

# Administer, Score, and Interpret the Clinical Assessment of Articulation and Phonology-2 (CAAP-2)

## Administer, Score, and Interpret the Clinical Assessment of Articulation and Phonology®-2 (CAAP®-2)

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## Speech Sound Disorders and Teachers' Perceptions

- Intelligibility and speaker pitch appear to be variables that influence a teacher's expectations of student's academic, social, and behavioral performance.
- Becomes very important for SLPs to remediate speech sound disorders for moderately intelligible children.

(Overby, Carrell, & Bernthal, 2007)

## Phonological Awareness and Articulation

- Children with speech sound disorders are at risk for having delayed phonological awareness skills if they have poor speech perception abilities and/or relatively poor receptive vocabulary.
- Becomes very important to assess speech perception, receptive vocabulary, phonological awareness, and emergent literacy skills.

(Rvachew & Grawburg, 2006)

## What Is Our Treatment Goal?

- To achieve the greatest amount of change in the least amount of time (Williams, 2002).
- Treatments are only as effective as our assessment is accurate and complete (Gierut, 1986).
- The ultimate goal of any assessment is to balance thoroughness against efficiency.
  - Thoroughness is necessary for valid decision making.
  - Efficiency should be sought for time, as well as financial constraints (Bleile, 2002).

## Why Do We Assess?



### A Thorough and Efficient Articulation Assessment Should:

- Assess production of all English consonants.
- Assess consonants in increasingly complex contexts.
- Differentiate an articulation impairment from a phonological impairment.
- Differentiate motor production from motor planning.

### Clinical Assessment of Articulation and Phonology – 2<sup>nd</sup> Edition (CAAP-2®)

- Ages 2;6 – 11;11
- Norm referenced (provides standard scores, percentile ranks, age equivalents)
- Assesses articulation and phonology
- 15-20 minutes to administer
- Checklist approach to assessing phonological processes virtually eliminates need for phonetic transcription
- Available in traditional print form or via iPad®

### Why Develop the CAAP-2®?

- Re-norm the assessment to reflect current U.S. census data.
- Extend the age limits of CAAP to 11;11.
- Discontinue the use of the error difference score.
- Include children with speech delays and differences in the sample (n=7%).
- Update the stimulus picture “computer.”
- Run new validity and reliability studies.
- Create an iPad® app that automatically generates scores.

### CAAP-2 Technical Characteristics

- Sample Size: 1,486 children between the ages of 2;6 and 11;11; closely resembles 2013 U.S. Census Data
- Test-retest correlations were significant beyond  $p < .01$  for raw scores, standard scores, and percentile ranks
- Concurrent validity comparing CAAP-2 to the GFTA-2 and the KLPA-2 were beyond  $p < .01$  for all raw scores, standard scores, and percentile ranks
- Inter-examiner reliability coefficients were perfect (1.00) for Articulation Inventory and above .99 for the Phonological Process Checklist

### What Does the CAAP-2® Assess?

#### Articulation Inventory Targets:

- Pre- and postvocalic consonant singletons
- Cluster words containing S, R, and L in the initial position
- Three- and four-syllable words
- Postvocalic productions of R
- Production of sounds in sentences (for children 5 years and older)

### What Does the CAAP-2® Assess?

#### Articulation Inventory (continued)

- Most consonant sounds are tested twice – once in initial position and once in final position; a few sounds are tested twice in initial position or twice in final position if the sound does not commonly occur in both positions.
- Three sections: **Consonant Singletons**, **Cluster Words**, **Multisyllabic Words**.
- Includes an *optional* introductory story to increase attention and act as a “warm-up” activity before beginning the actual assessment.

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## What Does the CAAP-2® Assess?

Phonological Process Checklists Target:

- Final Consonant Deletion
- Cluster Reduction
- Syllable Reduction
- Gliding
- Vocalization
- Fronting (velar & palatal)
- Deaffrication
- Stopping
- Prevocalic Voicing
- Postvocalic Devoicing



## CAAP®-2 Kit Includes

- Examiner's Manual
- Stimulus Easel
- 50 Articulation Inventory Record Forms
- 30 Phonological Process Record Forms
- 5 colorful, foam, 4" CAAP® Pals
- Tote bag!

