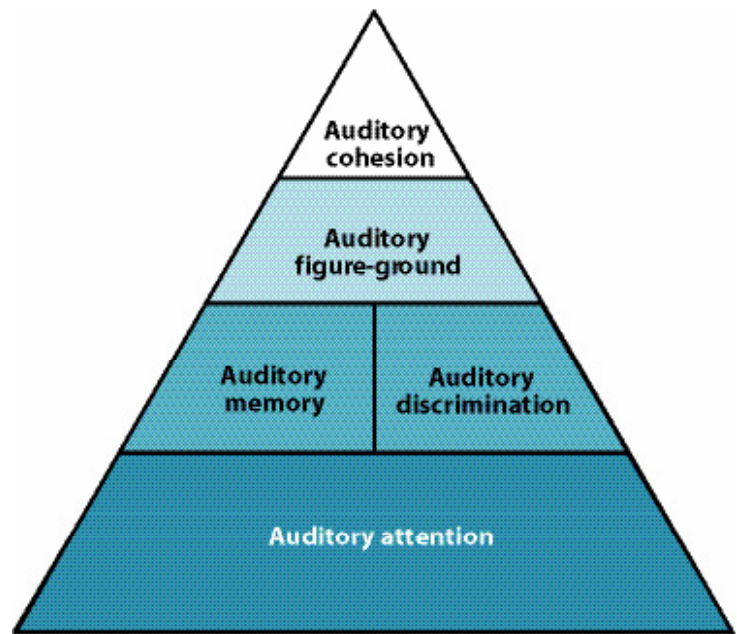


Figure 9. Auditory Processing Skills Hierarchy

Evaluation

When a child is referred for an evaluation to determine special education eligibility due to a diagnosis of auditory processing disorder or a potential disorder, and the special education director or designee decides to move forward with an evaluation, the team should consider certain assessment measures and medical information about the child.

The following procedures are offered as a best practice approach to completing an assessment of a child suspected of having an auditory processing disorder.

- Review developmental and student records. Identify onset of symptoms, developmental characteristics, and educational background. Review current medications and possible effects on performance.
- Select evaluation components to assess the student’s strengths and weaknesses in cognition, attention, and language.
- Gather sufficient assessment data to allow for analysis of all auditory skills (attention, memory, discrimination, figure-ground, and cohesion).

⁶ Auditory Processing Disorder may also be termed Central Auditory Processing Disorders (CAPD).

Table 18. Overlap Between Auditory Processing Disorders, Attention Deficit Disorders, and Speech-Language Impairments

Behavior	Auditory Processing Disorder	ADD/ ADHD	Speech-Language Impairment
Attention Concerns			
Distractibility	X	X	X
Difficulty listening	X	X	X
Difficulty understanding verbal information	X	X	X
Poor attention to auditory detail	X	X	X
Poor attention to visual detail		X	
Forgetfulness of routines		X	
Short attention span		X	
Need for repetition of information	X	X	X
Appears to 'daydream'	X	X	
Appears to lack motivation	X	X	
Delayed response to verbal requests	X	X	X
Frequently says, "Huh?" or "What?"	X	X	X
Often misunderstands what is said	X	X	X
Poor short-term memory	X	X	
Hyperactivity, Impulsivity and Emotional Concerns			
Fidgety - active hands and feet		X	
Often leaves seat		X	
Excessive movement		X	
Difficulty playing quietly		X	
Talks excessively		X	
Blurts out answers		X	
Restlessness	X	X	
Irritability		X	
Poor social interactions		X	X
Difficulty awaiting turn		X	
Interrupts or intrudes with others		X	X
Academic Achievement			
Difficulty following verbal instructions	X	X	X
Difficulty identifying, blending, and manipulating sounds	X	X	
Poor receptive and expressive language skills	X		X
Deficits in reading, writing, or comprehension	X	X	X
Decreased performance in noisy environments	X	X	X
Difficulty completing work		X	
Worry about academic performance	X		X
Frequently loses or misplaces items		X	
Poor organizational skills		X	

- An audiological evaluation conducted by a licensed audiologist with experience working with school-age children.
- Use questionnaires, checklists, and interviews to gather input from teachers and parents regarding student performance, distractibility, attentiveness, and compensatory strategies in both quiet and noisy settings.
- Complete multiple classroom observations with special attention to the following areas: classroom noise (i.e., in-class, outside-class reverberation), proximity to teacher, and comparison with other students in the class.

