California Speech-Language-Hearing Association's Guidelines for the Diagnosis & Treatment for Auditory Processing Disorders

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I. INTRODUCTION

The California Speech-Language-Hearing Association (CSHA) appointed a task force in August 2002 to facilitate a more consistent approach to the diagnosis and treatment of children with central auditory processing disorders, known at that time as CAPD or APD. The following document was respectfully submitted in response to the charge. The Task Force consisted of the following members: Patricia Hamaguchi, M.A., CCC-SLP, Chair, June McCullough, Ph.D., CCC-A, Jean M. Novak, Ph.D., CCC-SLP, Deborah Ross-Swain, Ed.D., CCC-SLP, CSHA Peer Reviewers Appointed to the Task Force: Jann Wilkerson, M.A., CCC-SLP, Stephen D. Roberts, Ph.D., CCC-A.

In September 2006, the CSHA Board approved a request for this Task Force to re-examine this document and make suggestions for updating, as well as determine if this updated document should be forwarded to the State Dept. of Education for consideration. Participating in this process were: Patricia Hamaguchi, M.A., CCC-SLP, Chair; June McCullough, Ph.D, CCC-A, Jean Novak, Ph.D, CCC-SLP, and Deborah Ross-Swain, Ed.D, CCC-SLP.

In 2002, the task force participants agreed a priori to the following process. We reviewed the reports from nationally recognized conferences (ASHA 1996, the Consensus Conference on the Diagnosis of Auditory Processing Disorders in School-Aged Children; Jerger and Musiek, 2000; ASHA 2003, Auditory Processing Disorders Conference; ASHA 2004, Scope of Practice for Audiologists), the published guidelines of several states (Florida, Colorado, and Minnesota), and guidelines developed by area school districts (San Diego City, San Jose Unified, and Ventura). We examined published works by leading professionals in peer-reviewed journals and books (see References) and sought formal input from several leading professionals in the field of APD: Dr. Donna Geffner, Dr. Frank Musiek, and Dr. Teri Bellis. Dr. Bellis was the chair of ASHA's APD Working Group, and Dr. Musiek was also a member. The purpose of the review was to establish areas of agreement among the leading researchers and practitioners of this very specialized field. Areas of consensus form the framework for this document.

During the updating process in 2006, the participants of the Task Force had the additional benefit of referencing the ASHA (Central) Auditory Processing Disorders Technical Report and Position Statement (The Role of the Audiologist) that were published in 2005, after the release of this document and revised IDEA regulations that were released in 2006.

There are issues in auditory processing that have not been fully defined, described, or remain fairly controversial. In examining theses issues, we have endeavored to present what we feel is the prevailing wisdom regarding the diagnosis and treatment of this disorder. Additionally, within the state of California, there continues to be concern regarding the following issues:

1. A lack of audiologists who are trained and available for the assessment and treatment of this disorder.

2. A lack of speech-language pathologists who are trained and available for the assessment of related speech-language-auditory skills which are necessary for a differential diagnosis of C/APD, as well as the treatment of this disorder.
3. A lack of consensus within the professional community as to the effectiveness of some commercially-available programs which are marketed as remediating auditory processing deficits.
4. Continued confusion over the differences between diagnostic labels that are used by speech-language pathologists, audiologists, psychologists, learning consultants, and educational therapists to describe deficits related to spoken language comprehension, including "auditory processing" which is already currently described in CA educational codes as being the domain of the psychologist.
5. An increasing number of related professionals (occupational therapists, educational therapists, "trainers") who purport to perform therapy that is marketed as improving auditory processing, without appropriate audiological assessments or research to support their interventions.

We suggest this document be updated regularly, as new research or ASHA guidelines become available that may help further define or clarify some of the issues contained herein. The subject of auditory processing disorders is fairly new to our field, and as such, still evolving.

The task force hopes that the guidelines proposed below will promote a more uniform approach to the diagnosis and treatment of auditory processing disorders.

A. Definitions

In the ASHA 2005 (Central) Auditory Processing Disorders Technical Report, the terms (central) auditory processing disorder [(C)APD] and auditory processing (APD) were deemed to be synonymous terms. For the sake of clarity, we have chosen to use (C)APD in this document in order to maintain consistent terminology.The ASHA Technical Report defines (C)APD as "the efficiency and effectiveness by which the central nervous system (CNS) utilizes auditory information." Auditory processes are the auditory system mechanisms and processes responsible for the following behavioral phenomena:

- Auditory localization and lateralization
- Auditory discrimination
- Auditory pattern recognition
- Temporal aspects of audition, including temporal resolution, temporal masking, temporal integration, temporal discrimination (e.g. gap detection) and temporal ordering
- Auditory performance decrements with competing acoustic signals
- Auditory performance decrements with degraded acoustic signals

.
(C)APD may be associated with difficulties in listening, speech understanding, language development, and learning, but in its pure form, it is conceptualized as a deficit in the processing of auditory input. However, the complex interactive neural network makes a "pure" auditory processing disorder the exception, rather than the rule. The differential diagnosis of (C)APD from related problems, including AD/HD, language impairment, reading disability, learning disability, autism spectrum disorder, and reduced intellectual functioning is often challenging, but important since children with these disorders may exhibit similar behaviors. In many cases, the diagnosis of (C)APD co-occurs with dysfunction in other modalities.

Because there is such a wide range of auditory skills assessed, one child with an auditory processing disorder may present with a very different set of symptoms than another. Many professionals in the field (e.g., Katz; Bellis and Ferre) prefer to use subcategories when diagnosing an auditory processing disorder, depending upon the collective set of symptoms and test results. For this reason, some view an "auditory processing disorder" as a generic name for one of several specific disorders that have been further defined. While this Task Force does not advocate for one type of model over another, we recommend it may be helpful for the clinician to recognize that there are several different profiles for children who could all conceivably be defined as having an auditory processing disorder.

In summary, (C)APD is 1) a complex disorder; 2) should be differentially diagnosed from disorders with similar symptoms, 3) may co-occur with other related disorders and 4) is often viewed as a generic name for a heterogeneous set of auditory disorders.

B. Behaviors Present in (C)APD

Children typically exhibit a wide range of behaviors when presenting (C)APD, depending upon the nature and severity of the disorder, as well as the presence of other co-morbid conditions. However, the following list represents the most common symptoms:

- Poor listening skills
- Difficulty learning through the auditory modality
- Significant difficulty understanding or focusing in the presence of background noise or competing conversations
- Frequently says "huh" or "what"
- Difficulty with phonics
- Poor auditory memory
- Slow processing and response time to verbal stimuli (referred to as "auditory latency")
- Often complains the speaker is "talking too fast"
- Misunderstands what is said
- Difficulty understanding speech that has been muffled or distorted
- Difficulty "hearing" speech when presented via a PA system, telephone, or electronically

- Require repetition or clarification of age level appropriate directions
- Difficulty following discussions, particularly in large rooms, with poor acoustics
- Receptive language may or may *not* be weak when tested in a quiet, clinical setting
- Expressive language may or may *not* be weak; typical errors tend to be related to morphology, syntax, word retrieval and sequencing
- Mumbly or indistinct articulation pattern
- Misinterpretation or confusion of vocal inflection, emphasis, sarcasm, etc.
- Difficulty using context clues when a part of a verbal message is distorted or contains an unfamiliar word
- Reading, spelling and related academic problems
- Difficulty acquiring and articulating a foreign language in an academic environment

Additionally, children with (C)APD are often observed to exhibit symptoms of "auditory overload," which refers to the tenacity and effectiveness of the auditory system. Individuals with (C)APD are often overwhelmed with auditory input, exhibiting difficulty screening out relevant from irrelevant auditory information, resulting in overload (Friel-Patti, 1995: Katz, 1997; Sloan, 1998). Factors contributing to overload include:

- Brevity of the acoustic signal
- Fast rate of speech
- Rapid presentation rate of new information
- Increased phonemic complexity
- Reduced context
- Decreased word familiarity
- Increased length of de-contextualized material
- Poor listening conditions
- Temporal distortions
- Increasing task uncertainty (e.g., open responses)
- Poor acoustic environment

II. THE SPEECH-LANGUAGE PATHOLOGIST'S ASSESSMENT

A. <u>The Purpose of the Speech-Language Pathologist's Assessment</u>

The purpose of the speech-language pathologist's assessment is to determine if the child has a language disorder, bilingual issue, or speech impairment. Additionally, there are auditory-based features of language (e.g. auditory memory, auditory discrimination of similar-sounding words, phonemic awareness) and higher order language deficits (e.g. processing of oral directions, identifying the salient features of a narrative or lecture, comprehending humor and sarcasm, reading comprehension) that may impact the auditory processing of language, which need to be identified as well as remediated, in addition to, or in conjunction with, a (central) auditory processing disorder. The SLP needs to determine if these issues are contributing to the child's presenting symptoms, as

well as impacting the child's performance on speech and language-influenced auditory tests. This background information is critical in formulating a differential diagnosis, both for the audiologist, as well as the SLP.

Through the assessment, the speech-language pathologist may find that the child indeed exhibits weaknesses or deficits in one or more auditory skill areas, not otherwise explained by linguistic, speech output, cognitive or attentional issues. The SLP does not need a formal confirmation from an audiologist in order to treat the presenting skill deficits. However, the speech-language pathologist may not diagnose a (central) auditory processing disorder or auditory processing disorder. The SLP report may state that the assessment reveals "auditory-based language deficits in the following areas: auditory memory, auditory discrimination, etc." This type of descriptive report may recommend further assessment by an audiologist or treatment for these deficits.

