



Rapid Online Assessment of Reading (ROAR)

A bridge between the lab,
community, and classroom

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Stanford University School of Medicine

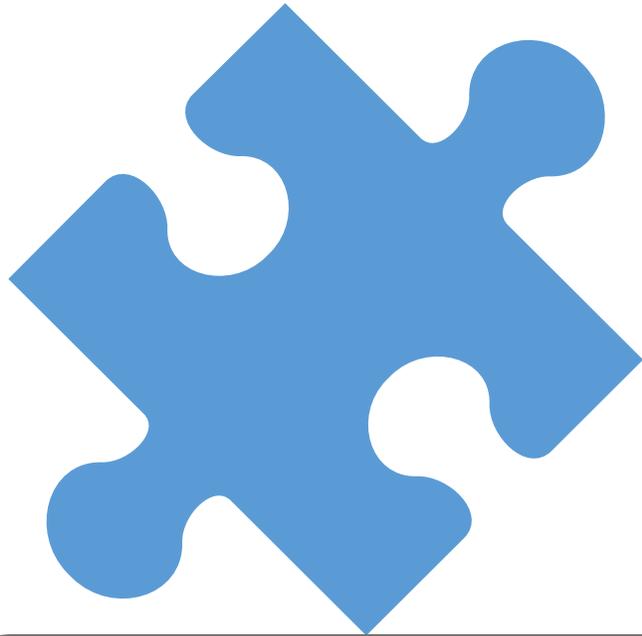
<https://ROAR.Stanford.edu/>

<https://BrainAndEducation.com>

Democratizing
Access with
ROAR@Home



<https://roar.stanford.edu/homesignup>



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Access with
ROAR@Home



<https://roar.stanford.edu/homesignup>

The Problem: Assessments are time-consuming, resource-intensive, costly, and are often grounded in opaque proprietary products that are divorced from science.

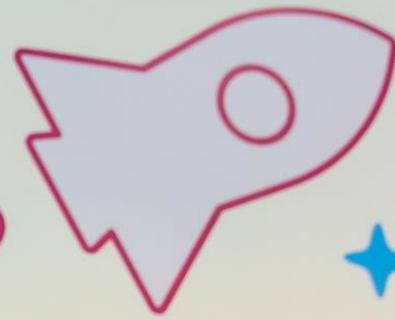
Our Solution: The Rapid Online Assessment of Reading (ROAR)

An open-science, platform of completely automated assessments that is grounded in ongoing research and co-developed with school-district partners and community-based organization.

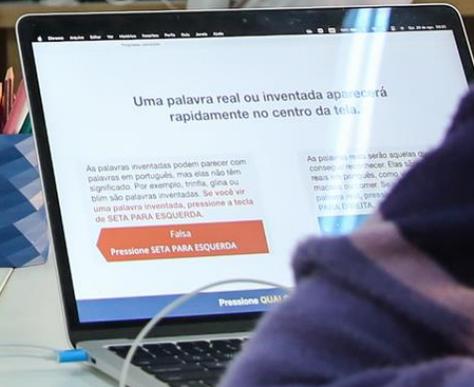
ROAR is...

- Kid-friendly, efficient, and automated
- Assess an entire district (K-12) in just a few minutes

GET



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ROAR is...

- Kid-friendly, efficient, and automated
- Assess an entire district (K-12) in just a few minutes
- Developed entirely through research-practice partnership model
- In collaboration with educators and families

So teachers can spend *more* time teaching and *less* time administering and scoring assessments!



Rapid Online Assessment of Reading (ROAR)

- More efficient, reliable screening, assessment & progress monitoring at scale
- No loss of instruction time
- Grounded in ongoing research



Collaborations with schools & clinics



Virtuous cycle of Research & Practice

- Insights from practitioners
- Large groups of diverse research participants
- New research directions



Lab R&D Cycle

- Brain Imaging
- Behavioral Measures
- Interventions



Rapid Online Assessment of Reading (ROAR)

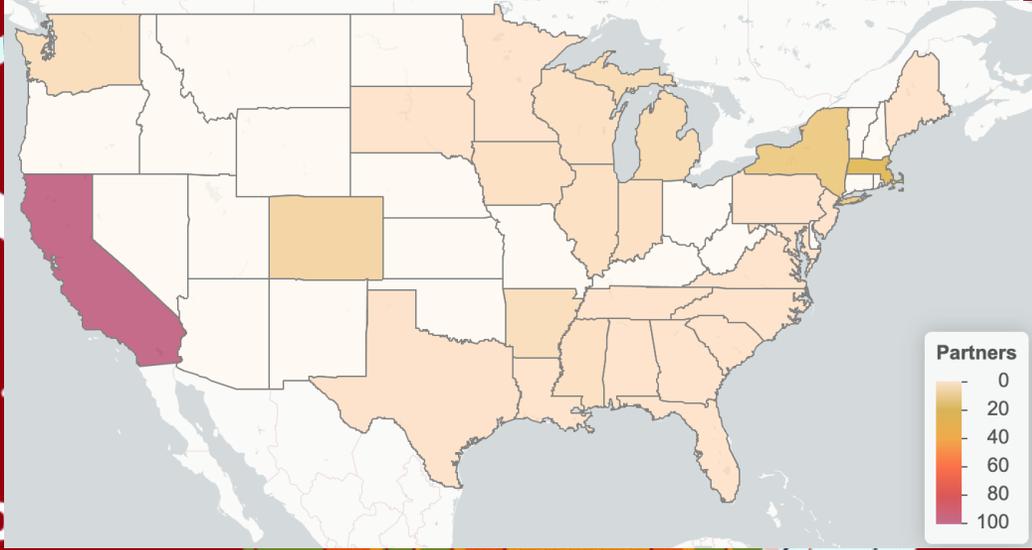
**Mission: Scientific
Transparency**

<https://roar.stanford.edu/technical/>

Large scale screening,
continuous monitoring at scale
time
research



<https://roar.stanford.edu/technical/intro-norms.html>



scientific reports

OPEN Rapid online assessment of reading ability

Jason D. Yeatman^{1,2,3,6}, Kenny An Tang^{1,2,9}, Patrick Mahalakshmi Ramamurthy^{1,2}, Ilana I. Karipidis^{1,2}, Shikant K. Kanopka⁷, Michal Ben-Shachar⁸ & Benjamin

An accurate model of the factors that contribute to individual differences in reading ability is essential for large-scale data collection in large, diverse and representative samples. However, such data collection is rarely feasible due to the constraints imposed by standard reading tests, which require test administration by trained clinicians or researchers. Here, we present a two-alternative forced choice, time limited lexical decision browser, which can serve as an accurate and reliable measure of reading ability. The LDT is highly correlated with scores on standardized reading tests (e.g., Woodcock-Johnson Letter Word Identification test ($r = 0.92$)). The LDT reading ability measure is highly reliable ($r = 0.92$).

www.nature.com/scientificreports

Check for updates

ROAR CAT: Rapid Online Assessment of Reading Ability with Computerized Adaptive Testing

A Fair Lexical Decision Task for Monolingual and Multilingual Spanish-Speakers

Development and validation of a rapid and precise online sentence reading efficiency assessment

Rapid Online Assessment of Reading (ROAR): Evaluation of an online tool for screening reading skills in a Developmental-Behavioral Pediatrics Clinic

Development and validation of a rapid online sentence reading efficiency assessment

Generative AI work for Sentence Reading Efficiency work presented at the AI4Education Summit