The student must meet the Virginia eligibility criteria for one or more of the disability areas in order to be eligible for special education and related services.

Management

Regardless of the eligibility determination, students with an auditory processing disorder will benefit from a multidisciplinary team approach to management. The team may include the general and special education teachers, speech-language pathologist, school psychologist, educational diagnostician, audiologist, and parent. Team members should recognize the significant overlap in the presenting characteristics of attention deficit disorder (with or without hyperactivity), speech-language impairment, and auditory processing disorders. It is important to address and rule out other common disabilities that may impact student performance (refer to Table 18). However, it is also important to note that auditory processing disorders may or may not occur comorbidly with other

Adapted from Chesterfield County Public Schools, 2000.

conditions, including those listed above.

Auditory processing disorder and auditory/language interventions: An evidence-based systematic review of 23 articles provided analysis of the research findings and revealed “no compelling evidence that existing auditory interventions make any significant contributions to auditory, language, or academic outcomes of school-age children who have been diagnosed with APD or language disorder” (Fey et. al., 2011). Children with auditory processing disorders will benefit most from management of three aspects of the following factors: environmental modifications, development of compensatory strategies, and direct treatment for specific deficits. The following summarizes some key management strategies that may be implemented for students in general or special education programs:

- Place the child away from noise sources and within six to eight feet of the speaker.
- Work one-on-one or in small groups.
- Reduce or eliminate background noises (e.g., audiovisual equipment).
- Keep doors and windows closed to reduce outside and hall noise; place windows and doors to the child’s back to put the noise behind the child.

Environmental modifications

Environmental modifications may be provided to students in general and special education programs. One common example of environmental modification is the use of sound absorbers in the classroom to reduce sound reverberation (e.g., curtains at the windows, acoustical tile ceiling, carpeting or pads/tennis balls on chair legs for noncarpeted floors, sound-absorbing room dividers and bulletin boards).

Strategies

There are a variety of strategies that may be implemented to assist a student in compensating for or improving skills related to the auditory skill weakness which also may be effective in supporting language difficulties and attentional concerns. Examples of strategies include:

- Develop a habit of previewing (announcing content), stating (presenting content), and reviewing (summarizing content).
- Teach the child how to advocate and manage his/her placement within the classroom to reduce the impact of noise.
- Teach the child how to maximize his/her visual strengths to compensate for auditory weaknesses.
- Consider the use of a personal or classroom FM auditory trainer (best used on a trial basis with pre- and post-testing to determine the effectiveness).
- Teach the child to ask for

clarification; to get organized and maintain a neat desk and calendar; to study aloud (when not interfering with others); to repeat what was said; to take accurate notes, using key words/concepts; and to note communication clues (teacher’s voice, time of day, setting).

- Teach memory enhancement activities (e.g., imagery, mnemonics, and drawing).
- Use of phonemic awareness, sequencing training, and language building exercises.

These strategies may be provided to students regardless of their special education status and may be implemented by the classroom teacher (especially environmental strategies), educational audiologist, speech-language pathologist, or other specialist. Strategies should be addressed, as appropriate in the child’s IEP or 504 plan.

For more information refer to the following references:

- Bellis, T.J. (2003). Assessment and management of central auditory processing disorders in the educational setting: From science to practice, second edition. Clifton Park, NY: Delmar Learning.
- Chermak, G. D., & Musiek, F. E. (Eds.) (2007). Handbook of (central) auditory processing disorder: Comprehensive intervention – Volume II. San Diego, CA: Plural Publishing.
- DeBonis, D, Moncrieff, D. (2008). Auditory Processing Disorders: An Update for Speech-Language Pathologists American Journal of Speech-Language Pathology Vol.17 4-18.
- Fey, M. E., Richard, G. J., Geffner, D., Kamhi, A. G., Medwetsky, L., Paul, D., Ross-Swain, D., Wallach, G. P., Frymark, T., & Schooling, T. (2011). Auditory processing disorder and auditory/language interventions: An evidence-based systematic review. Language, Speech, and Hearing Services in Schools, 42, 246-264. doi:10.1044/0161-1461(2010/10-0013).
- de Wit, E., Visser-Bochane, M. I., Steenbergen, B., van Dijk, P., van der Schans, C. P., & Luinge, M. R. (2016). Characteristics of Auditory Processing Disorders: A Systematic Review. Journal of Speech, Language, and Hearing Research, 59(2), 384-413. doi: 10.1044/2015_JSLHR-H-15-0118.

Websites:

- ASHA Web article
Understanding Auditory
Processing Disorders in
Children www.asha.org/public/hearing/disorders/understand-apd-child.html Overview
of terminology, diagnosis,
and treatment for auditory
processing disorders.
- National Institute on Deafness
and Other Communication
Disorders National Institutes
of Health www.nidcd.nih.gov/health/voice/auditory.html Overview of auditory
processing disorder causes,
diagnosis, and treatment.
- Colorado Department of
Education (Central) Auditory
Processing Deficits: A Team
Approach to Screening,
Assessment & Intervention
Practices (Revised 2008)
<http://www.cde.state.co.us/sites/default/files/documents/cdesped/download/pdf/apdguidelines.pdf> Guidelines
for the screening, assessment,
and intervention of (central)
auditory processing deficits
were developed by the Task
Force on Auditory Processing,
facilitated by the Colorado
Department of Education.

Speech Production Assessment Summary

An articulation/phonological impairment is characterized by an inability to use speech sounds that are appropriate for a person's age and linguistic dialect. Such errors in sound productions may interfere with intelligibility, social communication, and/or academic and vocational achievement.

Under IDEA, students must not be considered to have an articulation/phonological impairment based on characteristics that are consistent with cultural and/or linguistic diversity. Evaluating Children in U.S. Public Schools with Speech Sound Disorders: Considering Federal and State Laws, Guidance, and Research¹ (Ireland, McLeod, Farquharson, Crowe, 2020) reviews research and IDEA requirements.

Students who use American Sign Language or other alternate forms of communication (e.g., augmentative/alternative communication) should be assessed in their primary mode of communication. Children who evidence problems with hearing, structure and function of the speech mechanism (e.g., cleft palate), or motor speech difficulty (e.g., apraxia) should be viewed differently than those with more common developmental speech sound disorders. The presence of such etiological variables would suggest a high priority for intervention. After intervention, when the child has reached a plateau in his/her motor skills and has mastered compensatory strategies, the child may no longer be eligible for services.

This speech production assessment summary form provides an opportunity to review data from research-based SLP probes and measures as well as observation and data from academic settings. The team should review all data and identify the item (impact factor) that describes the student's performance for each column. This summary of the assessment data may be helpful as the team reviews the eligibility criteria for speech-language impairment (SLI), and provides data used to document the educational impact and/or need for specially designed instruction of the student.

NOTE: The presence of an articulation/phonological impairment does not guarantee the student's eligibility for special education. Virginia criteria, including educational impact caused by the impairment, need for specially designed instruction, and socio-cultural considerations must be met in order for a student to be eligible under IDEA for special education and related services.

Articulation/Phonological Considerations

Some areas of assessment may require additional consideration depending on the age of the student. The following guidelines may be helpful when:

Ages 3-5:	Intelligibility, phonological process usage, and stimulability are usually more important than social and vocational considerations.
Ages 6-9:	Speech sound production norms and stimulability are the typical focus. Social and academic variables should be given stronger consideration.
Ages 9 and up:	Stimulability and social and academic/vocational considerations are of high importance for this age group.

Evaluation Data

Evaluation data should be gathered from four areas for comprehensive assessment: Academic activities, academic tests and measures, SLP probes, and SLP tests and measures. Virginia regulations require multiple sources of information be used to determine eligibility. Teacher, child, and parent reports, interviews, norm-referenced tests, or checklists are not sufficient evidence by themselves and must be supported with additional data.