A referral to an audiologist is preferable when any of the following conditions are present:

- There is uncertainty as to the child's peripheral hearing acuity
- The clinician feels the child's speech or language issues require less linguistically-loaded testing to properly assess auditory processing function
- The child requires a more acoustically-controlled testing environment
- A child's school or insurance company requires a formal (C)APD diagnosis for treatment
- A consultation regarding FM or sound-field system is indicated
- A consultation regarding acoustic modifications in the class is indicated

B. Screening Tests for the Speech-Language Pathologist

Before a formal testing battery is initiated, the SLP should look qualitatively at the presenting symptoms, behaviors, history, and other academic issues, which may point to a possible (central) auditory processing disorder. At this time, there are no reliable screening tests for use by the SLP to identify a (central) auditory processing disorder, therefore, *we do not recommend any specific tests for the SLP to use as a screening instrument for (C)APD at this time*, as a limited use of standardized tests in this regard may very well miss an underlying problem. Development of such a tool in the future would be welcome. Below, please find a review of the pertinent information, which the SLP should gather in determining the need for a comprehensive (C)APD assessment.

1. Referral source and reason for referral
2. A thorough client history and/or parent interview to collect background information such as:
    a. Family history
    b. Pregnancy and delivery history
    c. Post natal history
    d. Adoption history
    e. Infancy and childhood history

f. Developmental milestones
g. Health history, including otologic history for middle ear fluid and allergies
h. Auditory developmental history
i. Visual developmental history
j. Motor and sensory developmental history
k. Social and behavioral developmental history
l. Speech and language developmental history
m. Previous evaluations and treatment with results
n. Educational history
o. School/Educational issues
p. Behavior
q. Parent expectations

3. Behavioral Survey
    a. Attending, focusing during auditory tasks
    b. Requests for frequent repetition or clarification ("huh")
    c. Misinterpretation of what is said
    d. Lack of response to name when called
    e. Processes better in a quiet environment
    f. Learns poorly through lecture-style teaching
    g. Is easily distracted, primarily by noise
    h. Sensitive to loud noises

C. Suggested SLP Assessment Battery

The following list represents *examples* of tests in each of the defined areas. We recognize that there are additional assessments that may be appropriate, and more will continue to be developed. While it is not a complete list, the following information will provide SLP's some guidance in selecting tests needed for a comprehensive battery. Not all areas will require testing during each assessment. *The clinician is cautioned to use judgment in selecting tests that measure performance in those areas in which presenting symptoms have been noted.*

The speech-language pathologist should be extremely vigilant to avoid drawing conclusions or using test scores in a vacuum, without consideration of the child's other speech and language or motor issues, which may adversely impact the validity of the test scores. Tests selected should require output modalities that are not influenced by the child's other skill weaknesses whenever possible. For example, children with expressive language difficulties may be more appropriately assessed for auditory weaknesses with tests that require pointing or single-word responses rather than sentence formulations or explanations. Here are just a few examples:

- A child's score on an "auditory memory" subtest that requires repeating sentences could be significantly low because his ability to reformulate the test prompt

verbatim is due to underlying syntax and morphological weaknesses rather than a true auditory memory weakness.

- A child's score on an "auditory memory" subtest that requires the repetition of a series of words could be significantly low because he has auditory discrimination difficulties and "misheard" the prompt words, resulting in similar sounding words being repeated.

- A child's score on an "auditory processing" subtest for following oral directions could be significantly low because he is unfamiliar with the positional concepts presented and therefore is unable to accurately perform the task.

- A child's low score on an "auditory processing" subtest that requires the child to answer questions about a story or passage may be symptomatic of an underlying expressive language disorder or confusion with linguistic concepts such as "why" or "how".

- A child's slow "auditory processing speed" could be due to anxiety about possibly answering incorrectly, a word retrieval deficit, apraxia, dysfluency, or expressive language disorder.

- A child's low score on the SCAN subtests may be influenced by a motor speech problem that makes it difficult for the child to imitate certain words with clarity, rather than an inability to perceive the word under degraded listening conditions.

- A child's low score on the Token Test may be exacerbated by fine motor issues that make manipulating objects challenging, resulting in the child forgetting the direction.

Tests are listed in each section in alphabetical order. Appendix E contains contact information for publishers of the tests listed below.

1. Perception and Discrimination

- The Goldman-Fristoe-Woodcock Test of Auditory Discrimination: *Quiet Subtest*
- The Lindamood Auditory Conceptualization Test (LAC);
- Test of Auditory Perceptual Skills Revised-TAPS R: *Word Discrimination Subtest*
- Test of Language Development-3 (TOLD-P:3) *Supplemental Subtest 1*
- Wepman's Auditory Discrimination Test

2. Auditory Association/Receptive Vocabulary

- The Comprehensive Receptive and Expressive Vocabulary Test (CREVT-2)
- Peabody Picture Vocabulary Test (PPVT-3)
- Receptive Vocabulary Test (ROWPVT)
- CELF-4

3. Auditory Memory

- Auditory Processing Abilities Test (APAT) *Subtests 2, 6, and 9*
- Test of Auditory Perceptual Skills-Revised (TAPS-R): *Memory for Words and Numbers Forward Subtests*
- The Token Test for Children
- Wepman's Auditory Memory Battery

4. Phonemic Awareness

- The Comprehensive Test of Phonological Processing (CTOPP) *Subtests 1, 2, 8, 10, 11, and 12*
- The Lindamood Auditory Conceptualization Test (LAC)
- The Phonemic Awareness Test (TAAS)
- The Phonemic Synthesis Test
- The Test of Phonological Awareness

5. Auditory Closure

- Comprehensive Assessment of Spoken Language: (CASL) *Meaning from Context Subtest*
- Test of Language Competence: *Subtest 3*

6. Auditory Cohesion/ Comprehension of Sentence & Paragraph-Length Material

- The Auditory Processing Abilities Test (APAT): *Passage Comprehension, Sentence Absurdities, Complex Sentences Subtests*
- Clinical Evaluation of Language Fundamentals-4 (CELF 4): *Linguistic Concepts, Sentence Structure, Concepts and Directions, Understanding Spoken Paragraphs Subtests*
- The Comprehensive Assessment of Spoken Language (CASL): *Sentence Comprehension*, *Paragraph Comprehension, Nonliteral Language, Ambiguous Sentences, Inference, Subtests*
- The Listening Test

7. Expressive Vocabulary

- The Comprehensive Receptive and Expressive Vocabulary Test (CREVT)
- The Expressive One Word Picture Vocabulary Test (EOWPVT)
- The Test of Language Development-Primary:3 (TOLD-3): *Oral Vocabulary Subtest*
- *DTLA-4 Story Construction*

8. Word Retrieval

- CELF-4: *Rapid Automatic Naming Subtest*
- The Comprehensive Test of Phonological Processing (CTOPP) *Rapid Object Naming Subtest*
- Test of Word Finding-2

9. Auditory/Speech Perception Under Degraded Listening Conditions

- Goldman-Fristoe-Woodcock Test of Auditory Discrimination: *Noise Subtest*
- SCAN or SCAN-C
- Woodcock-Johnson Tests of Cognitive Ability: *Auditory Figure Ground Subtest*

10. Behavioral Survey

- Children's Auditory Performance Scale
- Children's Home Inventory of Listening Difficulties (CHILD)
- Evaluation of Classroom Listening Behaviors
- Fisher's Auditory Problems Checklist
- Listening Environment Profile
- Listening Inventory
- Screening Instrument for Targeting Educational Risk (S.I.F.T.E.R.)

III. THE AUDIOLOGIST'S ASSESSMENT

A. The Purpose of the Audiologist's Assessment

The purpose of the audiologist's assessment is to diagnose (or alternatively, rule out) central auditory processing disorder. Both the assessment of auditory behaviors/skills and recommendations for managing (C)APD are included in the audiologist's scope of practice. However, the assessment, management, and treatment of auditory processing disorders requires a specialized knowledge base in auditory neuroscience and its related fields, and only those audiologists with the requisite training and experience should participate (ASHA, 2005). Since a diagnosis of (C)APD often involves the elimination of, or co-morbidity of, other types of disorders exhibiting similar symptoms such as peripheral hearing loss, AD/HD, language disorders, and auditory neuropathy, a team approach to assessment is recommended. At a minimum, the team should include an audiologist and a speech-language pathologist (Jerger and Musiek, 2000).

B. Screening Tests for the Audiologist

In general, screening tests provide criteria for eliminating individuals who are unlikely to have a specified disorder. In the case of (C)APD, a standardized screening protocol has yet to be established. However, case histories, behavioral surveys, or questionnaires (such as those listed on page _TBD__) may help audiologists determine if a child has age-appropriate listening skills and facilitate appropriate referrals to other professionals as needed. Examples of suspect behaviors include:

- Difficulty in hearing and/or understanding in the presence of background noise or reverberation,
- Difficulty in understanding degraded speech,

- Difficulty in following spoken instructions in the classroom in the absence of language comprehension deficits,
- Difficulty in discriminating and identifying speech sounds, and
- Inconsistent responses to auditory stimuli or inconsistent auditory attention.

Experience suggests that many (but not all) of the children who arrive at the audiologist's office already have been "pre-screened" by SLPs, psychologists, learning specialists, teachers, and /or parents, and the ensuing evaluation for (C)APD is warranted. A diagnosis of (C)APD cannot be made through the use of screening tests alone.

A comprehensive hearing test must be completed prior to the evaluation for (C)APD to determine if a peripheral hearing loss is present. The hearing test includes pure tone air and bone conduction thresholds, speech recognition threshold, word recognition in quiet and in noise (+5 or +10 S/N), tympanometry, and acoustic reflex thresholds. Neither the ASHA guidelines (2005) nor Jerger and Musiek (2000) support the practice of using audiometric "peaks and valleys" (that is, pure tone thresholds that differ by as little as 5 dB), nor elevated or absent acoustic reflexes, as a criterion for the diagnosis of (C)APD.