Generating and Evaluating Tests for K-12 Students with Language Model Simulations: A Case Study on Sentence Reading Efficiency

ROAR-CAT: Rapid Online Assessment of Reading Ability with Computerized Adaptive Testing

Publications

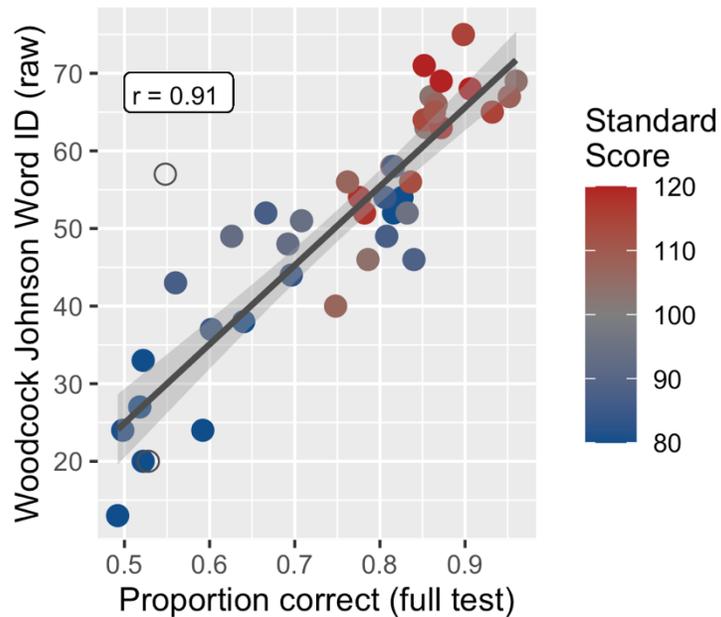
Research Practice Partnerships: 31 states, and 5 countries, >100,000 data points.

Goal: Build enduring links between research and practice, serve 1M learners for free, and unlock unprecedented research opportunities.

<https://roar.stanford.edu/>

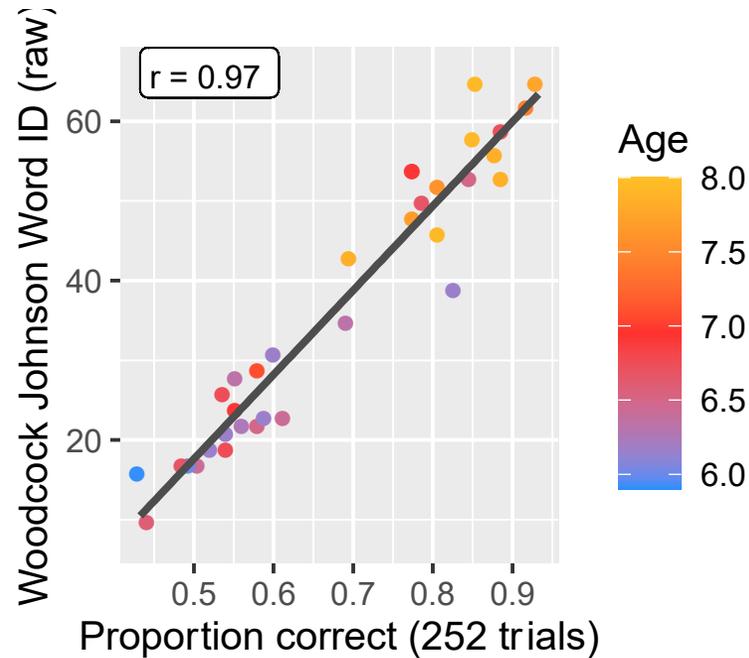
Grounded in cognitive neuroscience, rigorously validated in the lab and the school

Validation 1: Individually-administered Woodcock Johnson (ages 7-18)



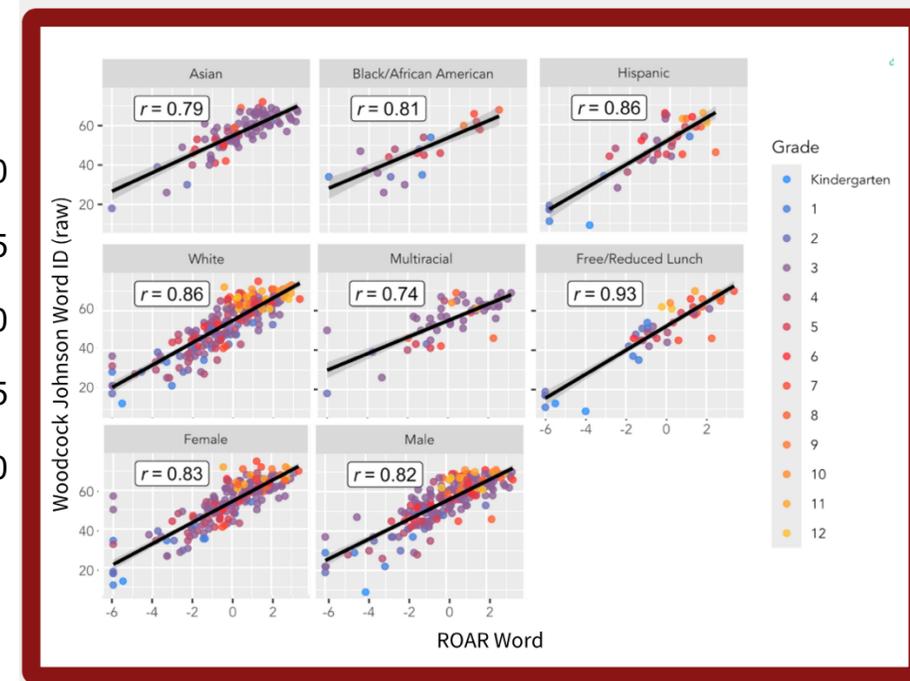
Yeatman et al. 2021; Fig. 1

Validation 2: Individually-administered Woodcock Johnson (ages 6-7)



Yeatman et al. 2021; Fig. 4

Validation 3: >5,000 students across districts around the US and Colombia (grades K-12)