Comprehensive Assessment Data Sources

Academic Activities, Tests and Measures

Data sources include classwork, homework, and observations of oral, written and pragmatic language in school settings. Intelligibility should be assessed in multiple settings by at least one familiar listener. Data from achievement tests, PALS assessments, SOL, benchmark tests, pre-referral intervention data should also be reviewed. Any speech production errors that are evident in written work samples or artifacts should be noted (e.g., spelling errors that mirror verbal productions).

In addition to providing valuable insight into the student's abilities, this data also provides support for determination of

¹ Ireland, M., McLeod, S., Farquharson, K., Crowe, K. (2020) Evaluating Children in U.S. Public Schools with Speech Sound Disorders: Considering Federal and State Laws, Guidance, and Research. Topics in Language Disorders

educational impact which is required by Virginia regulation.

Intelligibility:

Teachers play an important role in documenting intelligibility in the education setting. An objective measure of intelligibility can help quantify the severity of the impairment, provides a meaningful measure of progress, and can help predict outcomes of speech function (Allison, 2020²). Ratings of intelligibility should be made using connected speech. The Intelligibility in Context Scale (McLeod, Harrison, & McCormack, 2012³) is a free parent-report tool that considers children's intelligibility with different communicative partners in over 60 languages. Typically developing four to five-year-old children are "always to usually" intelligible, even to strangers (McLeod, 2020⁴). The overall impact of decreased intelligibility (ICS score of 3 or lower) should be determined by the team with consideration of environment. Other evidence-based methods for documenting intelligibility are also permitted.

"Children above the age of 4 with intelligibility percentages below 66 percent may be 'at risk.' The children farther along the continuum toward unintelligible speech would be of greatest concern not only for communication success, but also potentially for problems in developing literacy skills." (Gordon-Brannan & Hodson, 2000⁵)

Additionally, research shows that teachers' academic, social, and behavioral expectations are lower for students who are moderately to severely unintelligible compared to typically intelligible students⁶ (Overby et al, 2007).

For young students who are highly unintelligible, Gordon-Brannan and Hodson (2000) suggest an alternative measure of intelligibility using imitated sentences. Some advantages of the imitated sentence measure are: (a) suprasegmental features and some syntactic/morphological and contextual cues are available, (b) it takes less time to administer and score than the continuous-speech procedure, and (c) the child's intended utterance is known by the examiner. Children are typically more intelligible in conversation (with a known context) than when imitating sentences. For additional information on intelligibility measures for children with motor speech disorders refer to Allison (2020).

Speech-Language Pathology Probes, Norm-Referenced Tests and Measurements

Data sources include speech sound production or phonological processes data, stimulability, and percentage of consonants correct. Oral motor examination should be completed to ensure that an underlying physical structure or motor issue is not interfering with speech production. Use of the Crowe & McLeod (2020⁷) normative data is recommended.

Data from pre-referral interventions and dynamic assessment activities should be included in this section.

Speech Sound (segmental) Production:

This factor should be rated if phonological processes are not present. Determine whether speech sound errors are developmentally appropriate by using the norms from Crowe & McLeod (2020). These norms represent a compilation of 15 studies of 18,907 children from the United States.

The Crowe and McLeod norms are intended to inform the first criteria question, presence of an impairment, and do not provide sufficient information to determine eligibility for special education. Teams must also gather data to document the need for specially-designed instruction when making eligibility decisions.

2 Allison, K. (2020). Measuring Speech Intelligibility in Children With Motor Speech Disorders. Perspectives of the ASHA Special Interest Groups, 1-12.

3 McLeod, S., Harrison, L. J., & McCormack, J. (2012). Intelligibility in Context Scale: Validity and reliability of a subjective rating measure. *Journal of Speech, Language, and Hearing Research*, 55, 648-656. [https://doi.org/10.1044/1092-4388\(2011/10-0130](https://doi.org/10.1044/1092-4388(2011/10-0130)

4 McLeod, S. (2020). Intelligibility in Context Scale: Cross-linguistic use, validity, and reliability. *Speech, Language and Hearing*, 23(1), 9-16. <https://doi.org/10.1080/2050571X.2020.1718837>

5 Gordon-Brannan, M., & Hodson, B. (2000). Intelligibility/severity measurements of prekindergarten children's speech. *American Journal of Speech-Language Pathology*, 9(2), 141-150.