C. Suggested Audiological Battery

A helpful way to categorize diagnostic tests for (C)APD is by the underlying auditory behaviors they seek to evaluate. Bellis (2004) recently constructed the following categories of diagnostic tests for (C)APD, based on auditory behaviors and skills:

1. *Tests of Auditory Discrimination* (to assess the ability to differentiate between similar-sounding speech or non-speech stimuli, e.g., signals differing in frequency, intensity, or duration; minimally contrasting speech sounds).
   Example: Speech discrimination tests (WIPI, PB-K's, as appropriate)

2. *Tests of Auditory Temporal Processing* (to assess the ability to analyze acoustic events over time, e.g., gap detection, auditory fusion, temporal integration, backward and forward masking).
   Example: Auditory Fusion Test (AFT) (norms for children 5 – 11)

3. *Dichotic Listening Tests* (to assess the ability to separate or integrate competing auditory stimuli, with different signals presented to each ear simultaneously, e.g., syllables, numbers, words, sentences).
   Example: Dichotic Digits (norms for children 7 – 12+)

4. *Tests of Auditory Temporal Patterning* (to assess the ability to recognize and sequence patterns of auditory stimuli, e.g., frequency patterns, duration patterns).
   Example: Pitch Pattern Sequence Test (norms for children.)

5. *Monaural Low-Redundancy Speech/Auditory Closure Tests* (to assess recognition

of degraded speech stimuli presented to one ear at a time, e.g., filtered speech, time-compressed speech, speech in noise).
Example: SCAN-C, Filtered Words Subtest (norms for children 6 – adult)

6. *Binaural Interaction Tests* (to assess processing of binaurally presented signals involving interaural intensity or time variations, e.g., masking level difference (MLD), localization, lateralization).
   Example: MLD, from the VA CD (no norms for children)

7. *Electrophysiologic and related tests* (to assess neurophysiologic representation of auditory signals, e.g., auditory evoked potentials, topographical brain mapping, neuroimaging). Example: ABR, MLR

Recent research has focused on describing a minimal and/or optimal test battery that is sufficient for sampling the breadth of auditory behaviors and skills. For example, Musiek (1998) suggested that a test battery should consist of dichotic digits, frequency patterns, competing sentences, low-pass filtered or compressed speech, and evoked auditory brainstem and middle latency responses. Jerger and Musiek (2000) proposed that, at minimum, the diagnostic battery should include pure-tone audiometry to rule out peripheral hearing loss; performance-intensity functions for word recognition; a dichotic task; duration pattern sequence test; temporal gap detection; immittance audiometry; otoacoustic emissions; and auditory brainstem and middle latency responses. On the other hand, Bellis (2004) recommended that a diagnostic test battery should not be specified; instead, test components should be individualized so as to be appropriate for the child in question.

At this time, the following recommendations are made:

1) The audiologist should construct a test battery for each child that is of sufficient breadth so as to sample the various levels and mechanisms of the auditory system while taking into account the referring complaints. If possible, tests should be independently correlated with each other so as to insure that a variety of auditory mechanisms are represented.

2) Speech, language, learning and psychological evaluations be obtained prior to the audiological assessment so that the audiologist can correctly interpret a child's performance on subsequent listening tasks**.**

3) Tests used to diagnosis (C)APD should be age-appropriate, and should include both linguistically loaded (speech tests) and linguistically limited (non-speech tests) test materials.

Specific diagnostic criteria for defining (C)APD continue to evolve. Test scores commonly are interpreted based upon normative data (i.e., the degree to which a score must fall below age-correlated normal regions before a disorder is diagnosed). Generally,

scores falling 2 or more standard deviations on more than one test, combined with presenting symptoms that are not explained by other conditions. indicate (C)APD. Relative or patient-based interpretation of test scores also may be used in the diagnostic process (ASHA, 2005). Here, a child's scores are judged relative to his or her own baseline (e.g., test scores obtained from a child's right ear may be compared to scores from the left). The ensuing sections regarding the differential diagnosis of (C)APD provide additional information on the interpretation of test scores. Further research and consensus is needed to establish universally accepted diagnostic criteria, as well as to establish relationships between test results, deficit specificity, and subsequent treatment.

Recently, ASHA (2005) recommended that a clinical decision analysis approach be applied to constructing a test battery for (C)APD. In order to determine the clinical efficiency of a test battery, the relationship between individual tests in the battery (i.e., whether the tests are positively correlated, negatively correlated, or independent of each other) must be known. Further research is needed to correlate the underlying mechanism(s) in the auditory system with specific test procedures and results, so that newly constructed test batteries can be evaluated on the basis of sensitivity, specificity, and cost effectiveness.

IV DIFFERENTIAL DIAGNOSIS FOR THE SLP AND AUDIOLOGIST

A. Differentiating Language Processing from (Central)Auditory Processing Disorders

A (central) auditory processing assessment focuses on evaluating how the child is receiving speech sound(s), depending upon the auditory context, acoustic features of the speech signal, and environment. It seeks to determine if the auditory speech signal is reaching the child's language centers intact, in the same way other people perceive it. For example, if a child exhibits a significant left-ear weakness on auditory testing, it indicates a discrepancy that is typical for a child with (C)APD and probably not the result of a language processing problem.

A language processing assessment focuses on how the child processes linguistic information *afte*r if has been delivered by the auditory system. It focuses on evaluating if the child is comprehending specific word meanings and sentence types such as those used in following directions, passive voice, categorization, idioms, prepositions, "wh" questions, etc. The inclusion of disordered auditory-based features of language (e.g. auditory memory, auditory discrimination of similar-sounding words, phonemic awareness) within the realm of a "language processing disorder" is at this writing, still a matter of question. There are some who believe these deficits are in fact within the purview of a language processing disorder or specific language impairment (SLI), others

who believe the presence of these deficits constitute a separate disorder, and some who feel these are simply symptomatic of a (central) auditory processing disorder. Regardless, the identification of weaknesses in the areas assessed by the tests described below is helpful to formulating a comprehensive intervention plan.

A (central) auditory processing disorder and a language disorder are not synonymous terms. Not all (C)APD's lead to language disorders and not all language disorders are due to (C)APD's. There are many reasons a child has difficulty with processing language aside from a (central) auditory processing disorder. Language comprehension tests should not be used to diagnose a (central) auditory processing disorder, although behaviors and response patterns observed may indicate the need for further testing in the area of auditory processing.

Pure language processing (comprehension) tests only require the child to point to a picture or follow a verbal direction. As soon as a verbal response is required, the answer is affected by the child's expressive language and is then measuring two components, and great care must be taken when interpreting test results to determine if the presence of an expressive language disorder is present. The following list is not all-inclusive and not meant to be a blueprint for a suggested test battery. It is included merely to give concrete examples of the *types* of tests that are typically used for the described purposes. Tests are listed alphabetically.

Tests that Assess Primarily Language Processing (Auditory Comprehension of Language)

- CELF: *Semantic Relationships Subtest*
- Preschool Language Scale -3
- Test for Auditory Comprehension of Language (TACL)

Tests Given by an SLP that Assess Auditory Skills that May Suggest (C)APD:

- The Phonemic Synthesis Test (Jack Katz)
- The Phonemic Synthesis Picture Test (Jack Katz)
- The SCAN-C (ages 5-12) and SCAN-A (ages 12 +) *Considered a screening test unless administered by an audiologist
- Goldman Fristoe-Woodcock Test of Auditory Discrimination

Tests Given by an SLP that *Overlap Higher-Order Linguistic and Auditory Features of* Language:

- The Phonological Awareness Test
- Test of Auditory Perceptual Skills-R (TAPS-R)
- The Listening Test
- CASL (e.g. *Third Book Subtests: Inferential Reasoning*)
- CELF: *Listening to Paragraphs Subtest*
- The Token Test

Often children with (C)APD need language processing intervention *as well as* (central) auditory processing intervention and management. It is still controversial as to whether

these deficits are co-existing throughout development or if the auditory disorder *caused* the child's language development to be disrupted, and eventually weakened. However, one must logically assume than an improvement in a child's auditory processing would be beneficial to his language development. The clinician's challenge is to determine where the breakdown is occurring in the process, and direct the intervention accordingly.

B. Differentiating Attention Deficit Disorder from (Central) Auditory Processing Disorders

Children with attention deficit/hyperactivity disorder (AD/HD), including inattentive, hyperactive, and mixed forms, may have a co-existing auditory processing disorder. Great care must be given during the assessment process to ensure that the child's difficulty in responding to auditory stimuli is not strictly due to inattention. Keep in mind:

- The most recent research (Tillery Study, 2000) indicates improvement in auditory attention with 5 mg. of Ritalin, but not performance on (C)APD assessment measures. Therefore, whenever possible, it is recommended that children with AD/HD take their medication before the administration of the test battery.

- Methods of inter-subject interpretation of test date (e.g. ear differences, patterns that conform to established neurophysiological tenets, topographic hemispheric differences) are often recommended to be a valid method of differentiating APD from AD/HD.

- A child with AD/HD's performance on standardized tests may deteriorate throughout the testing session if his attention span is taxed too long. The results will be more reliable and valid if the testing is broken into shorter segments rather than one long, 1 ½-2 ½ hour battery.

- A child with AD/HD may frequently interrupt the test prompts with comments, observations, and not sufficiently attend to the testing task. The clinician should note these qualitative observations when determining whether the child's performance is in fact an "input" disorder of the auditory channel, difficulty focusing on the auditory stimuli, or in some cases, both.