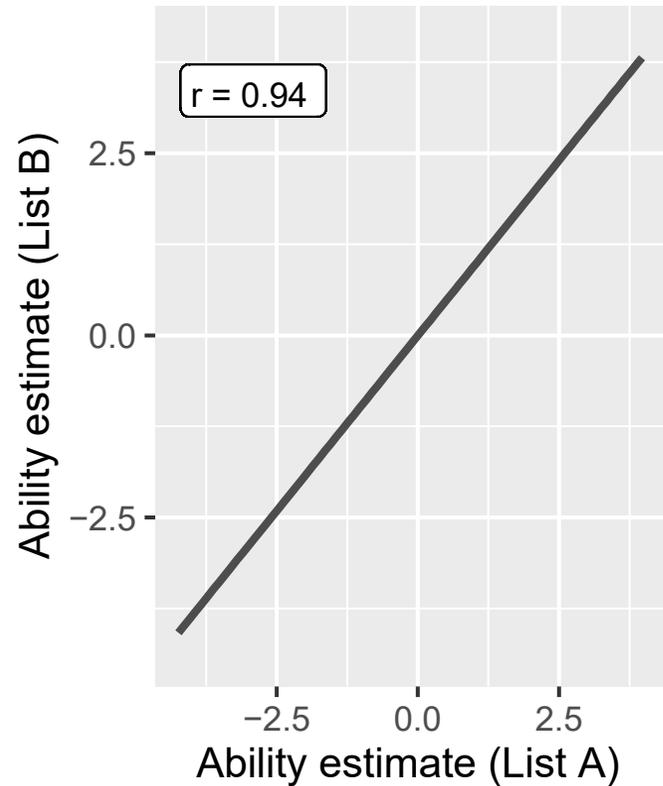
Gijbels et al. 2024; Ma et al. 2025

<https://roar.stanford.edu/technical/concurrent-validity-sw.html>

<https://roar.stanford.edu/technical>

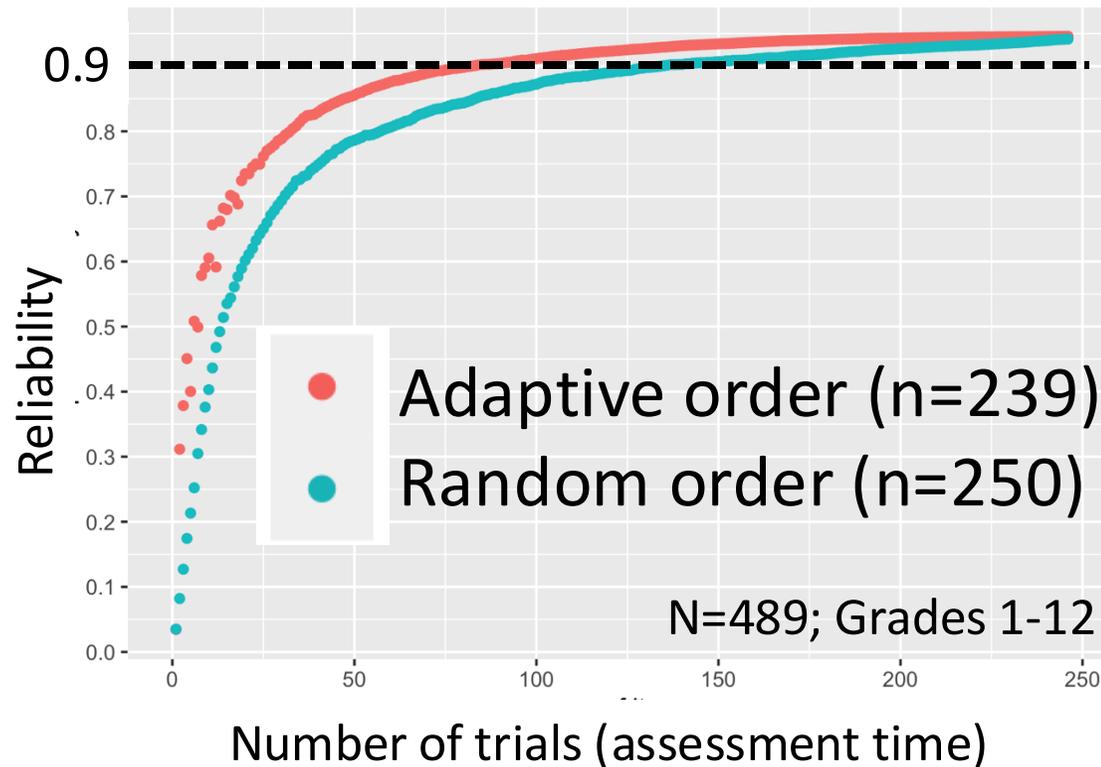
Optimized to be reliable, efficient, fun, and engaging

Test-retest reliability optimized based on Item Response Theory



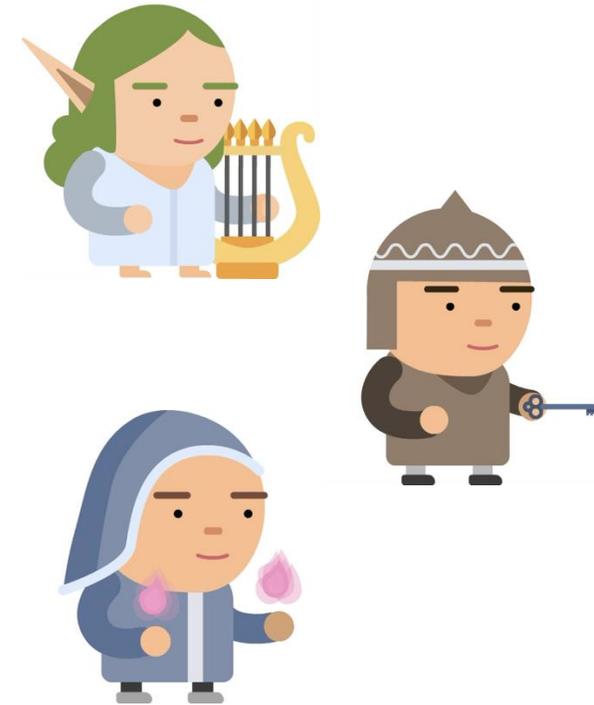
Yeatman et al. 2021; Fig. 1

40% Efficiency gain with a new Computer Adaptive Testing (CAT) algorithm



Ma et al. 2025; Fig. 7

Improved reliability through **thoughtful** gamification



Ma et al. *in prep*

Foundational Reading Skills and Dyslexia Screening

Single Word Recognition

ROAR-Word



ROAR-Word measures a student's ability to **quickly recognize words**. Word recognition is at the foundation of reading ability and is important for reading fluency and comprehension.

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Foundational Reading Skills and Dyslexia Screening

Single Word Recognition

ROAR-Word



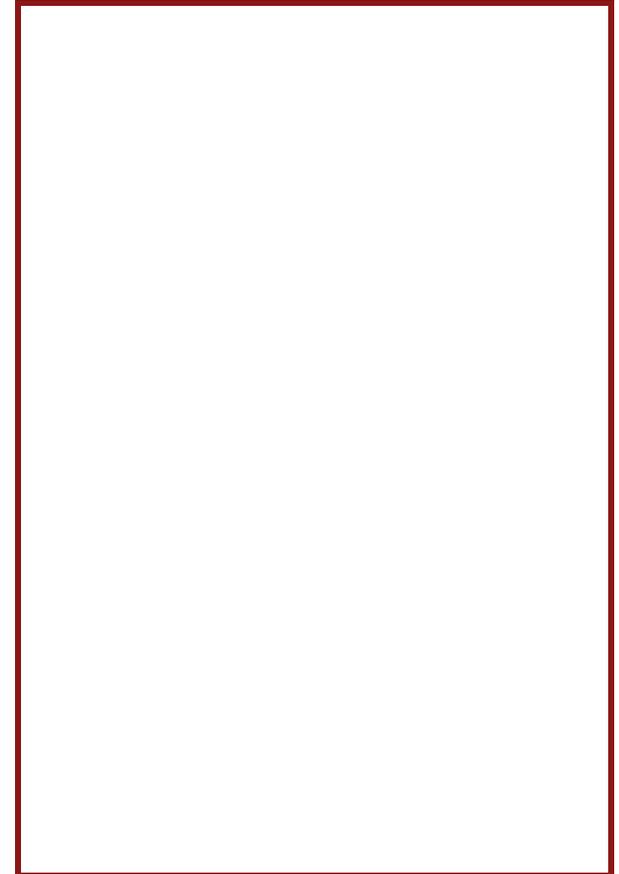
ROAR-Word measures a student's ability to **quickly recognize words**. Word recognition is at the foundation of reading ability and is important for reading fluency and comprehension.

Phonological Awareness

ROAR-Phoneme



ROAR-Phoneme measures **elision and sound matching** to assess a student's phonological awareness.