## Upgrade from CAAP


To upgrade from CAAP to CAAP-2, all you need are:

- New CAAP-2 Articulation Record Forms
- New CAAP-2 Phonological Process Record Forms
- New CAAP-2 Examiner's Manual

(Use the Stimulus Easel, CAAP Pals, and tote bag you already have!)

## CAAP-2 App for iPad®



- Purchase the app from the 
- Use paper Articulation Inventory Forms:
  - Purchase in-app & print from your iPad
  - or*
  - Purchase from Super Duper Publications
- No need for paper Phonological Process Checklist – the Phonological Process Checklist is built into the CAAP-2 app!

## CAAP-2 App for iPad®



- Integrated age calculator
- Electronic stimulus pictures
- Automatic calculation of Standard Scores, Percentiles, Age Equivalents
- Generate Phonology Scores directly from the Articulation Inventory
- Email or print summary reports
- Electronic Examiner's Manual in the app

## Administering the CAAP-2 Print Edition



# Administer, Score, and Interpret the Clinical Assessment of Articulation and Phonology-2 (CAAP-2)

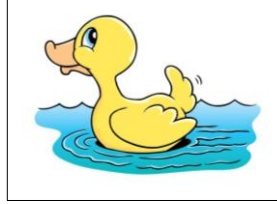
## Consonant Inventory: Optional Story



Child looks at easel pictures and examiner reads the story to the child.



## Consonant Inventory

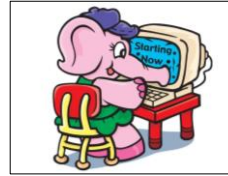


Examiner says, "What is this?"  
 If pictures fails to elicit the correct response, give the prompt.  
 Examiner says, "It says, 'Quack.'"  
 If child does not response correctly following prompt, say the target word and have the child repeat it.  
 Examiner says, "Say, 'Duck.'"

## School-Age Sentences

- For children ages 5;0 to 11;11
- Articulation accuracy in sentences that vary in length (8 to 11 words) and complexity (number of syllables in the word, word shape, quasi-clusters at word junctures, later developing sounds and frequently occurring sounds, etc.).
- May compare to Consonant Inventory. Some children who experience difficulty in speech motor planning may perform poorer on the sentences than expected.
- Child repeats eight sentences. Examiner may give two repetitions per sentence.

## School-Age Sentences



Examiner says: Say all the words I say.  
 "The elephant plays her favorite computer game."  
 If the child does not say **all** of the words, say the sentence again and have the child repeat it.  
 Examiner says: Remember to say all of the words. Say, "The elephant plays her favorite computer game."

The screenshot shows the 'Articulation Response Form' for the CAAP-2. It includes fields for Client's Name, Date of Birth, Age, Date of Administration, Sex, and Examiner's Name. There are checkboxes for 'Check appropriate age' (Preschool/Under 5 years, School Age/5 years and older) and 'Check appropriate gender' (Male, Female). Below these are two columns of data entry boxes for 'Articulation Inventory' and 'School Age Sentences', each containing boxes for Standard Score, Confidence Interval 95%, Percentile Rank, and Age Equivalent. A 'Comments' box is at the bottom.

Transfer scores to the front of the Response Form.  
 Look up Standard Scores, Confidence Intervals, Percentile Ranks, and Age Equivalents in the Norms Tables in the Examiner's Manual (pp. 76-93).

## CAAP-2: Phonological Process Checklist

Checklist approach to assess occurrence of ten common phonological processes.  
 Two types of scores:

- Simple percentage of occurrence (if process is  $\geq 40\%$  then that process is "active").
- Standard score (mean = 100; s.d. = 15).  
 Note: Only use phonology standard score if child has at least one process with a percentage of occurrence that is 40% or greater.