- Children with AD/HD have difficulty attending not only to auditory tasks, but any structured task, such as completing a worksheet or homework. A child with just an auditory processing disorder typically should perform better on visual tasks, such as worksheets. If the clinician suspects a pervasive problem with attending, a referral for an attention deficit disorder assessment should be made before finalizing an (C)APD diagnosis

C. Assessing Children from Linguistically and Culturally Diverse Backgrounds

Great care needs to be exercised in interpreting the standardized test results and behaviors of children from linguistically and culturally diverse backgrounds. Readers of this document are reminded to review the CSHA position papers relative to the delivery of service to linguistically and culturally diverse populations, approved September 2006. Unfortunately, evaluating children in their non-native language is not always a valid way to determine the presence of a (central) auditory processing disorder, due to the lack of normative data and the confounding language-processing issues that result. Depending upon the length of time the child has been exposed to a second, or even third language, his native tongue may also be diminished due to a reduction in conversational practice and exposure. Therefore, assessing auditory-based language skills, particularly those with language-influenced tasks (e.g., repeating words, sentences, following oral directions, listening to stories) is inappropriate in this population unless their command of the testing language (English, typically) is such that the examiner is confident the results are not influenced by the Limited English Proficiency issue. The clinician should inquire as to whether or not the presenting behavioral issues are observed in both languages, or just in one setting, such as school. A true auditory processing disorder would be observable in both spoken languages.

A referral to an audiologist is recommended in order to provide additional testing using instruments (e.g., frequency patterns, duration patterns, pitch pattern tests, gap detection, gap fusion) that are less dependent upon language processing skills.

In many cases, a definitive diagnosis for a bilingual child may be elusive, and it is recommended to defer a diagnostic label under these circumstances.

D. Assesssing Children with Autism Spectrum Disorders

Children with autism spectrum disorders are frequently referred for a (C)APD assessment. Clinicians are reminded that children with autism by definition have a severe receptive language disorder, which is typically manifested by a severe deficit in responding to auditory linguistic stimuli, sometimes coupled with hypersensitivity to certain noises (hyperacusis) associated with other sensory-integration disorders. These auditory processing issues should be considered part of the underlying condition, and not a separate diagnosis.

The nature of this population is such that standardized test responses are often unreliable, depending upon their motivation, attention, familiarity with the task, cognition, and comfort level with the examiner. The Task Force recommends clinicians refrain from diagnosing (C)APD in this population.

However, in children with significantly milder presenting symptoms and normal cognition, such as with a non-verbal learning disorder or Asperger's Syndrome, a separate and co-morbid diagnosis may be possible if the test responses are consistent and reliable, and not confounded with cognitive, attention, or motivational issues.

E.Assessing Children with Learning Disabilities

In the context of a school system, a learning disability traditionally referred to difficulty in learning academic skills, at the same rate, and using the same methodologies, as a typical child, despite at least normal intelligence. Please see page 22 for the complete legal definition per California's present educational laws. (30 EC 56337 - Specific Learning Disability; Discrepancies)

However, the most recent IDEA legislation has modified the manner in which the diagnosis of a learning disability is determined, by allowing other models that may be more sensitive to children from diverse socioeconomic, linguistic, and cultural backgrounds through the use of a response to intervention (RTI) approach.

Audiologists and SLPs are cautioned that the "learning disability" label may therefore be applied under one set of regulations (IDEA) but that the CA regulations (see page 22) remain intact as of this writing.

A comprehensive assessment for (C)APD should note the client's reading -- decoding, as well as comprehension -- and writing skills. This information may be documented by a variety of professionals, such as a special education teacher, clinical or school psychologist, or an SLP who has sufficient training in these areas.

The error patterns observed in these areas should be carefully described and compared with presenting (C)APD symptoms and their performance on audiological tests. For example, with a (C)APD, one might see difficulties with decoding, as well as spelling patterns that are devoid of a logical phonemic order or letter-sound representation, despite having received sufficient instruction in these areas. These are the children who struggle to use "invented spelling," a beginning writing technique typically used in kindergarten and first grade which requires the child to "sound out" words and write down the letters they hear, in order. Of course, only a small portion of children with these deficit patterns would be expected to also be diagnosed with (C)APD. However the diagnosis of a (C)APD would necessitate additional accommodations (e.g. increasing signal-noise ratio) and interventions which would help support increased performance in these areas.

(C)APD profiles differ, and thus children with (C)APD exhibit other kinds of reading, spelling and writing error patterns. Clinicians are urged to read and research this area further in order to better identify comorbid or "copycat" conditions. (Swain & Geffner, 2007)

F. Interpretation of Results

Once the audiological and other testing have been completed, the diagnosis of a (C)APD may be considered, based on the following criteria:

- Behavioral symptoms consistent across settings that correspond to (C)APD
- Formal testing that shows a consistent significant weakness (i.e., 2 standard deviations or more) on more than one (C)APD measure given by the audiologist that cannot be explained by other factors (e.g., cognition, attention, hearing impairment, ESL issues)
- Inter- and intra-test patterns that indicate a (central) auditory processing disorder, including ear differences on behavioral assessments and hemispheric differences on topographic physiologic tests. Poor and consistently low scores may in fact indicate a global or other confounding condition rather than a (C)APD. (Bellis, 2004)

Just as a mild hearing loss can impact each person differently, depending upon their coping skills, support system and academic strengths, so it is with a (central) auditory processing disorder. Each child comes to us with a different collective gestalt, and we should not underestimate the impact of even a mild (central) auditory processing disorder on a child with co-morbid emotional, psychological, behavioral, or learning issues.

Caution should be used when interpreting any test results. Very often examiners fail to remember that "tests do not diagnose, people do" and base their impressions, interpretation and diagnoses exclusively on test results. When interpreting testing regarding (C)APD, there are a number of considerations other than test scores that must be taken into account. These considerations, in combination with test scores, are what form clinical impressions, interpretation and diagnosis. The following should be considered:

- Medical history: Premature birth; chronic ear infections; chronic upper respiratory infections; delayed speech and language onset; jaundice; hyperbillirubin and kernicterus; genetic predisposition; abnormal peripheral hearing.
- Parent and/or teacher observation: The use of the Listening Inventory or S.I.F.T.E.R
- Clinician observation: Observation and documentation of response behaviors during standardized assessment, in non-structured interaction; classroom observation; social and behavioral interaction
- Other professional reports: Audiology; psychology; RSP; physician; occupational therapy

Many factors can contribute to a child's performance on a test. It is essential that a clinician have access to any and all information that may affect test performance and make necessary adjustments to ensure that the results are valid and reliable. All information should be included to ensure valid and reliable interpretation, impressions and diagnoses.

V. DIAGNOSIS & TREATMENT IN THE SCHOOL SETTING

A. Pre-Referral Strategies

Schools are required to employ pre-referral strategies to address an identified academic weakness with regular-ed interventions before seeking a formal evaluation. (California's Educational Code Section 56303: A pupil shall be referred for special educational instruction and services only after the resources of the regular education program have been considered and, where appropriate, utilized.) In general, a "Response to Intervention" model should be utilized before embarking on a costly assessment plan.

Initially, other explanations should be ruled out when considering an (C)APD diagnosis: Some possible reasons children have difficulty "listening" in the classroom include:

1. They are bored because the work is too easy.
2. They are overwhelmed because the work is too hard.
3. They are worried about any number of other things (from family issues to whether there is going to be pizza left at lunchtime)
4. The teacher is speaking too quietly.
5. The acoustics in the room are poor.
6. They are tired from lack of sleep.
7. They are hungry.
8. They are not from an English-speaking family and therefore do not process the instructions or information well.
9. They have a hearing impairment in one or both ears.
10. They have fluid in their ears from a recent cold or allergies.
11. They are allergic to something they ate at breakfast or lunch.
12. They are taking medications for allergies, asthma, seizures, depression, or any number of things that cause a child to be "jumpy", somewhat sedated or "spacey".
13. They don't feel well.
14. A child sitting near them is engaging in behaviors that are distracting.
15. The teacher has a monotonous voice.
16. The content of the lesson is not interesting.
17. The child has been sitting for too long and needs to move around.
18. The teacher's expectations of the class's auditory attention are overestimated for their age and development.
19. The teacher is not using a good mix of visual/ auditory/ and "hands-on" methods.
20. The child has little previous preschool experience listening in large groups.
21. The child has poor balance and trunk control resulting in difficulty staying seated, causing him/her to be distractible.
22. The child has a learning disability, AD/HD or other *language* processing delay or disability.

Below are some additional examples of pre-referral problem-solving steps to address specific concerns, prior to pursuing a formal (C)APD assessment**:**

Symptom: Child's attention during verbal instructions wanders.
*Rule out the following***:** fatigue, internal distractibility (ADD), hunger, lack of sleep, location of seat near another child whose behavior is distracting, ESL issues, reaction to prescription or over-the-counter medications, weak receptive language/vocabulary affecting ability to extract meaning from verbal information. Pure-tone threshold audiogram conducted (not a screening) in order to rule out a mild hearing loss (above 20DB) or the presence of fluid through tympanometry.

If none of the above issues are present, try the following:

- Preferential seating near the teacher or have the teacher move closer to the child during direct instructions
- Teacher to use visual cues whenever possible.
- Have the child/class listen for specific purposes. Write the important questions to be answered on the board. ("What is camouflage?"/ "Who helped Arthur find his frog?")
- Cue the child by name, then pause before asking a question. ("*Peter...*, what sound does 'boat' begin with?")
- Teacher to use a slower rate of speech when asking the child questions.
- Teacher to repeat important concepts/new vocabulary several times.
- Reduce ambient noise by closing windows, doors.
- Incorporate a class-based listening program
- Reduce the amount of concentrated listening time to shorter intervals.

Symptom: Child misinterprets what is heard.
Rule out: Hearing loss or middle ear fluid (see above), ESL issues, weak vocabulary/receptive language.

If none of the above issues are present, try the following:

- Teacher to move closer to the child, gain eye contact, and repeat the instructions/directions.
- Close windows and doors to minimize ambient noise.
- Write down and repeat important key words and phrases.

Symptom: Child says "Huh?" or "What?" often.
Rule out: Hearing loss or middle ear fluid, noisy class or teacher with unusually quiet voice or strong foreign accent.

If none of the above issues are present, try the following:

- Move the child's seat away from windows or doors
- Move the child's seat closer to the teacher

- Alert the child to important instructions by name or physical prompt (e.g. a tap on the child's desk)
- Incorporate a class-based listening program to improve listening behaviors and facilitate the use of repair strategies.