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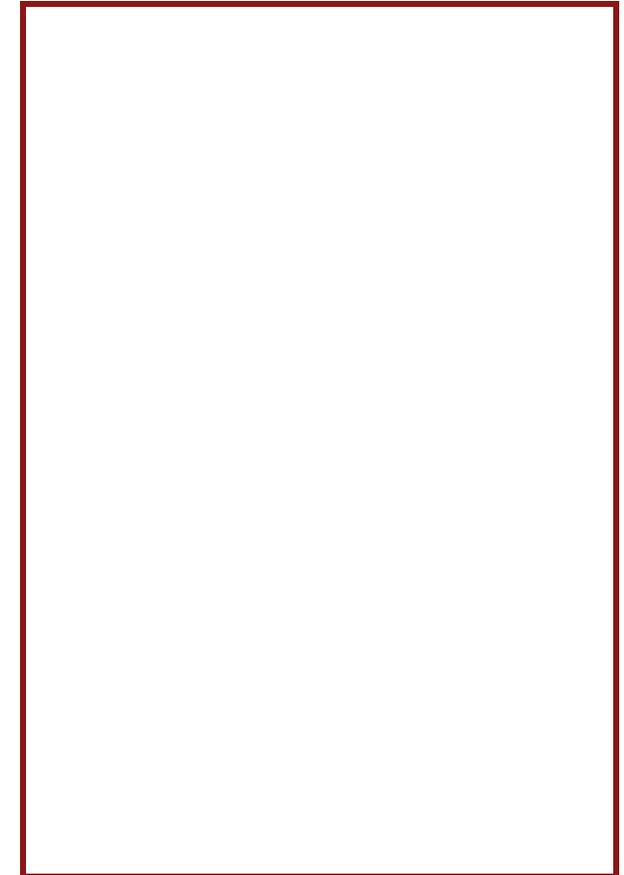
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Sentence Reading Efficiency

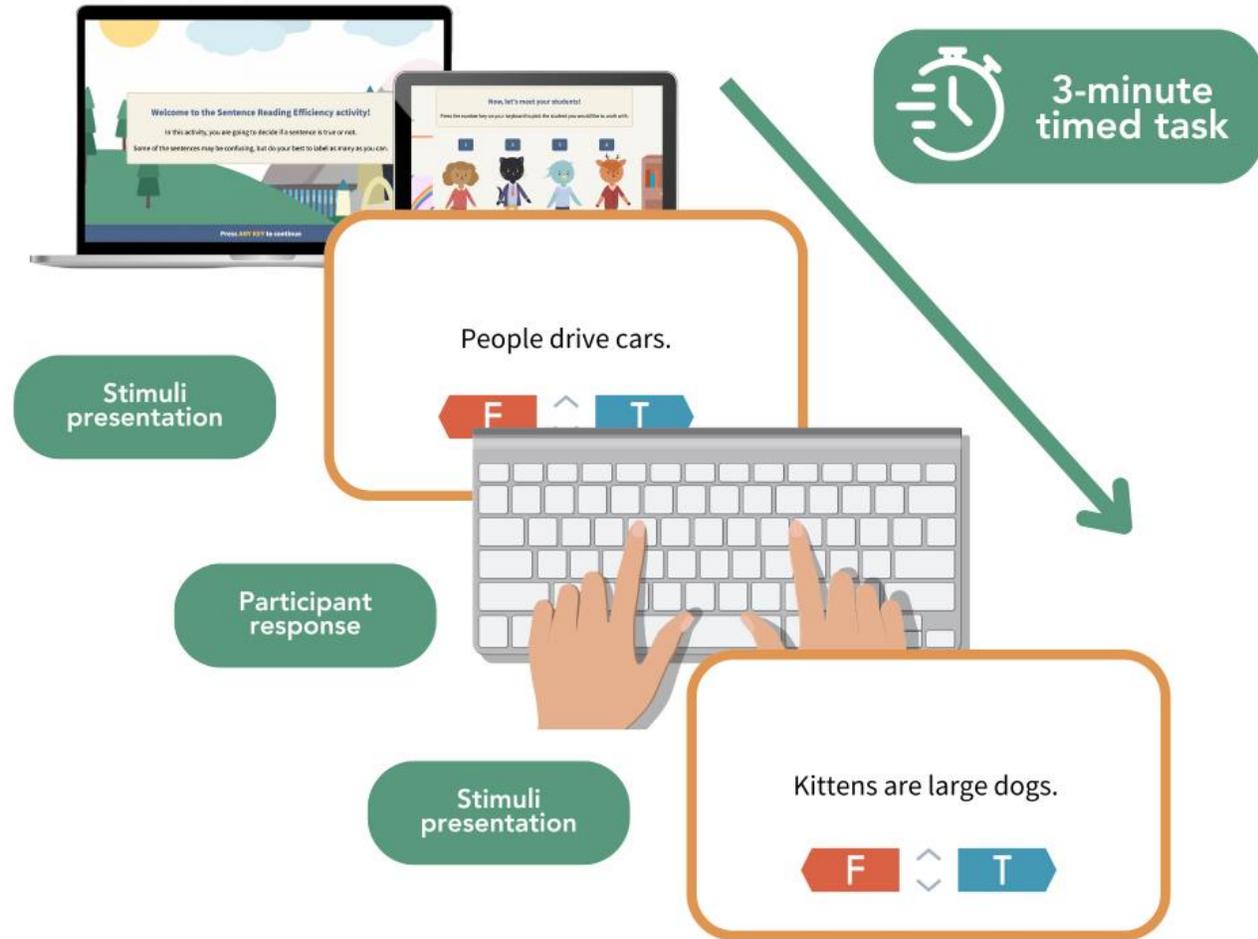
ROAR-Sentence



ROAR-Sentence measures students' ability to **silently read and understand sentences quickly and accurately**.



