

Constructs Measured

The following sections provide descriptions of the Amira Screener test design covering each of these areas as well as links and screenshots to illustrate Amira in action.

Phonological Awareness

All Phonological Awareness tasks are supported for grades K-1.

Blending task

In this task, spoken words are presented as sequences of individual phonemes. The student must blend the provided phonemes together into the full word. The task begins with Amira providing instructions that the student will hear the individual sounds that make up a word. The student is then prompted to blend these sounds seamlessly into a word typically mastered at the student's grade level.

The blending task is structured as follows:

1. Amira: "You will hear a word one part at a time. Listen carefully and put the sounds together to make a whole word."
2. Video of teacher articulating phonemes: "/m/ /oo/ /s/."
3. The expected student response would be "moose".

A video of the task can be found [here](#).

Phoneme segmentation task

This task requires students to listen to words consisting of one- and two-syllable words with two to five phonemes (e.g., ate, up, jump). The full articulation of the word is provided, and students are then asked to identify either the first or last sound of the word. The student is not presented with any text associated with the word to be segmented.

The single phoneme segmentation task is structured as follows:

1. Amira provides directions to the student.
2. A warm-up item is presented.

For each assessment item:

3. Amira shows a person on the screen saying the word, and then asks the student to say the word back.

4. After Amira detects that the student has said the word back, Amira then asks the student to say the first or last sound.
5. The student says the sound.

The responses are scored using Amira.

Phonological elision task

In the phonological elision task, students are asked to say the sounds that remain after deleting a specific phoneme or word-part from a word. For half of the words, the deletion occurs at the beginning of the word, and for the other half of the words, the deletion occurs at the end of the word.

Amira delivers this task under the cover story of figuring out “mystery words” to say to Spot, a dog that students become acquainted with when they are first introduced to Amira’s software.

The phonological elision task is structured as follows:

1. Amira provides directions to the student: “We’re going to say some mystery words to Spot. I’m going to say a word, and then give you a part of that word you should not say.”
2. A warm-up item is presented: “For example, can you say the word ‘cup?’” [student says the word] “Now, can you say ‘cup’ without the /k/ sound?” [student responds and Amira provides feedback]

For each assessment item:

3. Amira says the word and asks the student to say the word.
4. After Amira’s models detect that the student has said the word back, Amira says “Now tell me what word would be left if I said [word] without the [phoneme or word-part] sound”.
5. The student responds.
6. The responses are scored using Amira’s machine learning models

Phonological working memory task

In the pseudoword repetition task, an adult person says – in the context of a video – a sequence of syllables that string together to produce a pseudoword that does not exist in any commonly spoken language. The student is then prompted to say back this pseudoword exactly as they heard it.

The sequences of syllables are carefully developed to calibrate to varying degrees of difficulty (e.g., varying syllable counts), to ensure they don't form words in any commonly spoken language, and to be age-appropriate (e.g., utilize phonemes and syllables that are appropriate to the speech capabilities of children at each age level).

The phonological working memory task is structured as follows:

1. Amira provides directions to the student: "Here is my friend. My friend is going to say some words that aren't real words, like *zehvy*."
2. A warm-up item is presented: [a woman on the screen sounds out *zeh-vy*] "Please say *zehvy* to my friend" [student responds, and Amira provides feedback].

For each assessment item:

3. Amira says the pseudoword syllable sequence and asks the student to say the pseudoword syllable sequence back.
4. After Amira's models detect that the student has made an attempt at a response, Amira says "Got it!". If Amira detects that the student is making no attempt, she will give the student up to one opportunity to replay the video of the pseudoword.
5. The student responds.
6. The responses are scored using Amira's machine learning models

Alphabetic Knowledge: Letter Identification/Naming

Amira's Letter Naming task shows the letters of the alphabet in text form on the screen, one at a time, and requires students to verbally name the letters within a certain time window per letter.

This task utilizes Amira's ability to listen to speech, enabling the software to emulate the typical approaches that teachers use to assess alphabetic knowledge mastery.

A student is typically presented with ten items in this task.

The Letter Naming Task is structured as follows:

1. Amira provides directions to the student.
2. A warm-up example is presented.
3. A letter is presented to the student on screen in text form.
4. The student is asked to say the name of the letter shown on the screen.
5. The student has a configured interval of time in which they are given to articulate the correct letter name.
6. Amira scores the item dichotomously.

For an example video of the Letter Naming Task, go [here](#). The Letter Naming Task is supported for Grades K-1.