If the pre-referral strategies are unsuccessful or if the child's problematic behaviors/symptoms are severe and/orcontinue, a speech-language pathologist should assess the child, including appropriate auditory tests that might indicate a possible APD. The IEP team should make a referral to an audiologist, based on behavioral observations of APD symptoms in the classroom and/or social school environment, if they feel there is sufficient cause for ruling this disorder in or out.

B. Current Practices in Determining Eligibility Criteria

Presently, Colorado, Florida and Minnesota have adopted guidelines through their state departments of education for the diagnosis and treatment of auditory processing disorders in the schools. Their IEP teams, with an audiologist's confirmation, using set criteria, determine this diagnosis. In the state of California, some individual school districts have chosen to formulate their own guidelines for this purpose. We recommend the State Department of Education of California seek to clarify the responsibilities of public school districts for the identification and treatment children with (C)APD by considering the content of this document.

At this time, many school districts in California do not diagnose or treat this disorder. Some do, but often only if a parent applies pressure from outside professionals or utilizes legal resources. There is an understandable caution in over-referring, over-diagnosing, and over-treating any disorder. Additional reasons for the schools' reluctance to identify and treat (central) auditory processing disorders are varied, but include: a lack of financial resources, access to audiological services, staff training, ideological concerns about the validity of the disorder itself, unavailability of diagnostic tools, intervention materials; and a lack of consistent professional criteria to properly identify and treat the disorder. This document seeks to address the latter issue, but recognizes that the former issues expressed will need to be appropriately addressed at the local and state level before widespread changes can take place.

According to the US Dept. of Education, Special Education Division, the educational categorization of this disorder is diverse across the country, depending on the state and local school district's own guidelines. It is reportedly more often defined as a learning disability or a hearing impairment, depending on the school district. For children with co-morbid conditions, it is often a secondary deficit, and thus the category issue is a moot one. The question lies in determining eligibility for those children who do not present with other areas of deficit (e.g. a speech or language delay) but do exhibit problematic symptoms, diagnosed as a (C)APD, that adversely affects their ability to function in a large-group environment.

C. Related Special Education Laws

The present California Regulations and Laws (Part 30. Special Education Programs, Article 3.1 3030) that pertain to this issue read as follows:

30 EC 56337 - Specific Learning Disability; Discrepancies

56337. A pupil shall be assessed as having a specific learning disability which makes him or her eligible for special education and related services when it is determined that all of the following exist:
(a) A severe discrepancy exists between the intellectual ability and achievements in one or more of the following academic areas:
(1) Oral expression.
(2) **Listening comprehension.**
(3) Written expression.
(4) Basic reading skills.
(5) Reading comprehension.
(6) Mathematics calculation.
(7) Mathematics reasoning.
(b) The discrepancy is due to a disorder in one or more of the basic psychological processes and is not the result of environmental, cultural, or economic disadvantages.
(c)The discrepancy cannot be corrected through other regular or categorical services offered within the regular instructional program.

30 EC 56363 - Designated Instruction and Services

56363. (a) Designated instruction and services as specified in the individualized education program shall be available when the instruction and services are necessary for the pupil to benefit educationally from his or her instructional program. The instruction and services shall be provided by the regular class teacher, the special class teacher, or the resource specialist if the teacher or specialist is competent to provide such instruction and services and if the provision of such instruction and services by the teacher or specialist is feasible. If not, the appropriate designated instruction and services specialist shall provide the instruction and services. Designated instruction and services shall meet standards adopted by the board.
(b) These services may include, but are not limited to, the following:
(1) Language and speech development and remediation. The language and speech development and remediation services may be provided by a speech-language pathology assistant as defined in subdivision (f) of Section 2530.2 of the Business and Professions Code.
(2) Audiological services.

5 CCR 3030 - Eligibility Criteria

3030. A pupil shall qualify as an individual with exceptional needs, pursuant to Section 56026 of the Education Code, if the results of the assessment as required by Section 56320 demonstrate that the degree of the pupil's impairment as described in Section 3030 (a through j) requires special education in one or more of the program options authorized by Section 56361 of the Education Code. The decision as to whether or not the assessment results demonstrate that the degree of the pupil's impairment requires special education shall be made by the individualized education program team, including assessment personnel in accordance with Section 56341(d) of the Education Code. The individualized education program team shall take into account all the relevant material, which is available on the pupil. No single score or product of scores shall be used as the sole criterion for the decision of the individualized education program team as to the pupil's eligibility for special education. The specific processes and procedures for implementation of these criteria shall be developed by each special education local plan area and be included in the local plan pursuant to Section 56220(a) of the Education Code.

(a) A pupil has a hearing impairment, whether permanent or fluctuating, which impairs the processing of linguistic information through hearing, even with amplification, and which adversely affects educational performance. Processing linguistic information includes speech and language reception and speech and language discrimination.

(b) A pupil has concomitant hearing and visual impairments, the combination of which causes severe communication, developmental, and educational problems. (c) A pupil has a language or speech disorder as defined in Section 56333 of the Education Code, and it is determined that the pupil's disorder meets one or more of the following criteria:

(1) Articulation disorder.

(A) The pupil displays reduced intelligibility or an inability to use the speech mechanism which significantly interferes with communication and attracts adverse attention. Significant interference in communication occurs when the pupil's production of single or multiple speech sounds on a developmental scale of articulation competency is below that expected for his or her chronological age or developmental level, and which adversely affects educational performance.

(B) A pupil does not meet the criteria for an articulation disorder if the sole assessed disability is an abnormal swallowing pattern.

(2) Abnormal Voice. A pupil has an abnormal voice which is characterized by persistent, defective voice quality, pitch, or loudness.

(3) Fluency Disorders. A pupil has a fluency disorder when the flow of verbal expression including rate and rhythm adversely affects communication between the pupil and listener.

(4) Language Disorder. The pupil has an expressive or receptive language disorder when he or she meets one of the following criteria:

(A) The pupil scores at least 1.5 standard deviations below the mean, or below the 7th percentile, for his or her chronological age or developmental level on two or more standardized tests in one or more of the following areas of language development: morphology, syntax, semantics, or pragmatics. When standardized tests are considered to be invalid for the specific pupil, the expected language performance level shall be determined by alternative means as specified on the assessment plan, or

(B) The pupil scores at least 1.5 standard deviations below the mean or the score is

below the 7th percentile for his or her chronological age or developmental level on one or more standardized tests in one of the areas listed in subsection (A) and displays inappropriate or inadequate usage of expressive or receptive language as measured by a representative spontaneous or elicited language sample of a minimum of fifty utterances. The language sample must be recorded or transcribed and analyzed, and the results included in the assessment report. If the pupil is unable to produce this sample, the language, speech, and hearing specialist shall document why a fifty-utterance sample was not obtainable and the contexts in which attempts were made to elicit the sample. When standardized tests are considered to be invalid for the specific pupil, the expected language performance level shall be determined by alternative means as specified in the assessment plan.

Determining the best IEP category for an auditory processing disorder is challenging, but the mechanism for special education eligibility is already present in the California special education laws under the category of learning disability (3030 j). Because there is an aspect to (C)APD that is largely perceptual in nature, this category may be appropriate, particularly in the absence of an audiologist on staff. In many cases, though, the use of the label "auditory processing disorder" by a psychologist denotes a disorder that is more likely diagnosed by language-based auditory tests, such as those used by the SLP. In order to clarify the differences between the disorder diagnosed by an audiologist and the SLP/psychologist, it is recommended that the State Dept. of Education seek to clarify these two related, but different, disorders through the use of a set, universally-accepted, criteria.

Because (C)APD is an impairment of the auditory system, confirmed by an audiologist, one can also make a case to use the label hearing-impaired to describe this disorder. This is the most common category used by private practitioners using a medical model, and sometimes used in schools. We recommend that, in the absence of defined local guidelines, school districts select either the category of "specific learning impairment" *or* "hearing impairment" to qualify a child with (C)APD for special services.

D. The IEP

Upon receiving a (C)APD assessment and diagnosis from the audiologist, the team needs to examine this data in the context of the child's presenting symptoms, observations in the classroom, and other formal testing. The team then determines eligibility for special education services and develops an individualized, appropriate IEP, if indicated. Since (C)APD is often a *secondary* educational label to other conditions, several specialists may need to be involved in the implementation of the IEP.

Upon determining a (C)APD diagnosis, you will need to develop an appropriate IEP In California, IEP team members typically include the SLP, resource specialist, school psychologist, classroom teacher, and program specialist. In cases where a (C)APD diagnosis is being considered, an audiologist trained in this area should be included in the IEP team.

1. As a team, decide what other special education services are necessary for this child to succeed. (e.g. resource, reading specialist, psychologist, OT)
2. Make sure all staff that has contact with the child is aware of the child's auditory weaknesses as one would with a hearing impairment.
3. Identify appropriate teaching and testing modifications.
4. Make recommendations for modifying the classroom environment.
5. Determine if assistive listening devices (FM or Sound-Field) are necessary or should be utilized on a trial basis.
6. Implement direct services by the SLP and/or other trained personnel specifically to improve auditory skills.
7. Select supportive technology that could supplement or compensate for the child's deficits.

The role of the speech-language pathologist: The SLP should provide language testing, including auditory-based and higher order language skills testing, direct intervention, as well as facilitating classroom management and communicating with other professionals to insure goals are being coordinated. He or she may also monitor the need or use of assistive listening devices if trained, recommend acoustic or teaching modifications, and refer for supportive academic/technology services.

Case manager: The SLP or audiologist should be the "manager" for a child with a primary diagnosis of (C)APD if it is the sole or primary handicapping condition, however the case manager is typically the resource specialist if the child qualified under the "specific learning disability" category.