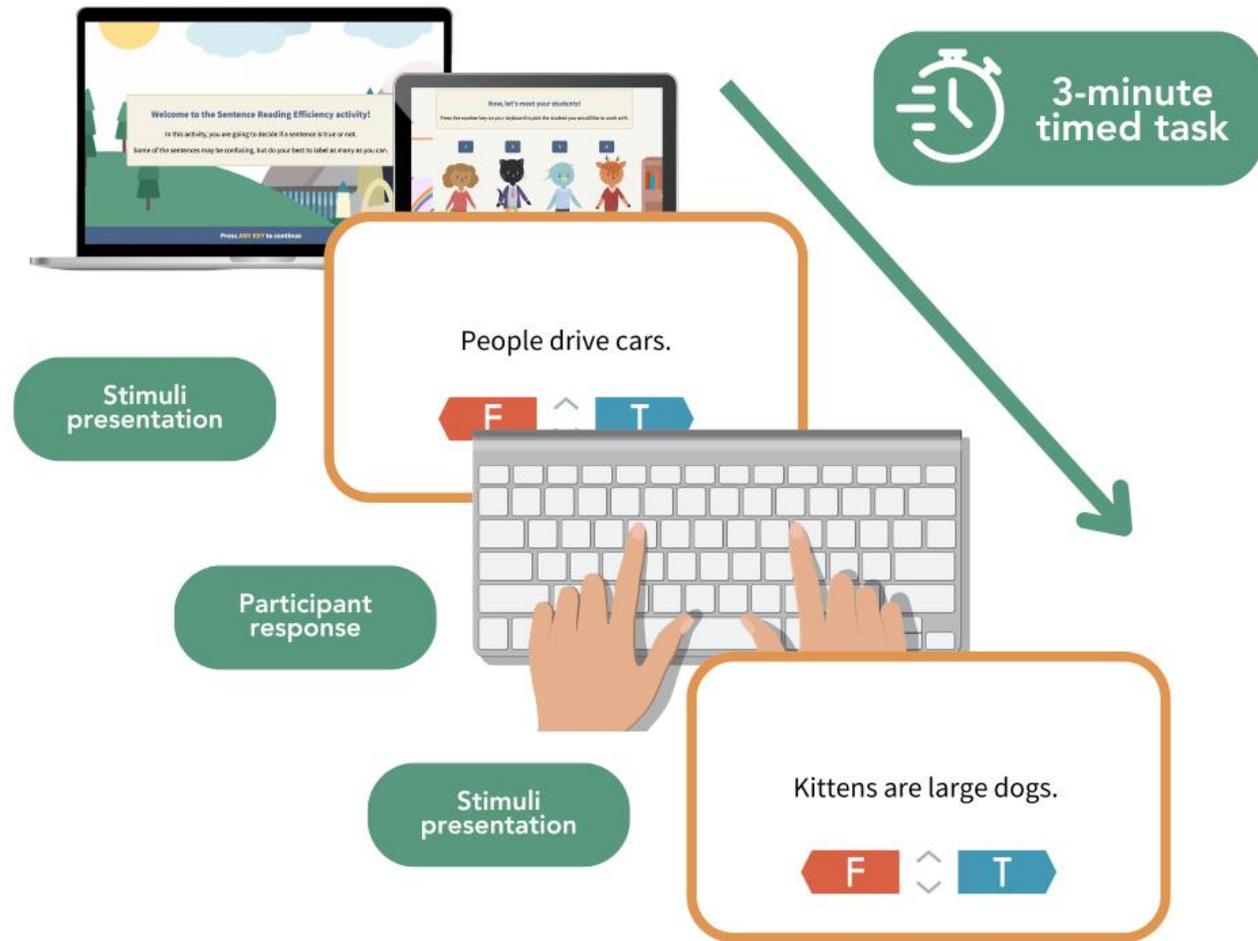
ROAR - Sentence Reading Efficiency



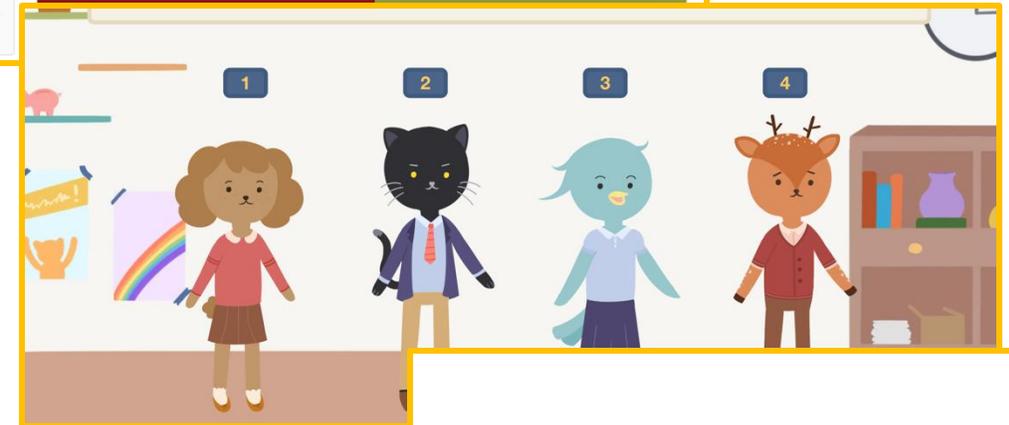
Design principles

- Simple assertions that are clearly (and universally) true or false
- Minimal background knowledge
- Simple syntax
- Simple vocabulary
- Measures the efficiency of reading for understanding

ROAR - Sentence Reading Efficiency

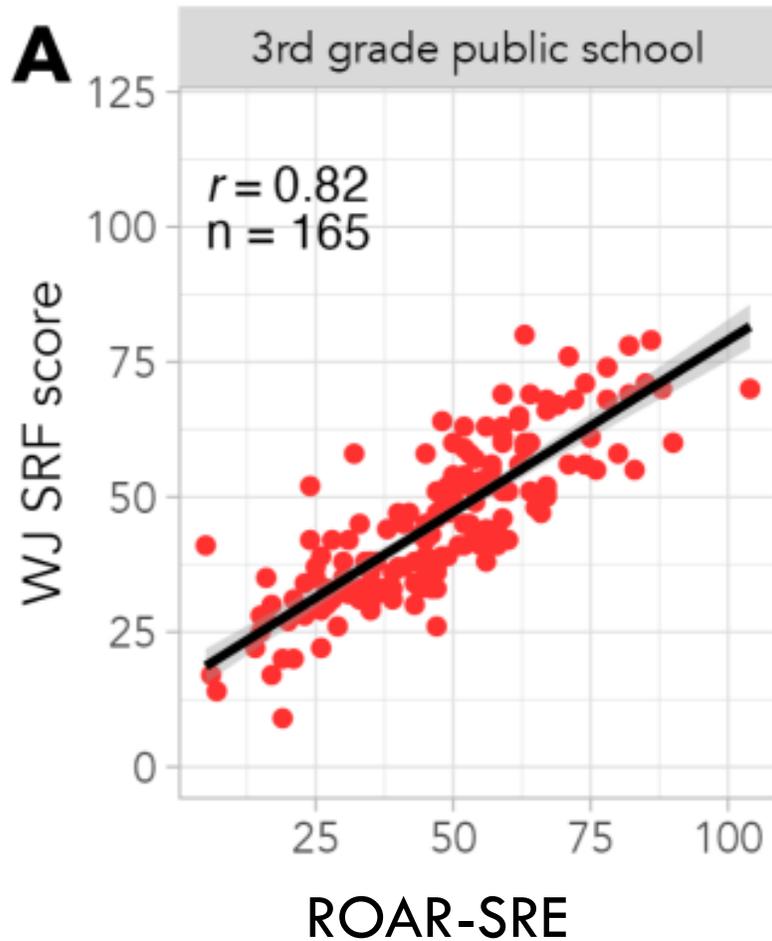


The screenshot shows the ROAR web interface. At the top, there is a "United States" dropdown and a "Sign Out" button. The main heading is "zzz Test ROAR Preview". On the left, a green progress indicator shows "4/5 tasks completed!". Below it, "Student Info" indicates "Grade: 10". The main content area has tabs for "ROAR - Letter", "ROAR - Phoneme", "ROAR - Word", "ROAR - Sentence", and "ROAR - Palabra". The "ROAR - Sentence" tab is active, displaying the text "ROAR - Sentence" and "Read sentences as quickly as you can and decide if they are true or false." Below this, a green box highlights the current task: "ROAR Sentence" with the sentence "Cats bark like dogs." and buttons for "F" (False) and "T" (True).