6 Overby, M. Carrell, T., Bernthal, J. (2007) Teachers' Perceptions of Students With Speech Sound Disorders: A Quantitative and Qualitative Analysis University of Nebraska–Lincoln Language, Speech, and Hearing Services in Schools Vol.38 327-341 October 2007

7 Crowe, K., & McLeod, S. (2020, in press). Children's English consonant acquisition in the United States: A review. *American Journal of Speech-Language Pathology*.

The ages of acquisition represent the age at which 90 percent of children have typically mastered the sound. Because there is a normal range of acquisition and some children acquire sounds without treatment after the ages listed in these norms, incorrect production of a sound does not conclusively indicate an impairment. The standard deviation for the McLeod and Crowe normative data is 6 months to 18 months depending on the specific speech sound.

Noted Exceptions: For students producing **lateralized sibilants**, using norms to determine if therapy is warranted is not best practice because self-correction does not usually occur with lateralization. There is literature to support not using developmental norms to determine when to provide therapy for lateral /s/.

Phonological Processes:

When multiple sounds are in error, phonological processes provide a way to examine patterns of sound errors. Phonological processes go beyond individual phonemes to changes that occur regularly for entire classes or groups of sounds. Processes can be divided into three categories:

1. **Whole Word/Syllable Processes** change the syllable structure of the word by either taking away a sound(s), adding a sound(s), moving a sound, or a combination of these.
2. **Substitution Processes** substitute one sound for another, changing something in the manner, place or voicing of the sound.
3. **Assimilation Processes** are also known as harmony processes as one sound changes to become more like (or exactly like) another sound in the word.

Phonological processes simplify the production of speech and can be part of normal development. When processes continue beyond a developmental stage they may impact intelligibility. Some processes have been shown to have a greater relative effect on intelligibility than others. For example, research shows that final consonant deletion and stopping have a greater impact on intelligibility than velar fronting.⁸

Processes like **unstressed syllable deletion, reduplication, and assimilation** often disappear before age three, while **cluster simplification, gliding of liquids, vocalization and stopping** tend to persist the longest, up to age five and beyond. Only processes that are not developmental and occur in 40 percent or more opportunities should be noted on the assessment summary form. However, when there is evidence of at least one process that meets the 40 percent criterion, it is important to document any additional processes used more than 15 percent.

Descriptions and examples of phonological processes are provided in the special topics section of this document. The VDOE's [Professional Development for SLPs](#) webpage provides free online training modules on Phonological Processes.

Stimulability:

Stimulability is an important factor when determining the level of impairment and when **documenting the need for specially designed instruction**. A student who is stimutable for a misarticulated sound may benefit from a home practice program or general education classroom support. In contrast, a student who is not stimutable for the target sound may require direct intervention to acquire and generalize the sound.

Determine stimulability using the Miccio Probe (Miccio, A.W., 2002). Stimulability is determined for all error sounds, regardless of age appropriateness. Use of the Miccio Probe is best described in Miccio's article in the American Journal of Speech-Language Pathology.⁹ The following is a summary of the process:

1. Only sounds absent from the inventory are tested. The student is asked to imitate these specific consonants in isolation or nonsense syllables. Those sounds imitated correctly some of the time (at least 30 percent of possible opportunities) are presumed to be stimutable.
2. Provide the student ten opportunities to produce a sound: in isolation and in three word positions in three vowel contexts, [i], [u], and [ɑ]. The corner vowel contexts: a high (or close) unround front vowel, a high round back vowel, and a low unround vowel usually reveal any consonant-vowel dependencies.
3. If multiple sounds are absent from the inventory, the probe may be shortened by administering only one vowel context during the initial assessment.