The role of the audiologist: The audiologist diagnoses the disorder, may make specific therapeutic recommendations, carry out therapy, monitor the need or use of assistive listening devices, (including FM systems, sound-field systems, auditory trainers, and any coupling device if needed) recommend acoustic or teaching modifications, and refer out for supportive academic and technology services in keeping with the ASHA scope of practice statement (2004).

The Recommended Professional Practices for Educational Audiologists (EAA, 1997) states that audiologists: "1) provide identification and assessment information, ideally as a member of an interdisciplinary team, for students suspected of having (C)APD; and 2) provide information to the student, parents, teachers, and other school personnel concerning auditory strengths and limitations of students with (C)APD, as well as possible learning and teaching strategies for the classroom and other learning environments that assist the student with (C)APD to learn and manage the auditory environment to his or her best advantage." In other words, the audiologist must interpret the results of the (C)APD evaluation for all interested parties, determine areas of deficit for specific intervention, and monitor the classroom environment of students with (C)APD.

The 504 Plan At some point, a child may no longer require direct intervention, but continue to require acoustic and/or educational modifications in order to function in a

school setting. A 504 plan is set up to ensure that appropriate modifications are implemented in order to compensate for the problems encountered as a result of this diagnosis.

E. Classroom/Teaching Modifications

When a child is diagnosed with an auditory processing disorder by the IEP team, it is incumbent upon the specialists involved to communicate, and properly explain, the impact of the child's disorder to the child's teacher(s). Questions and answers that may help explain the disorder are contained in Appendix A, "Parent/Teacher Information." It is critical that a child with (C)APD have a teacher who speaks with a clear and distinct voice. Children with (C)APD may find increased difficulty processing speech when it is accented or an unfamiliar regional dialectical pattern is present.

Modifications in teaching style and expectations may be required, and appropriate under IDEA regulations. The teacher may not refuse these accommodations if they are written into the IEP. For a comprehensive list of teaching modifications, please refer to Appendix C, "Modifications for Teachers"

VI. DIAGNOSIS & TREATMENT IN THE CLINICAL/PRIVATE SETTTING

A. Current Practices and Concerns: School Issues

Speech-language pathologists and audiologists in the private setting typically have at their disposal several advantages in terms of available tests, acoustically advantageous test settings, direct parent input, and individualized treatment. However, because the practitioner is often not in direct contact with the child's school, the holistic nature of the diagnosis can be sacrificed. Parents sometimes pursue private evaluations for the purpose of taking the information back to their local public school and challenging the IEP diagnostic category, services provided, or accommodations. While the child may perform poorly on auditory processing tests, the diagnostic label should be considered within a larger context of presenting issues whenever possible.

If a parent denies access to past assessments or refuses an exchange of information with pertinent professionals, it places the SLP and audiologist in a difficult position. Without a more complete picture of the issues being discussed at the IEP meeting, (e.g. cognition, reading level, bilingual issues, emotional or mental health) input from teachers and other professionals who work with that child, information about curriculum, etc, it is difficult and perhaps unadvisable for an outside professional to interject strong opinions as to class placement or the appropriateness of the diagnostic category in terms of the (C)APD being a primary or secondary educational label.

As an outside professional, it is important to remember that a private SLP or audiologist can diagnose a disorder or weakness regardless of whether or not that child would also be

eligible for special education services through the public schools. Parents should be informed that the child's diagnostic category in a private setting may or *may not* fall under the very strict criteria set forth by the public school system in California. Furthermore, therapy or intervention recommended by the private practitioner may or may not be available or required by the child's public school, which is not legally bound to provide an "ideal" program (e.g. 1:1 services, many hours of intensive therapy, expensive software) or to administer unproven or trendy treatments. Just because these interventions are available privately, does not mean the school system is required to provide them, simply because the parent demands them or the private practitioner suggests them.

However, the school is legally required to identify any handicapping condition, and may not ignore an (C)APD due to lack of funds, staffing, or testing capabilities. In the event that the parent disagrees with the IEP goals and/or diagnosis, due process should be considered so that the child's rights to a free and appropriate education are preserved.

When a child attends a private school, the child's local public school must assess the child when requested. However, it is left up to the local school districts to decide the type and amount of treatment, and the service delivery model they will provide to a child who chooses to attend a private school. For this reason, parents often decide not to pursue the IEP process. Diagnosing an (C)APD with sufficient background information from other professionals may be difficult. State standardized tests, report cards, and talking with the classroom teacher will help give additional information about performance in other areas and behavioral observations within the classroom setting. There may be little ability to accommodate recommendations by the private practitioner for modifications or additional help in the form of resource teachers or reading specialists. There is often no SLP or audiologist on staff to monitor FM equipment or consult on curricular issues. However, the nature of many private schools is to offer smaller, more nurturing classes, and this fact alone may offset some of the other drawbacks described.

B. Current Practices and Concerns: Medical Model

Presently, most insurance companies do cover some form of audiological or speech-language therapy services for its members. In order to secure payment or reimbursement to the parent, most insurance companies require a physician's referral prior to commencing an assessment or treatment. Initial treatment plans, progress notes, and formal progress reports may be requested. The ICD-9 codes that correspond to APD are typically:

388.4 Abnormal auditory perception
388.43 Impairment of auditory discrimination
389.14 Central hearing loss.

Many children may have an additional language or articulation disorder or delay, therefore the appropriate codes should also be included when appropriate.

VII. SUGGESTED APD INTERVENTION & MANAGEMENT

A. Research

There is still controversy as to the most effective treatment for children with (C)APD. Further research still needs to be completed in order to compare various treatments in terms of time and financial investment as they relate to efficacy. Professionals in any setting need to recognize that no "cures" are available or should be promised for (C)APD.

Intervention should encompass direct therapy, modification of the environment, compensatory strategies, teaching modifications, and when indicated, improvement of the signal-to-noise ratio through an appropriate assistive listening device.

As discussed in the Introduction, we are not advocating for the use of a specific (C)APD subtype diagnostic process (e.g., the Bellis-Ferre model or the Buffalo model) at this time. However, clinicians are encouraged to carefully examine the collective sets of symptoms and test results in order to plan their intervention accordingly.

Most professionals in the field feel a *combination* of a "top-down, bottom-up" approach to the treatment of (C)APD is more effective than a singular approach. That is, a combination of interventions that facilitate higher-order ("top-down") linguistic and cognitive skills such as metacognitive strategies or vocabulary development, with the remediation of the underlying auditory deficits ("bottom-up") is the most advantageous approach (ASHA Conference 2003). While many children with (C)APD require therapy for receptive language and auditory-based language deficits, it should be recognized that the two interventions do overlap in some areas. However, receptive language development is not a replacement for APD therapy, although it may be necessary to address both areas.

The following should be considered:

- Intervention must correlate specifically to the presenting observable behaviors and underlying weaknesses that necessitated the original referral.
- Intervention must correlate specifically to the individual child's test results.
- Intervention must strive to improve functional and observable skills
- Intervention should be hierarchical in nature, rather than randomly selected "auditory" tasks
- Intervention effectiveness should be documented and reassessed at regular intervals

B. Target Skills and Compensatory Strategies

The following are some examples of skills that may be appropriate to target for children with (C)APD for both the SLP and the audiologist. The list represents a combination of

"top-down" and bottom-up" intervention goals. Skills should be selected according the child's individual needs. Effectiveness of the therapy should be substantiated through behavioral observations as well formal testing improvement.

1. Attending to speech, depending on audiological test results: auditory awareness/vigilance, recognizing pitch changes, tapping patterns, attending to the direction of sound, identifying environmental sounds, gap detection, temporal activities, etc (Chermak & Musiek, 1997)

2. Attending to the person speaking, including body awareness, maintaining focus, eye contact) (Hamaguchi, 2002)

3. Phonemic awareness, including phonemic synthesis and segmentation (Katz, 2003; Bellis, 2003; Lindamood, 1998)

4. Auditory discrimination (Kelly, 1995; Sloan, 1986)

5. Initiating specific clarification/repair strategies (Geffner, 2001; Hamaguchi, 2002)

6. Auditory memory/ retention of linguistic information (e.g., improving the length of time the child can hold on to a verbal message by giving him specific strategies to do so) through strategies such as subvocalization (also referred to as "verbal rehearsal" or "reauditorization") and chunking (Hamaguchi, 2002; Chermak, 2003)

7. Metacognitive strategies (Chermak & Musiek, 1997; Chermak, 2003; Geffner, 2002; Hamaguchi, 2002)

8. Visualizing (Bell 1991; Hamaguchi, 2002)

9. Lip-reading (Ferre, 1997)

10. Auditory figure-ground improvement (Ferre, 1997, Bellis, 2003)

11. Dichotic listening (Bellis, 2003)

12. Auditory closure (Figuring out a part is missing, such as "close the _oor") (Bellis, 2003)

13. Interhemispheric transfer activities (Bellis, 2002; Chermak & Musiek, 1997)

14. Altered auditory input (auditory verbal messages presented and processed at gradually increased rates of speed) (McKinnis & Thompson,1999)

15. Interpreting vocal intonation, syllabic stress, and other suprasegmental features of speech (Kelly, 1995 ; Bellis, 2003; Musiek & Chermak, 1997)

C. Language Intervention

In cases where there is a coexisting language weakness, the following *language* skills often need to be strengthened along with the auditory skills described above:

1. Vocabulary and concept development, using visual/sketching and contextual cueing (Musiek & Chermak, 1997; Hamaguchi, 2002)

2. Following verbal directions, including concepts such as: temporal, spatial, exclusion, and quantity (Chermak, 2003 ASHA Conference)

3. Morphological markers and syntax (Bellis, 2002)

4. Higher order listening tasks requiring inferential reasoning, paraphrasing, predicting, explaining cause/effect, idioms, humor etc.