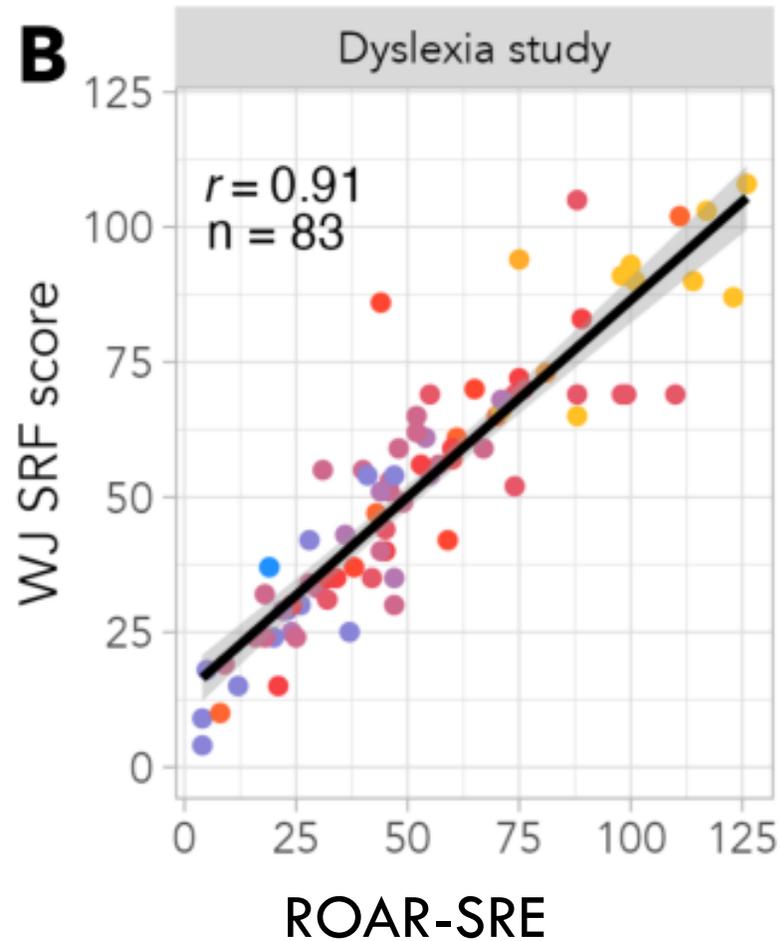
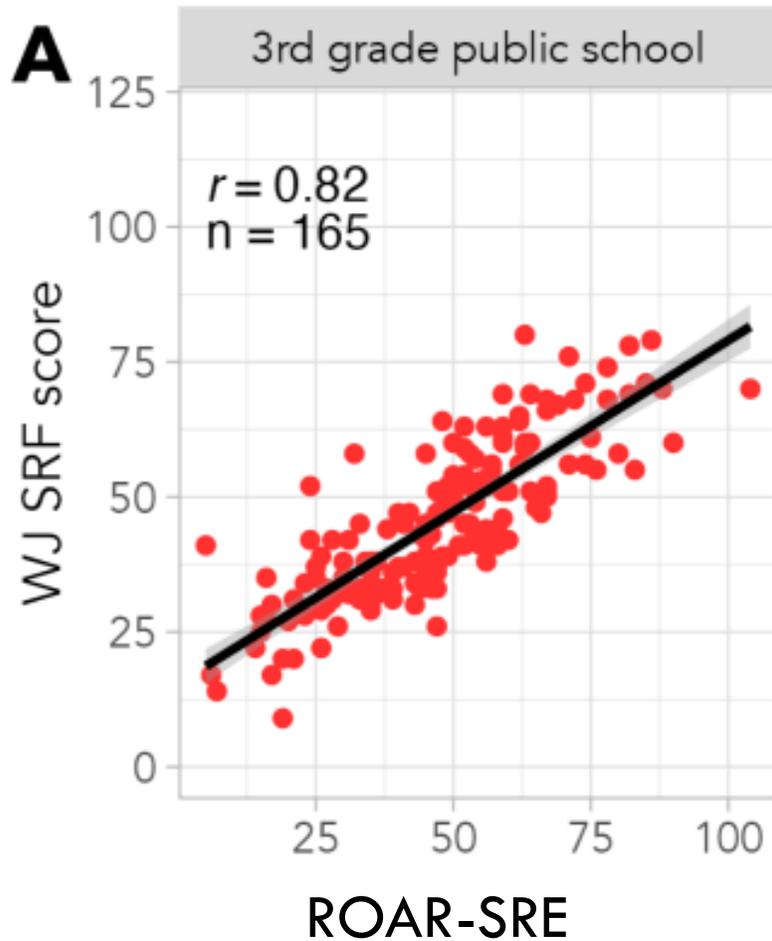


A screenshot of a sentence in the ROAR interface: "You wear a hat on your foot." Below the sentence are buttons for "F" (False) and "T" (True).

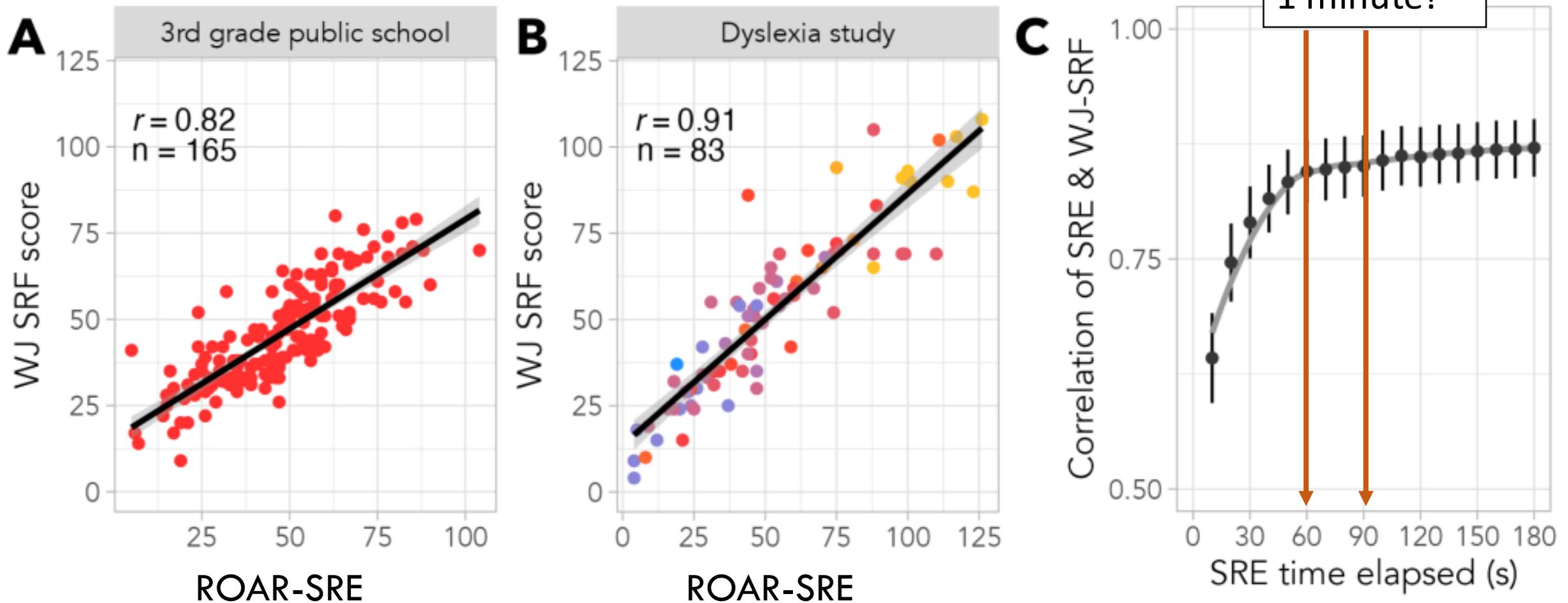
Sentence Reading Efficiency: Fast and reliable