### CAAP-2: Phonological Process Checklist

Ten phonological processes evaluated:

- Final Consonant Deletion
- Cluster Reduction
- Syllable Reduction
- Gliding
- Vocalization
- Fronting (Velar & Palatal)
- Deaffrication
- Stopping
- Prevocalic Voicing
- Postvocalic Devoicing

### CAAP-2: Phonological Process Checklist

Checklist I used to analyze process patterns based on child's responses on the Articulation Inventory. It is done after the testing is finished.

Checklist II (print version only) permits an active assessment of child's phonological process patterns. Administer plates 45-69 and score the child's sound changes as they happen.

#### Phonological Process Checklist I (print edition)

Transfer information from Articulation Inventory to the Checklist.

#### Phonological Process Checklist I (print edition)

Summary of Phonological Processes

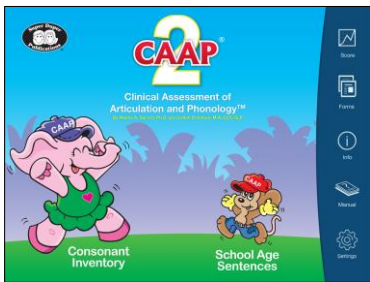
Phonological Process	Checklist I	Checklist II
	YES NO	YES NO
1) Final Consonant Deletion	YES NO	YES NO
2) Cluster Reduction	YES NO	YES NO
3) Syllable Reduction	YES NO	YES NO
4) Gliding	YES NO	YES NO
5) Vocalization	YES NO	YES NO
6) Fronting (Velar and Palatal)	YES NO	YES NO
7) Deaffrication	YES NO	YES NO
8) Stopping	YES NO	YES NO
9) Prevocalic Voicing	YES NO	YES NO
10) Postvocalic Devoicing	YES NO	YES NO

Phonological Processes Score: \_\_\_\_\_

Checklist I Total: \_\_\_\_\_ Checklist II Total: \_\_\_\_\_

- Transfer # of yes responses and % of occurrence to front page of test form.
- Total number of "yes" responses.
- Look up Standard Score, Percentile rank, and Age Equivalent in the Norms Tables in the Examiner's Manual (pp. 103-114).

### Administering the CAAP-2 App Edition



Use a printed Articulation Inventory to record responses. Purchase in app and print from iPad *or* order from Super Duper Publications.

### Consonant Inventory: Optional Story



Enable Story in Settings.  
Tap Consonant Inventory to begin.

Story pictures are shown and the prerecorded story is "read" to the student by the iPad.

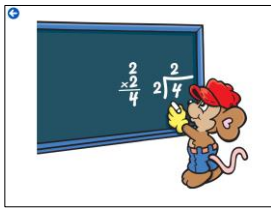
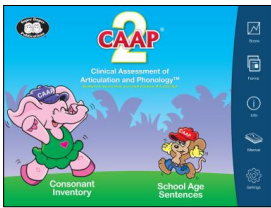
### Consonant Inventory



Examiner says, "What is this?"  
If pictures fails to elicit the correct response, give the prompt.  
Examiner says, "A bird can live here."  
If child does not respond correctly following prompt, say the target word and have the child repeat it.  
Examiner says, "Say, 'Cage.'"

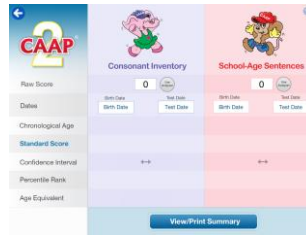
Document responses on paper record form.  
Can **audio record** response in the app.  
Swipe to next item.

### School-Age Sentences



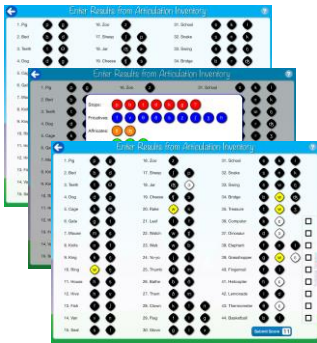
- Tap School-Age Sentences on home screen to begin.
- Picture is presented on iPad. Student repeats sentence. If the child does not say **all** of the words, say the sentence again and have the child repeat it.
- Mark any words with errors on paper record form.