Alphabetic Knowledge: Letter Sound Correspondence

Amira's Letter Sound Task shows the letters of the alphabet in text form on the screen, one at a time, and requires students to produce the sound that the letter makes within a certain time window per letter.

The Letter Sound Task is structured as follows:

1. Amira provides directions to the student.
2. A warm-up example is presented.
3. Amira displays the upper- and lower-case instantiations of one letter.
4. The student is asked to say the sound that the letter shown on the screen makes.
5. The student has a configured interval of time in which they are given to articulate the correct phoneme.
6. Amira scores the item dichotomously. If there are multiple correct responses (as with vowels), Amira accepts any version as correct

A student is typically presented with six to ten items in this task.

The Letter Sound Task is supported for Grades K-1. To see a video of the Letter Sound Task, go [here](#).

Phonics/Decoding: Pseudoword (Nonword) Decoding

The goal of this task is to measure a student's capacity to decode, converting printed text into a sequence of sounds and then blending those sounds into complete pseudowords.

Using pseudowords, word-like items that are not real words in the English lexicon, requires students to rely on their decoding skills rather than recognizing words from memory and familiarity. The Pseudoword Decoding task is presented as a series of made-up words, with Amira listening for the proper sound-outs based on common letter-sound correspondences and for successfully blending the sounds into the full pseudoword unit. Amira's pseudoword items are carefully constructed to reflect the expected decoding skills of scholars at the target grade level, to be phonotactically valid,

and to avoid biases that may be present for bilingual/ELL and other special populations (i.e., pseudowords that are real words in other languages, especially if the decoding patterns differ from English, are excluded). Kindergarten and 1st grade items are short and mostly mono syllabic. Words used in the task conform to standard and typical patterns within the English lexicon.

The Pseudoword Decoding task is structured as follows:

1. Amira provides directions to the student.
2. A warm-up item is presented.
3. A pseudoword is presented in text form.
4. The student is asked to decode and pronounce the full pseudoword.
5. The student has a configured interval of time to articulate the pseudoword.
6. Amira scores the item.

The Pseudoword Decoding task is supported for grades K-6. To see an example video of the task, go [here](#).

Phonics/Decoding: Word Decoding/Identification

Amira measures the word decoding construct using a Word Identification Task. In this activity, the student is presented with decodable words of varying difficulty and is asked to read the word aloud.

The Word Identification Task tests the basic ability to read words in isolation. The words presented are mostly at the student's grade level but vary in difficulty. Words are chosen to test a student's mastery of all letter-sound correspondences and basic decoding skills that are expected at the student's level.

The Word Identification Task is structured as follows:

1. Amira provides directions to the student.
2. A warm-up item is presented.
3. An isolated word is presented to the student in text form.
4. The student is asked to read the word.
5. The student has a configured interval of time to read the complete word.
6. Amira scores the item.

The Word Identification Task is supported for Grades K-6. The number of items presented varies from 4-20, depending on the grade level, with the number of words increasing with higher grade levels.

Oral Passage Reading Fluency

Amira administers an Oral Reading Fluency (ORF) task to assess students' ability to read words in the context of a passage, employing accuracy and speed metrics, including Words Correct Per Minute (WCPM).

Amira presents a grade level passage with no images, broken into chunks. The student reads a chunk of text and then moves to the next block of text. If the student is not able to read with any degree of fluency, the text presented is downleveled. Typically, Amira presents enough text for the student to read for between 90 seconds and 4 minutes, providing enough reading to produce a valid ORF score.

When a student completes a block within the passage, Amira enables the student to move on to the next block.

The ORF task is structured as follows:

1. Amira provides directions to the student.
2. Amira presents a short passage broken into blocks.
3. The student reads the passage, one block at a time.
4. If necessary, Amira adjusts text complexity based on the student's observed ability.
5. Timing information is kept at the word level.
6. On passage completion, Amira scores the ORF passage, identifying which words were correctly read and which words were not.
7. Amira uses each word as an item, and additionally uses overall metrics like WCPM and error rate to compute final scores.

The ORF task is supported for Grades K-6. To see an example video of the ORF task, go [here](#).

Reading Comprehension

The Reading Comprehension task is an extension of the Oral Reading Fluency task. When enabled via task configuration, Amira follows on the student's oral reading with a set of questions in order to minimize assessment time. After the student completes the ORF passage, Amira poses several questions, typically in cloze format.

Vocabulary

In this task, Amira presents a word and asks the student to choose which word “goes best with” the target word from an array of 3 options. Amira reads the target word out loud and can read each of the multiple-choice options out loud on mouse-over, avoiding the need for students to be able to read the words in order to complete the task. The goal of this task is to measure on-grade vocabulary skills, with each item chosen to represent a class of words that should be in the vocabulary of learners progressing at the state’s expected pace.