Sentence Reading Efficiency: Fast and reliable



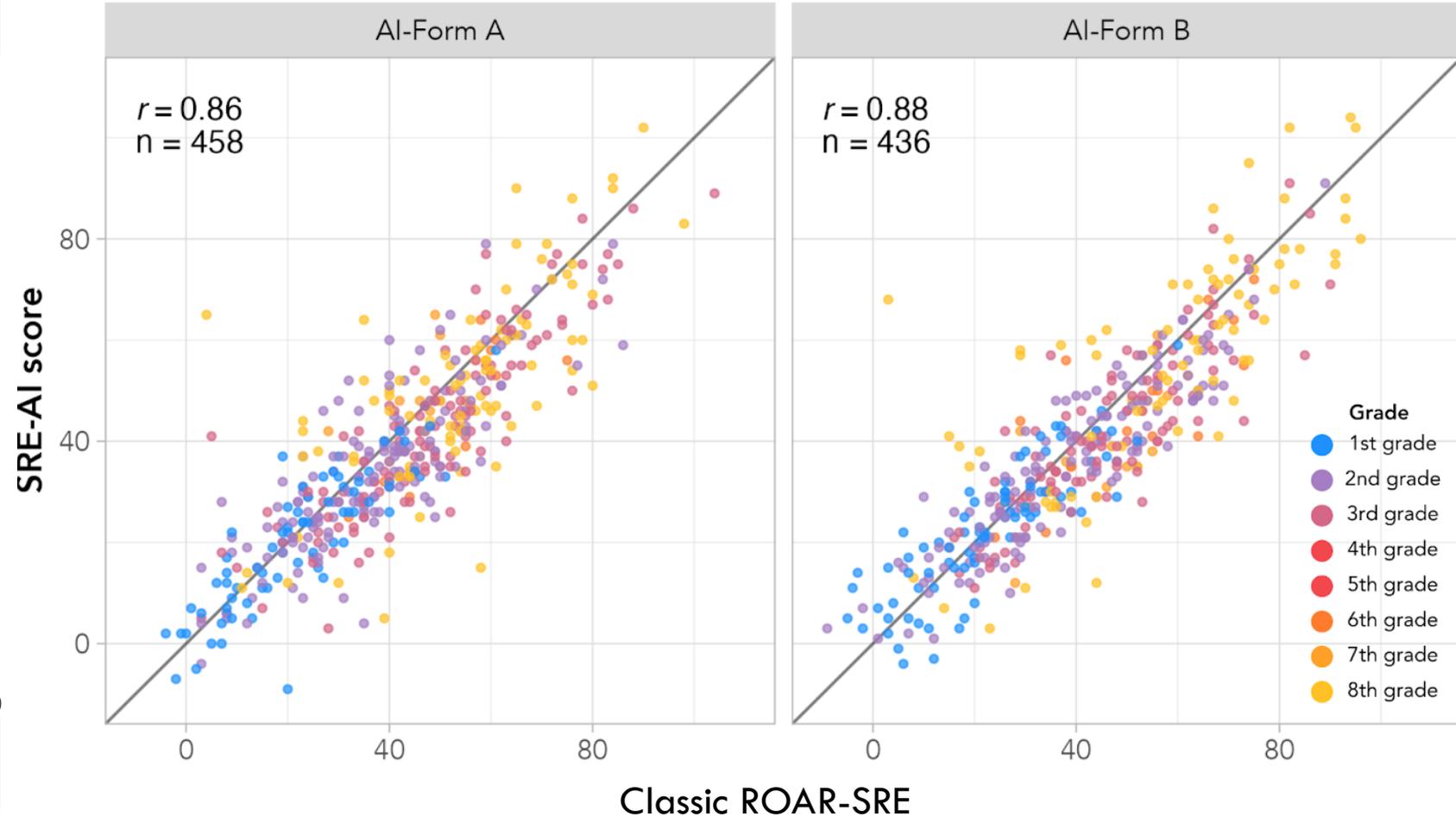
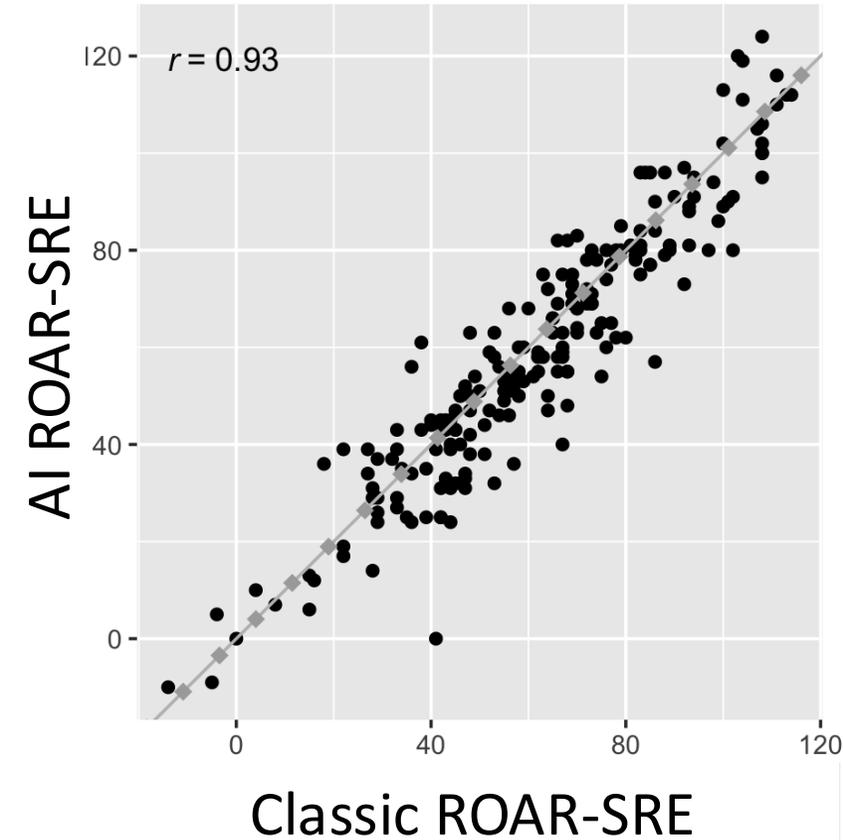
Sentence Reading Efficiency: Fast and reliable



Sentence Reading Efficiency: Fast, reliable and “infinite” parallel test forms

New AI model can generate “infinite” matched test forms!

90s; Precise; Validated grades 1-12



Foundational Reading Skills and Dyslexia Screening

Single Word Recognition

ROAR-Word



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Phonological Awareness

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Sentence Reading Efficiency

ROAR-Sentence



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Letter Sound Knowledge

ROAR-Letter

Aa

ROAR-Letter measures knowledge of **upper and lowercase letter names** as well as **letter sounds**.

Foundational Reading Skills: Student View



2/4
tasks
completed!

Student Info

Grade: Kindergarten

ROAR - Phoneme

ROAR - Letter

ROAR - Sentence

ROAR - Word

ROAR - Word

Words will flash quickly on the screen. Decide if they are real or made up.



Click to start



Hi, welcome
to ROAR!



Hi, welcome to ROAR! Today, we are going to play a game that involves reading!