### Scoring on the iPad



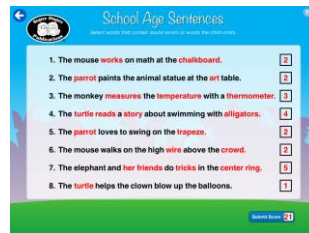
Tap "Score" on home page.  
On scoring screen, tap to enter Birth Date and Test Date.  
Tap "Use Analyzer" to enter sound errors made.

### Scoring the Consonant Inventory on the iPad



On Analyzer screen, tap on the target sound that was produced in error. Listen to audio recording of child as needed.  
Tap on substituted sound or omission, distortion, or other.  
Once errors are entered, tap Submit Score.

### Scoring School-Age Sentences on the iPad

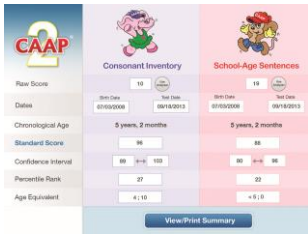


Tap Use Analyzer from scoring screen.  
Tap on words that contained an error or were omitted.  
Once errors are entered, tap Submit Score.



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## Scoring CAAP-2 on the iPad



Chronological age, standard score, confidence interval, percentile rank, and age equivalent scores are automatically calculated after errors are entered into the analyzers.

Tap "View/Print Summary" to view a summary of all results, including the Phonological Process results!

## CAAP-2 iPad Summary Report

## Reliability of Administering Stimulus Items Via the iPad

- Multiple studies regarding reliability of presenting stimulus items digitally via iPad or computer have been conducted.
- Study results indicate test reliability does not change when stimulus items are delivered electronically.

(Bowers & Husingh, 2011; Strait et al., 2013; Waite et al., 2013)

## Test Interpretation: The Articulation Inventory

- **Step 1:** Finalize All Record Form Information and Test Scores.
- **Step 2:** Complete the Consonant Singleton Summary and Consonant Singleton Index (completed automatically in the app edition).
- **Step 3:** Review the Developmental Age Norms.
- **Step 4:** Analyze Performance on School-Age Sentences.
- **Step 5:** Other Considerations and Observations
  - Rate Speech Intelligibility
  - Other Observations

## Test Interpretation: Phonological Process Data

- **Step 6:** Finalize all checklist information and percentages (completed automatically in app edition).
- **Step 7:** Identify active processes (identified automatically in app edition).
- **Step 8:** Focus on Phonological Processes that may hinder the development of key contrastive features.

## Step 8 (Details)

### First Priority

- Simple syllables (CV, VC)
- Syllables with final consonants (CVC)
- Front vs. back of mouth differences (alveolars/velars)
- Acquisition of stridency (/s/, /f/, "sh", etc.)
- Glides vs. liquids (/w/ or /j/ for /r/ or /l/)

### Second Priority

- Syllables with initial clusters (CCV, CCVC)
- Syllables with final clusters (CVCC, CCVCC)
- Front vs. back (middle) of mouth differences (alveolars/palatals)
- Voicing contrasts
- Syllabic consonant contrasts
  - rhoticity, "vocalic R"
  - /l/ vs. /o/ tied with assimilations – harmony problems

# Administer, Score, and Interpret the Clinical Assessment of Articulation and Phonology-2 (CAAP-2)

## Test Interpretation: Phonological Process Data

- **Step 9:** Tie up loose ends.
- **Step 10:** Define the big picture.
  - Review all test scores and determine severity.
  - Determine what speech sounds are produced in error.
  - Determine what characteristics of the child's speech you notice the most.
  - Review error types and patterns.
  - Determine if additional information is needed.
  - Make recommendations.

Refer to Examiner's Manual pp. 45-60 for details on the authors' Ten-Step Test Interpretation Process.

## Test Interpretation: Additional Resources

Additional resources in the Appendices of the Examiner's Manual (pp. 119-132):

- Stridency Deletion Checklist
- Initial Consonant Deletion Checklist
- Backing Checklist
- Consonant Harmony Checklist
- Stimulability Assessment
- Summary Tables for /s/, /l/, /r/, and /ə/
- Vowel Checklist

## Questions?

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