8 Klein, E., Flint, C. (2006) Measurement of Intelligibility in Disordered Speech Language, Speech, and Hearing Services in Schools Vol.37 191-199 July 2006

9 Clinical Problem Solving: Assessment of Phonological Disorders. Volume 11, Issue 3. Pages 221 - 229. August 2002

10 Revisions to pages 87-95

Percentage of Consonants Correct:

Percentage of Consonants Correct (PCC) yields severity ratings on a 4-level scale and has been accepted as a valid index of severity in the field of speech-language pathology. A study by Johnson, Weston, and Bain found that an imitative sentence procedure provided PCC scores that compared favorably to those derived from spontaneous speech, and the imitative procedure was significantly faster than sampling spontaneous speech.¹⁰

Imitative Sentence Procedure

The abbreviated procedures below are based on the recommendations of Johnson, Weston, and Bain (2004) and Shriberg and Kwiatkowski (1982):

1. Imitative samples of 36 sentences with appropriate mean length utterance (MLU) for the student's age should be used. Present sentences using a conversational tone without exaggerated prosodic cues (Weston and Bain 2004).
2. Only consonants are scored, not vowels (i.e., only the consonantal /r/ is scored).
3. Mark errors directly on the list of sentences for efficient scoring. Only consonants are scored, not vowels (i.e., only the consonantal /r/ is scored).
4. Score only the first production of a consonant if a syllable is repeated (e.g., ba-balloon. Score only the first production of /b/).
5. Do not score consonants if a word is unintelligible or only partially intelligible.
6. Errors include substitutions, deletions, distortions, and additions. Voicing errors are only scored for consonants in the initial position of words.
7. If /ng/ is replaced with /n/ at the end of a word, do not score it as an error. Likewise, minor sound changes due to informal speech and/or selection of sounds in unstressed syllables are not scored as errors (e.g., /fider/ for "feed her," /dono/ for "don't know").
8. Dialectal variations are not scored as errors.
9. To determine the PCC value use the following formula:

Number of Correct Consonants	X	100 =	PCC
Total Number of Consonants			

Spontaneous samples should include 90 different words. If the child is so unintelligible that it is impossible to identify this number of different words, then a single word assessment tool may be used for analysis. Either imitative or spontaneous speech samples may be used when calculating PCC.

McLeod & Crowe Norms

Phoneme	Age of Acquisition		Phoneme	Age of Acquisition
/b/	2;7		/v/	4;3
/n/	2;9		/dʒ/	4;3
/m/	2;9		/s/	4;3
/p/	2;9		/tʃ/	4;6
/h/	2;11		/l/	4;6
/w/	2;11		/ʃ/	4;7
/d/	3;0		/z/	4;9
/g/	3;1		/r/	4;9
/k/	3;2		/ð/	5;9
/f/	3;2		/ʒ/	5;11
/t/	3;3		/θ/	6;5
/ŋ/	3;4			
/j/	3;10			

10 Johnson, C., Weston, A, Bain, B. (2004) An Objective and Time-Efficient Method for Determining Severity of Childhood Speech Delay *American Journal of Speech-Language Pathology* • Vol. 13 • 55–65

Student/Child: _____

Date of Birth: ____/____/____

Miccio Probe Date: ____/____/____

SLP: _____


**VIRGINIA
IS FOR
LEARNERS**
Prompt: "Look at me, listen, and say what I say."

Sound	Isolation	__i	i__i	i__	__a	a__a	a__	__u	u__u	u__	% Correct
p											
b											
t											
d											
k											
g											
θ											
ð											
f											
v											
s											
z											
ʃ											
ʒ											
tʃ											
dʒ											
m											
n											
ŋ											
w											
j											
h											
l											
r											

MICCIO STIMULABILITY PROBE

The following is a summary of the process described in Clinical Problem Solving: Assessment of Phonological Disorders (Miccio, 2002)

1. Only sounds absent from the inventory are tested.
2. The student is asked to imitate these specific consonants in isolation and nonsense syllables. Those sounds imitated correctly some of the time (at least 30 percent of possible opportunities) are presumed to be stimulable.
3. Provide the student 10 opportunities to produce a sound: in isolation and in three word positions in three vowel contexts, [i], [u], and [a]. The corner vowel contexts: a high (or close) unround front vowel, a high round back vowel, and a low unround vowel usually reveal any consonant-vowel dependencies
Pronunciation key: /i/ as in me, /a/ as in mom, /u/ as in hoop
4. If multiple sounds are absent from the inventory, the probe may be shortened by administering only one vowel context during the initial assessment.