5. Reading decoding or comprehension (Katz, 2003, ASHA Conference)

6. Higher level listening tasks requiring the child to listen to a lecture, identify the important elements, and take notes. (Kelly, 1995, Bellis, 2002)

7. Word-retrieval facilitation (Richard, 2003 ASHA Conference)

D. Commercial Programs

There are presently a number of commercial programs marketed for the improvement of auditory processing. Clinicians are cautioned to research each program carefully before recommending one for a child.

1. Computer Programs
Clinicians are also reminded that any intervention for a child with (C)APD should be *multi-faceted and functional*. That is, while computer programs such as Fast ForWord™ or Earobics® may facilitate certain discrete auditory skills, other aspects of auditory processing intervention should not be overlooked.

2. AIT
ASHA's position on Auditory Integration Training for the treatment of auditory processing disorders is as follows:
"…After a careful review of available research findings gathered after years of experience with AIT, the Working Group on Auditory Integration Training did not find sufficient evidence that AIT improves the behavior of individuals who undergo this procedure. Therefore, the working group concluded that AIT does not meet scientific standards for efficacy that would justify its practice by audiologists and speech-language

pathologists. This position is now the Association's official policy on AIT." (ASHA Leader, August 5, 2003).

E. Use of an FM System

Speech recognition in a classroom is influenced by the power of the sound source, the distance from the source, background noise levels, and reverberation. The purpose of an FM system is to improve the signal-to-noise ratio at a listener's ear by increasing the power of the source, decreasing the level of background noise, and limiting the effects of reverberation. Some children with APD who exhibit problems understanding speech in competition may benefit from an FM system. There are a variety of systems presently available, including: flat panel displays, ceiling-mounted multi-directional speakers, mini desktop speakers, and headsets. Children with a co-morbid hearing impairment have additional options for their coupling devices. If a trial period with an FM system is recommended, the audiologist should select, fit, and monitor the equipment and its benefits.

Recently, ASHA published guidelines for fitting and monitoring FM systems (ASHA, 2002). The ASHA guidelines are directed primarily towards children with peripheral hearing loss, but many of the recommendations can be applied to children with APD. ASHA recommends that audiologists give "hands on" training to the user of the FM system and to school support personnel (e.g. speech-language pathologists, teachers, and teacher aides) as regards use, care, maintenance, and troubleshooting of FM systems.

A more comprehensive description of the selection, fitting, and monitoring process that is specifically geared for managing children with APD was provided by the Florida Department of Education (1999). We recommend that California adopt a similar process, that includes:

1) medical clearance from a student's physician prior to fitting an FM system;
2) signed consent from the student's parent prior to fitting an FM system;
3) selection of the FM system and fitting options by the audiologist (including the specification of personal or sound field systems, coupling options, monaural vs. binaural configuration, and microphone options);
4) pre-evaluation observation by the classroom teacher using the S.I.F.T.E.R;
5) in-service training for the classroom teacher and support staff;
6) post-evaluation using the S.I.F.T.E.R. at the 30 or 45 day point; and
7) regular monitoring of the equipment and the child's hearing sensitivity.

F. Environmental Acoustic Modifications

Just as a child with a hearing loss struggles to accurately receive speech signals in poor acoustic environments, so do children with auditory processing disorders. To compensate for this weakness, the clinicians and team members must often recommend modifications in the environment to maximize the signal-to-noise ratio, similar to those one would suggest for a hearing-impaired child. Please refer to Appendix D for additional information and suggestions for improving acoustic conditions within the classroom.

Appendix A: Parent/Teacher Support (Questions/Answers)

Q. What is a (Central) Auditory Processing Disorder?
A. (Central) Auditory Processing Disorders (C/APD) affect the way children are able to perceive speech. There are several different types of auditory processing disorders, so symptoms sometimes vary from child to child. Children with (C)APD are able to hear beeps and tones with no difficulty. However, speech is not processed in a normal way. This results in a variety of symptoms, such as a child's ability to discriminate speech in background noise or poor acoustic environments. Because discrimination of sounds is often affected, reading and spelling may also be challenging. Frequent ear infections before the age of three are frequently associated with (C)APD, but most children with frequent ear infections *do not* develop an auditory processing disorder. There is still much more research that is needed about how to diagnose and treat this disorder. Experts are still developing new tests and treatments every day, and not always in agreement about which ones are the best to use.

Q. How is an auditory processing disorder diagnosed?
A. While an audiologist will perform the audiological test battery, the first step is to perform a thorough team evaluation. This will help eliminate other confounding factors that will preclude a (C)APD diagnosis. A speech-language evaluation is included in this team assessment. The information in the speech-language pathologist's report is needed by the audiologist in order to make a proper differential diagnosis because articulation patterns and delayed language patterns may affect the validity of the audiological tests. Additionally, information about skills such as auditory memory, auditory discrimination, and phonemic awareness are needed from this evaluation.

There must be a gap between the child's ability in the auditory areas and other cognitive skills. If the child is displaying more systemic attentional problems, the team should determine if an Attention Deficit Disorder, with or without a hyperactivity component (AD/HD) is present. While it is possible to have a (C)APD and AD/HD at the same time, a child with untreated AD/HD may not have the attention span to reliably participate in the audiological tests.

In addition to these formal tests, the audiologist and the educational team will need to consider the symptoms presented (in the context of the child's complete educational profile) in order to determine if a disorder exists, as well as whether it is the *primary* or *secondary* handicapping condition. Diagnosing (C)APD before the age of 7 is difficult because very few tests are normed on this age and young children are often unreliable test-takers. A disorder is typically diagnosed if the child's scores are at least 2 standard deviations from the mean, which translates to the 7t^h percentile or lower, on two or more tests, coupled with behavioral symptoms not otherwise explained by other disorders or conditions.

Q. What tests does the audiologist perform?
A. The audiologist will give a variety of hearing tests using earphones in a sound-treated room. The purpose of the tests is to confirm normal hearing for quiet tones and speech,

and to determine if auditory processing skills (e.g. discriminating words in a noisy background or repeating words presented to both ears at the same time) are age appropriate. Poor performance on the audiology test battery suggests an auditory processing disorder if other conditions that might explain these scores have been effectively ruled out.

Q. If my child has a (central) auditory processing disorder, does that mean he doesn't have a learning disability?
A. No. In fact, children with a (C)APD often have other related difficulties, such as a learning disability, speech and language delays, and Attention Deficit Disorder, with or with a hyperactivity component. Many states consider (C)APD to be a form of a learning disability and/or perceptual disorder, rather than a "hearing impairment", which is the category private practitioners sometimes use. Other states consider (C)APD to be a type of language impairment. At this time, there is still inconsistency in how (C)APD is categorized by educational institutions, and in many cases, how it is diagnosed.

Q. If my child does have (C)APD, what happens next?
A. In the public school, a team called an IEP team (which includes you) looks at all the information and identifies what your child needs. For some children with mild problems, changing the child's seat position, having the teacher modify her instructional style (slowing down, repeating, rephrasing, using visual prompts) and improving the acoustic environment in the classroom may suffice. It's important to remember that a child with a slight or mild (C)APD who is not clinically in the disordered range *may not* be eligible for special education services in the public schools if there is no other accompanying disability. If a child's diagnosis does qualify for special education services, they will typically require direct therapy to remediate the auditory weaknesses, in addition to teaching modifications, acoustic modifications, and perhaps an assistive listening device. At some point your child may only require teaching or environmental modifications and/or an assistive listening device. This type of support would be considered under a document called a Section 504 plan instead of an IEP.

If reading and spelling problems are present, the resource specialist or reading teacher may need to provide some additional help. Any direct instruction outside of your child's regular classroom teacher requires your child to have an IEP, which is the document that describes the your child's goals, program, the specialists involved, and the manner in which the goals will be measured.

Q. Can I have an independent specialist diagnose my child?
A. Parents may bring a private evaluation to the IEP team for review. However, it should be noted that the criteria used by the private sector may not be consistent with the public school requirements. (C)APD should only be diagnosed by an audiologist, but the law in CA presently also allows a psychologist to qualify a child for special education services under the category of "auditory processing disorder" as a form of a specific learning impairment. California public schools generally require that a child scores lower than the 7th percentile in order to be diagnosed as a special education student. Private sector evaluators may interpret higher numbers as an (C)APD disorder, using methods such as

inter-test and intra-test discrepancies, which are not at this time part of the state's diagnostic formula for determining a disorder. While a child may perform below average or be diagnosed as having an auditory processing disorder by a private practitioner, this does not necessarily qualify as a disorder for special education services in the context of a public school program.

The treatment recommended by a private evaluator may be considered. However, outside agencies may advocate for treatments considered experimental, non-traditional or without research or clinical substantiation. The providers may lack proper educational degrees, licenses, or background to properly determine an appropriate (C)APD program. The public school system is not required to provide an *ideal* program, which may involve considerable expense to the district, but an appropriate education that *adequately* addresses the child's special education needs. In cases where there is a disagreement between the school and the parents as to how this should be defined, "due process" is often utilized to reach a settlement.

Appendix B: Tips for Parents

Parents will need to be an active participant in guiding their child through the assessment, treatment, and management process. The following are some suggestions for parents:

1. Learn and read as much as possible about auditory processing disorders. There are some excellent books written for parents, such as, When the Brain Can't Hear (Teri Bellis) as well as websites http://www.ncapd.org (National Coalition on Auditory Processing Disorders) and http://pages.cthome.net/cbristol/capd-lnk.html (A parent-run website).

2. For children who are old enough and have sufficient maturity, you may want to consider explaining to the child why he/she is experiencing difficulties, and what the "game-plan" is that you are putting together to help address the auditory issues and accommodate the child's weakness.

3. Try to understand your child's assessment report(s). Ask as many questions as needed, in order to fully comprehend the areas of difficulty your child is experiencing. Because each child with (C)APD is unique, it's important to know which aspects of (C)APD your child is exhibiting.