Foundational Reading Skills: Teacher/Admin View

(score reports for validated measures)

Current research partnership: Best practices for multi-lingual learners

DISTRICT SCORE REPORT
ROAR DEMO DISTRICT
 ADMINISTRATION
ROAR DEMO ADMINISTRATION

VIEW Progress Report Score Report
 Export To PDF

ROAR-WORD

SINGLE WORD RECOGNITION

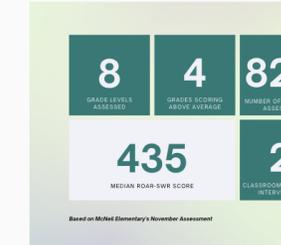
The ROAR - Single Word Recognition test evaluates a student's ability to quickly and accurately recognize individual words. To read fluently, students must master fundamental skills of decoding and automaticity. This test measures a student's ability to detect real and made-up words, which student's reading levels and need for support.

WHAT IS DECODING?

Decoding refers to the ability to sound out and recognize words by associating individual letters or groups of letters with their corresponding sounds. It involves applying knowledge of letter-sound relationships to read words accurately and fluently.

WHAT IS AUTOMATICITY?

Automaticity refers to the ability to read words quickly and accurately without having to think about each letter or sound. It allows readers to focus more on understanding what they are reading instead of getting stuck on individual words.



<https://roar.stanford.edu/score-reports>

ROAR-WORD SCORES

SINGLE WORD RECOGNITION

The ROAR - Single Word Recognition test evaluates a student's ability to quickly and automatically recognize individual words. To read fluently, students must master fundamental skills of decoding and automaticity to become efficient readers. This test measures a student's ability to detect real and made-up words, which can then translate to a student's reading levels and need for support.

- What does decoding mean? Decoding refers to the ability to sound out and recognize words by associating individual letters or groups of letters with their corresponding sounds. It involves applying knowledge of letter-sound relationships to read words accurately and fluently.
- What does automaticity mean? Automaticity refers to the ability to read words quickly and accurately without having to think about each letter or sound. It allows readers to focus more on understanding what they are reading instead of getting stuck on individual words.

Overview

This score report presents information from the recent administration of the ROAR assessment to students in x during x.

- 30 students completed the Single Word Recognition task.
- The average ROAR score was 378 on a scale of 100 - 900 (min = 146, ROAR score for your classroom was 382).



IDENTIFYING WHO COULD BENEFIT FROM SUPPORT
 The ROAR score is the score we provide based on your student's performance measure their reading abilities at the time of the test. We use this score to identify students who could benefit from support or extra support should be worked with needs.



This graph contains individual student scoring compared to national norms. Highlighted are students scoring below the 25th percentile and above the 75th percentile. Hover over any datapoint and click to learn more about student performance.

ROAR-PHONEME SCORES

PHONOLOGICAL AWARENESS

ROAR - Phonological Awareness assesses a student's mastery of phonological awareness through elision and sound matching tasks. Research indicates that phonological awareness, as a foundational pre-reading skill, is crucial for achieving reading fluency. Without support for their foundational reading abilities, students may struggle to catch up in overall reading proficiency.

- What does elision mean? Elision refers to the omission or deletion of a sound or syllable within a word. It involves the removal of specific sounds or syllables to create a new unpronounced pronunciation. For example, the word "library" may be pronounced as "li-bry" by eliding the second syllable.
- What is phonological awareness? Phonological awareness is the ability to recognize and manipulate the sounds of spoken language. It involves an understanding of the individual sounds (phonemes), syllables, and words that make up spoken language. Phonological awareness skills include tasks like segmenting words into sounds, blending sounds to form words, and manipulating sounds within words.

Overview

This score report presents information from the recent administration of the ROAR assessment to students in x during x.

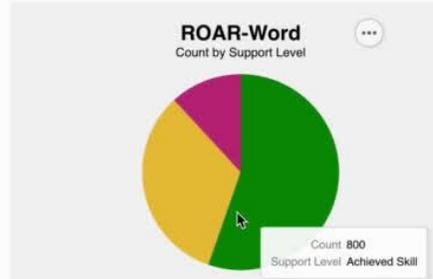
- 30 students completed the Phonological Awareness task. The average age of the student was 9.4.
- The average ROAR-PA score for your classroom was 38 (out of 57) (min = 9, max = 56, sd = 12.46). The median ROAR-PA score for your classroom was 41 (out of 57).



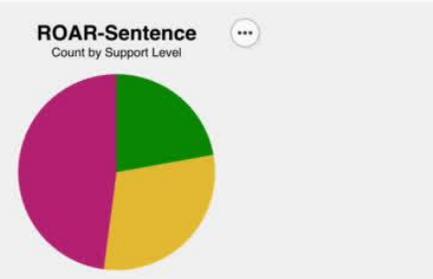
HOW THESE SCORES WERE DERIVED
 The Comprehensive Test of Phonological Processing (CTOPP) is a standardized test that was normed on a representative sample. We use ROAR scores to estimate CTOPP scores. By doing so, we are able to understand how your students' phonological awareness skills compare to other students across the country.



This graph contains individual student scoring compared to national norms for this age group. Highlighted are students scoring below the 25th percentile and above the 75th percentile. Hover over any datapoint and click to learn more about student performance.



ROAR-Word
 assesses decoding skills at the word level.



ROAR-Sentence
 assesses reading fluency at the sentence level.



ROAR-Phoneme
 measures the ability to hear and manipulate the individual sounds within words.

Report an Issue

Needs Extra Support Developing Skill Achieved Skill
 LEGEND

Tour the platform: <https://roar.education/>

Open-access resources: roar.stanford.edu

Resources for Educators



Professional Development Protocol



Democratizing Access with ROAR@Home

<https://roar.stanford.edu/homesignup>



ROAR QUICK-START GUIDE
FOR PARAPROFESSIONALS AND CLASSROOM ASSISTANTS



ROAR PROFESSIONAL DEVELOPMENT PROTOCOL



This guide is for students

ROAR GUIDANCE
FOR ENGLISH LANGUAGE LEARNERS



This document provides guidance for administering ROAR assessments to English Language Learners (ELLs). It outlines best practices for using both Spanish and English versions of the assessments, depending on the student's language proficiency and reading instruction background.

TIPS FOR



Rapid Online Assessment of Reading



NEXT STEPS

This protocol outlines a structured approach to reviewing our resources. It is designed for educators to gain an understanding of administering and utilizing ROAR (Rapid Online Assessment of Reading). Our aim is to ensure that all educators and administrators are equipped to employ these assessments effectively and make informed decisions to support students' reading development. You may choose to follow this protocol as a group with your organization to engage in some of the discussion topics!

I. OVERVIEW AND INTRODUCTION TO ROAR

Objective

You will gain a clear understanding of the ROAR system, its purpose, and how it fits into the broader goals of reading assessment and literacy development.

Resource

Task

Video Guides

Introduction to ROAR — An overview everything you need to know about how ROAR works

ROAR in Schools — A look at how ROAR is being used in schools

ROAR: Breaking Barriers for Older Struggling Readers — How ROAR addresses barriers for older struggling readers

Guide to the Student Dashboard — An overview of a student's view when logging into ROAR and starting assessments

Guide to Logging In to Your Educator Account — Steps to log in to ROAR as an educator or administrator

Guide to the Group Score Report — How to navigate and interpret score reports from a classroom, grade, or district level

Guide to the Individual Score Report — How to navigate and interpret a single student's score report



Thank you for helping us realize the goal of building deeper, systemic relationships between research and practice to support the diversity of learners.



The Rapid Online Assessment of Reading

<https://roar.stanford.edu/>