1. Miccio, A. (2002) Clinical Problem Solving: Assessment of Phonological Disorders. AJSLP. Volume 11, Issue 3. Pages 221 - 229



VIRGINIA
IS FOR
LEARNERS

PERCENTAGE CONSONANTS CORRECT (PCC) IMITATIVE SENTENCE SCORING FORM

Student/Child: _____ Date of Birth: ____/____/____

PCC Probe Date: ____/____/____ SLP: _____

The abbreviated procedures below are based on the recommendations of Johnson, Weston, and Bain (2004) and Shriberg and Kwiatkowski (1982):

1. Imitative samples of 36 sentences with appropriate mean length utterance (MLU) for the student's age should be used. Present sentences using a conversational tone without exaggerated prosodic cues (Johnson, Weston and Bain 2004).
2. Mark errors directly on the list of sentences for efficient scoring. Only consonants are scored, not vowels (i.e., only the consonantal /r/ is scored).
3. Score only the first production of a consonant if a syllable is repeated (e.g., ba-balloon). Score only the first /b/.
4. Do not score consonants if a word is unintelligible or only partially intelligible.
5. Errors include substitutions, deletions, distortions, and additions. Voicing errors are only scored for consonants in the initial position of words.
6. If /ng/ is replaced with /n/ at the end of a word, do not score it as an error. Likewise, minor sound changes due to informal speech and/or selection of sounds in unstressed syllables are not scored as errors.
7. Dialectal variations are not scored as errors.
8. To determine the PCC value count the total number of consonant errors and use the formula below.

- | | | | |
|--|--|--|--|
| 1. We see one big dog.
/wi si wʌn big dɒg/ | 10. Watch them dance.
/wɒtʃ ðəm dæns/ | 19. One boy went behind
the balls.
/wʌn bɔɪ wɛnt
bəhaɪnd ðə bɒlz/ | 27. A lady climbed.
/ə ledɪ klaɪmd/ |
| 2. Mother talks on the
new phone.
/mʌðə tɔːks ən ðə nu
fɒn/ | 11. Now he can read.
/naʊ hi kæn rɪd/ | 20. She can't get inside yet.
/ʃi kænt get ɪnsaɪd jət/ | 28. All kids work.
/ɔl kɪdz wɜːk/ |
| 3. The baby has a pretty
toy.
/ðe beɪ hæz ə prɪti
tɔɪ/ | 12. He took dinosaurs.
/hi tuːk daɪnəsɔːrz/ | 21. I brought bugs and
things.
/aɪ brɒt bʌgz æn
θɪŋz/ | 29. Maybe this will move
now.
/meɪbɪ ðɪs wɪl muv
naʊ/ |
| 4. Mom says, "Sit down."
/mɒm seɪz sɪt daʊn/ | 13. Look, he can pull.
/lʊk he kæn pʊl/ | 22. Pieces are all over.
/piːsɪz ɑːl ovə/ | 30. They are very tired.
/ðe ɑː vɛrɪ taɪəd/ |
| 5. You'll be fine with
teacher.
/jʊl bi faɪn wɪθ tiːtʃə/ | 14. They just made cars.
/ðeɪ dʒɪs meɪd kɑːz/ | 23. He got cold.
/hi gɒt kɒld/ | 31. We'll rest awhile.
/wɪl rɛst əwaɪl/ |
| 6. Oh no, the door shut!
/oʊ noʊ ðə dɔː ʃʌt/ | 15. Everybody goes
around.
/evrɪbɒdi goz əraʊnd/ | 24. Time to clean up.
/taɪm tə klin ʌp/ | 32. He can open a door.
/hi kæn opən ə dɔː/ |
| 7. She looks happy.
/ʃi lʊks hæpi/ | 16. Now he wants water.
/naʊ hi wʌnts wɔːtə/ | 25. Put one flower on his
head.
/pʊt wʌn fləʊə ən ɪz
hed/ | 33. Come into the room.
/kʊm ɪntu ðə rum/ |
| 8. Some kids are playing.
/sʌm kɪdz ɑː pleɪŋ/ | 17. She fell down.
/ʃi fɛl daʊn/ | 26. We want more food.
/wi wʌnt mɔː fud/ | 34. The dog is watching.
/ðə dɒg ɪz wɒtʃɪŋ/ |
| 9. She is looking in.
/ʃi ɪz lʊkɪŋ ɪn/ | 18. What is so funny?
/wʌt ɪz so fʌnɪ/ | | 35. Move the bug off.
/muv ðə bʌg ɒf/ |
| | | | 36. Time to go home.
/taɪm tə go hom/ |