4. Make sure your child's teachers have been fully briefed on the ramifications of having this disorder on his classroom performance. Don't assume last year's teacher or team members have done so. You will need to be proactive and initiate a conversation with each teacher at the beginning of each year. Give the teachers printed information about the disorder, as well as explain the nature of your child's specific type of (C)APD.

5. Encourage and praise your child when he/she asks for clarification when confused during auditory processing tasks. This is a compensatory strategy that will be necessary for your child to accommodate this weakness. Make sure your child's teacher is receptive and supportive of this "repair" strategy.

6. Encourage and praise your child when he/she takes proactive steps to structure their conversational or learning environment to limit auditory distractions or background noise. For example, he/she may want to close a window or door during a conversation, turn down the car radio, or move closer to you.

7. If your child has a weak auditory memory, make sure you help your child get used to writing down key words in directions in order to remember them. Note-taking skills will be helpful in remembering lectures, but some children find audiotaping lessons help to review important concepts as well.

8. Slow down your rate of speech and pause between key points when talking to your child.

9. Try to limit idiomatic expressions, unfamiliar words, and long-winded explanations.

10. Make sure your child is attending to you when giving directions or initiating a conversation. A gentle touch on the shoulder may be needed if he doesn't tune in to his name, particularly with background noise present.

11. Limit background noise (dishwasher, TV, washer/dryer) when initiating conversations. Be aware that having conversations outdoors with ambient noise (e.g. on a soccer field) or in a car, is challenging for many children with (C)APD.

12. Write down and draw important new concepts from school subjects (e.g. Science, Social Studies, or literature) to help illustrate the word. Using a dictionary is rarely a helpful way for children with (C)APD to learn new words.

13. Be patient. Your child may need things re-explained several times in order for it to "sink in". He may forget or misunderstand when assignments, projects, or tests are due at school, or misunderstand the directions for doing them.

Appendix C: Modifications for Teachers

Children with an auditory processing disorder typically require adaptations and modifications in the classroom in order to compensate for their weak auditory systems. Specific recommendations should be based on the results of standardized tests as well as behavioral observations. *Modifications should always be individualized*. Some suggested teaching modifications are:

1. Facilitate an "acoustically-friendly" environment. (See Appendix D: Modifications for Classroom Acoustics).

2. Learn as much as possible about auditory processing disorders. (See Appendix A: Parent/Teacher Support) Additional suggested reading: When the Brain Can't Hear by Teri James Bellis, PhD (2002) and Childhood Speech, Language & Listening Problems: What Every Parent Should Know by Patricia Hamaguchi (2001).

3. Some helpful suggestions:

    - Seating: Find out if the child has a weaker ear, if so, position the child with the stronger ear facing you. Seat the child so he can see your face clearly, with no more than a 45° angle, and away from ambient noise sources.
    - Get the child's attention during critical instruction with a verbal or tactile cue when it's time to listen.
    - Limit lecture-style instruction to short periods of time.
    - Face the child when talking.
    - Speak at a slow-normal rate.
    - Pause frequently at natural breaks to allow processing time, particularly when asking questions.
    - Project your voice, but don't over-exaggerate your speech.
    - Use gestures to supplement your meaning, including facial expressions.
    - Demonstrate the first few examples of an activity, rather than simply explaining.
    - Repeat important pieces of information several times.
    - Preteach important concepts and vocabulary.
    - For middle-high school level children, providing the teacher's lecture notes ahead of time is helpful.
    - Allow and encourage the child to ask questions to clarify what was heard or meant.
    - Keep the child in close proximity.
    - Avoid talking or giving directions when writing on the eraserboard.
    - Avoid multi-stepped directions-give directions one at a time.
    - Avoid idiomatic expressions.
    - Keep ambient noise (e.g. pencil sharpeners, feet shuffling, papers being collected,) to a minimum during key instructional times.
    - Write key words and concepts on the board.
    - Illustrate (draw) out new words and use in several sentences in lieu of having the child look them up in the dictionary.
    - Allow a note-taking "buddy".
    - Tell the child which specific information to listen *for*, during lectures to help the child stay on task and zero in on what is important (directed listening).

Appendix D: Modifications for Classroom Acoustics

Most children listen better in an environment where there is an advantageous signal-noise ratio. Please read ASHA's "Guidelines for Addressing Acoustics in Educational Settings"(2004) for an in-depth discussion on the conditions that are needed for classrooms and schools to provide optimal listening conditions.

Creating an "acoustically-friendly" listening environment is a key component of the management plan for children with auditory processing disorders. Open-classroom designs are inappropriate for children with APD. (Bellis, 2002) Below are suggestions for ways in which the classroom environment can be modified for optimal listening conditions.

Limit Mechanical Noise
Heating and cooling systems are often noisy, as well as fluorescent lights, clocks, fish tanks, and computers. When and where possible, efforts should be made to eliminate or reduce these noise sources, particularly during key instructional times.

Floors
Floors with hard surfaces, such as wood or tile, should be covered with wall-to-wall carpeting, including padding. If this is not possible, large area rugs can reduce some ambient noise.

Ceilings
Acoustical ceiling tiles are an excellent way to help absorb noise. Ceiling height should be less than 12 feet. Any kind of fabric or artwork suspended from the ceiling will help dampen noise and reverberation.

Windows
Because windows are hard surfaces, they reflect sound. Add draperies, blinds or shades to help reduce the hard surface area. In cases where this is not possible, hanging artwork, posters, and students' papers will help somewhat. Close windows during oral instructions.

Walls
Walls are best covered with cork bulletin boards, fabric, egg cartons, carpet squares and other materials that will absorb sound. Avoid hard surfaces.

Doors
A solid-core door is preferential to a hollow-core door. Squeaks should be oiled. Rubber strips or a felt lining around the opening can help keep out noise from outdoors or the hallway.

Desks
For rooms that are not carpeted, some people find putting tennis balls or rubber tips on the bottom of the desk legs helps reduce the ambient noise that occurs when children shift and move their desks. As children rummage through desks looking for items, the shuffling can add to the noise level. Lining the inside of the desk with felt or fabric can help dampen this effect.

Additional Resources: www.clasroomacoustics.com; Classroom Acoustics Coalition: www.nonoise.org/library/classroom; Educational Audiologists Association: www.edaud.org

Appendix E: Test Publishers

Presently, tests are often distributed by many publishers. The following is a list of some of the publishers who carry tests described in the body of this document:

1. **Academic Therapy Publications**
   20 Commercial Blvd.
   Novato, California 94949
   (800) 422-7249
   www.AcademicTherapy.com
   Test of Auditory Perceptual Skills Revised: TAPS-R
   Receptive Vocabulary Test
   Auditory Processing Abilities Test
   Test of Auditory Analysis Skills
   The Expressive One Word Picture Vocabulary Test

2. **American Guidance Service, Inc.**
   4201 Woodland Road,
   Circle Pines, Minnesota 55014
   (800) 328-2560
   www.agsnet.com
   Comprehensive Assessment of Spoken Language (CASL)
   Wepman's Auditory Discrimination Test
   Peabody Picture Vocabulary Test
   CELF-4
   Goldman-Fristoe-Woodcock Test of Auditory Discrimination
   Listening Inventory

3. **Auditec of St. Louis**
   2551 S. Big Bend Blvd.
   St. Louis, MO 63143
   314-781-8890
   www.auditec.com
   Auditory Fusion Test-Revised (AFT-R) A Gap Detection Test
   Competing Sentences
   Dichotic Consonant/Vowel (D-CV)
   Dichotic Digits
   Dichotic Sentence Identification (DSI) Test
   Discrimination of PB-K in Noise (PRKN)
   Duration Pattern Sequence (DPS)
   Low Pass Filtered Lists
   Masking Level Difference (MLD)
   Pitch Pattern Sequence (PPS)
   Random Gap Detection Test-Expanded (RGDT-EXP)
   Rapid Alternating Speech
   Selective Auditory Attention Test (SAAT)

Spondee Binaural Fusion
Time Compressed Monosyllabic Word Tests
Time Compressed Sentence Test (TCST)

4. **Educational Audiology Association**
   13153 N. Dale Mabry Hwy.
   Tampa Florida 33618
   (800) 460-7322
   www.edau.org
   Children's Auditory Performance Scale (CHAPS)
   Screening Instrument for Targeting Educational Risk (S.I.F.T.E.R)

5. **Life Products**
   Bemidji, Minnesota
   Fisher's Auditory Problems Checklist

6. **LinguiSystems**
   3100 4th Avenue
   East Moline, IL 61244-9700
   (800) 776-4332
   www.linguisystems.com
   The Listening Test
   The Phonological Awareness Test

7. **Phonic Ear**
   3880 Cypress Drive
   Petaluma, California 94954
   (800) 227-0738
   www.phonicear.com
   Listening Environment Profile

8. **Precision Acoustics**
   505 NE 87th Avenue, Suite 150
   Vancouver, WA 98664
   360-892-9367
   The Phonemic Synthesis Test
   The Phonemic Synthesis Picture Test
   Central Test Battery-CD (ncluding the Staggered Spondaic Word Test: SSW)

9. **Pro-Ed**
   8700 Shoal Creek Blvd.
   Austin, Texas 78757
   (800) 987-3202
   www.proed.com
   Lindamood Auditory Conceptualization Test (LAC)
   Test of Language Development –3

The Comprehensive Receptive and Expressive Vocabulary Test (CREVT)
The Token Test
The Test of Phonological Awareness (TOPA)

10. **Psychological Corporation**
    19500 Bulverde Road
    San Antonio, Texas 78259
    (800) 228-0752
    www.psychcorp.com
    SCAN and SCAN-C

11. **Richard H. Wilson, Ph.D.**
    Audiology 126
    VA Medical Center
    Mt. Home, TN 37684
    www.va.gov/621quillen/clinics/asp/products

12. **Riverside Publishing**
    425 Spring Lake Drive
    Itasca, Illinois 60143
    (800) 323-9540
    www.riversidepub.com
    Woodcock-Johnson Test

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