Amira also supports a configurable version of the vocabulary task whereby the choices are presented in the form of pictures. In this version, she presents and reads the word aloud and it is also shown in text. Amira asks the student to select which picture best shows that word. The correct picture is accompanied by two to three distractors. The screenshot below shows an item from the configurable picture version of the core vocabulary task. The task includes 5 items per grade in grades K-6.

Encoding

In the Encoding task, Amira presents a spelling test of 5 to 10 words. Item count is determined by grade and configuration. Amira articulates the words one by one, including using each word in a full sentence to give the student context. The student uses the keyboard to spell the word. Amira will repeat the word if needed. When the student has finished spelling, the green arrow activates, and the student can move forward at their own pace. If too much time elapses, Amira will automatically move to the next item.

Words vary in difficulty level, and the amount of time a student has to respond is adaptive within the software. Words are automatically scored by Amira as correct or incorrect. Additional error analysis by the teacher can help teachers understand specific spelling confusion. As with other items, the words included in the spelling task are specifically chosen for grade appropriateness and for letter-sound correspondence coverage.

The encoding/spelling task is structured as follows:

1. Amira provides directions to the student.
2. Amira reads the word, followed by an example of the word used in a sentence, followed by repeating the word again. For example, for the target word “rub”, Amira might say “Rub. I rub my eyes when they itch. Rub.”
3. The student is then prompted to type the word into a text box, with an option to ask Amira to repeat the word if needed.
4. The responses are scored dichotomously based on whether the student spells the word fully correctly (1) or not (0).

The Encoding Task is supported for Grades K-6.

Listening Comprehension

Amira's Listening Comprehension Task involves playing a video with an adult reading a short story out loud. After listening to the passage, the student answers 3 to 5 questions, which are also read aloud to the student. The Listening Comprehension Task does not involve the presentation of any text, require any reading, or necessitate the use of the alphanumeric keyboard.

The typical Listening Comprehension passage is 60 to 75 seconds long and tells a brief character-rich story. Each comprehension passage is tailored for a specific grade level. After the student listens to the oral reading by the adult, the student can choose to listen to the story again, or to move on to the questions.

The stories/passages used in the Listening Comprehension task have been carefully grade leveled and equated to one another. The number and nature of the questions posed depends on the grade level of the passages and user preferences.

The Listening Comprehension stem and alternative answers are all read aloud for the student. Answer choices are repeatedly read aloud whenever the student mouses over each one.

The Listening Comprehension task is supported for Grades K-6.

Rapid Automatized Naming

The Amira Screener administers a Rapid Automatized Naming (RAN) task. The RAN task has been found to be a highly valid signal of dyslexia risk and highly predictive of the developmental trajectory of word reading (word recognition) skills in kindergarten, 1st, and 2nd grades.

Amira can deliver three different forms of RAN—numbers, colors, and objects—since the screener strives to rely on items that are within the general scope of a student's development and abilities. The purpose of the task is to assess speed and automaticity, not whether or not the students can identify the stimuli or not. In all forms of the RAN task, the stimuli are those that are likely to be known by children at very early ages.

The foundational output of the RAN task is total processing time required to complete the task. Students are timed and total time to completion is recorded by the system, with item-level accuracy also recorded. Amira also computes a RAN speed by dividing the number of items accurately sequentially named by the total processing time.

Within each task type (letters, colors, or objects), six different stimulus items per task type are repeated in random order for a total of 36 stimuli, arrayed in four horizontal rows of 9 items per row. The RAN task is structured as follows: Amira provides directions to the student to identify the stimuli from left to right, starting with the top line and moving line by line from the top line to the bottom line, naming the items on

each line from left to right. Students are asked to go as fast and as accurately as they can. Amira presents and demonstrates an example consisting of six different stimulus items per task type repeated in random order for a total of 18 stimuli, arrayed in two horizontal rows of 9 items per row. In the example, she names the stimuli in the top row from left to right, followed by the stimuli in the second row from left to right. Amira tells the student it's their turn and presents a screen with six different stimulus items per task type, repeated in random order for a total of 36 stimuli, arrayed in four horizontal rows of 9 items per row. This is a completely separate ordering of stimuli than that which was presented in the example. The student reads the stimuli serially from left to right, with a "return to sweep" in each subsequent line going from top to bottom. Total time to completion is recorded. Item-level accuracy is recorded.

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The RAN Task is supported for Grades K-6 (all task types in grades K and 1, and the number RAN task only for grades 2-6).