273 Consonants - _____ errors = _____ / 273 X 100 =

PCC SCORE: _____

Permission was granted by the American Speech-Language Hearing Association to reprint Appendix B from Johnson, C. A., Weston, A. D., & Bain, B. A. (2004). An objective and time-efficient method for determining severity of childhood speech delay. American Journal of Speech-Language Pathology, 13, 55-65.

Speech Production Assessment Summary

Name: _____ Date: _____

Review all assessment data prior to completing this form. For each assessment area column, circle the item that best represents the student's performance. When a valid comparison to a normative sample cannot be made or a student has significant impairments, consider completion of the Functional Communication Summary form.

	Academic Activities, Tests, and Measures		SLP Probes, Tests and Measures			
	Data sources include classwork and observations of oral, & written language in school settings	Intelligibility in connected speech across settings	Speech Sound Production		Stimulability (Miccio Probe)	Percentage of Consonants Correct (PCC) Imitative or Spontaneous
			1. Speech sound segmental production; Use McLeod & Crowe norms	2. Phonological Processes (Check only those not developmentally appropriate that occur in 40 percent or more opportunities)		
No Apparent Impact	Performs similarly to peers in most areas	ICS 4 or 5 Age 3: >75% Age 4: >85% Age 5+: >90%	Meets norms for acquisition of phonemes	No significant error processes.	Error sounds are 90% stimutable	PCC value more than 95%
Minimal Impact	Evidence of struggles with one or more areas compared to peers	ICS 3 or lower Age 3: 65-75% Age 4: 75 - 85% Age 5+ : 81-90%	1 - 2 sounds do not meet norms for acquisition	1 or more occur: <input type="checkbox"/> Gliding <input type="checkbox"/> CR with /s/ <input type="checkbox"/> Vowelization post-vocalic /r/ or /l/	Error sounds are 60 - 89% stimutable	PCC value of 85 - 94%
Moderate Impact	Evidence of struggles in most areas compared to peers	ICS 3 or lower Age 3: 50 - 64% Age 4: 65 - 74% Age 5 and up: 70 - 80%	3 - 4 sounds do not meet norms for acquisition	1 or more occur: <input type="checkbox"/> WSD <input type="checkbox"/> DEP initial <input type="checkbox"/> CR /l/, /r/, /w/ Velar fronting	Error sounds are 50 - 59% stimutable	PCC value of 50 - 84%
Substantial Impact	Evidence of very limited ability in most areas	ICS 3 or lower Age 3: <50% Age 4: <65% Age 5+ : <70%	5 or more sounds do not meet norms for acquisition	1 or more occur: <input type="checkbox"/> ICD <input type="checkbox"/> FCD <input type="checkbox"/> Stopping DEP final	Error sounds are less than 50% stimutable	PCC value less than 50%

Phonological Process Abbreviations:		
CR - cluster reduction WSD - Weak syllable deletion	FR - Fronting Gliding- Gliding of liquids	DEP- depalitzation of singletons FCD- final consonant deletion ICD- initial consonant deletion



VIRGINIA
IS FOR
LEARNERS

© 2018 Commonwealth of Virginia Department of Education

The Virginia Department of Education does not discriminate on the basis of race, sex, color, national origin, religion, sexual orientation, gender identity, age, political affiliation, or against otherwise qualified persons with disabilities. The policy permits appropriate employment preferences for veterans and specifically prohibits discrimination against veterans.