

Data Analysis and Reporting

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Agenda

- Definitions
- Descriptive statistics
- Example results
 - Baseline
 - Efficacy Study
- Q&A

Basic Definitions

- Mean
- 2, 3, 3, 3, 5, 8, 11 (5)
- Median
- 2, 3, 3, 3, 5, 8, 11 (3)
- Mode
- 2, 3, 3, 3, 5, 8, 11 (3)
- Standard deviation
- (3.3)
- Construct Validity
- Effect Size

EGRA and EGMA

- Have timed and untimed subtests
 - Timed subtests assess automaticity
 - Untimed subtest assess accuracy

Basic Descriptive Statistics

- Means and standard deviations
 - Correct unit per minute
 - Percent correct

Other Descriptive Statistics

- Zero Scores
- Benchmarks

Results: Baseline

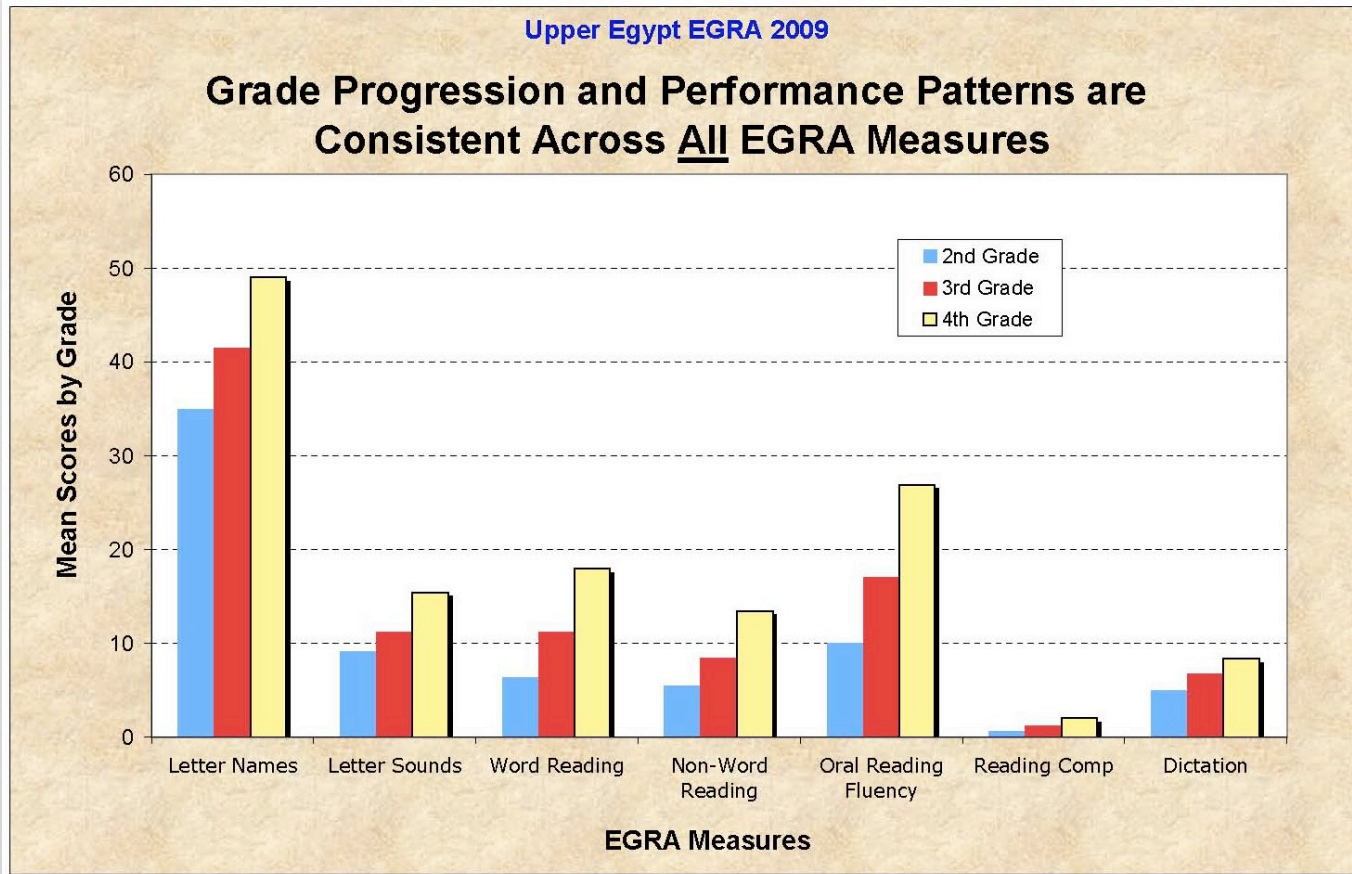
- What do students know and when do they know it?
- Distribution
- Stratified

Data second to fourth grade

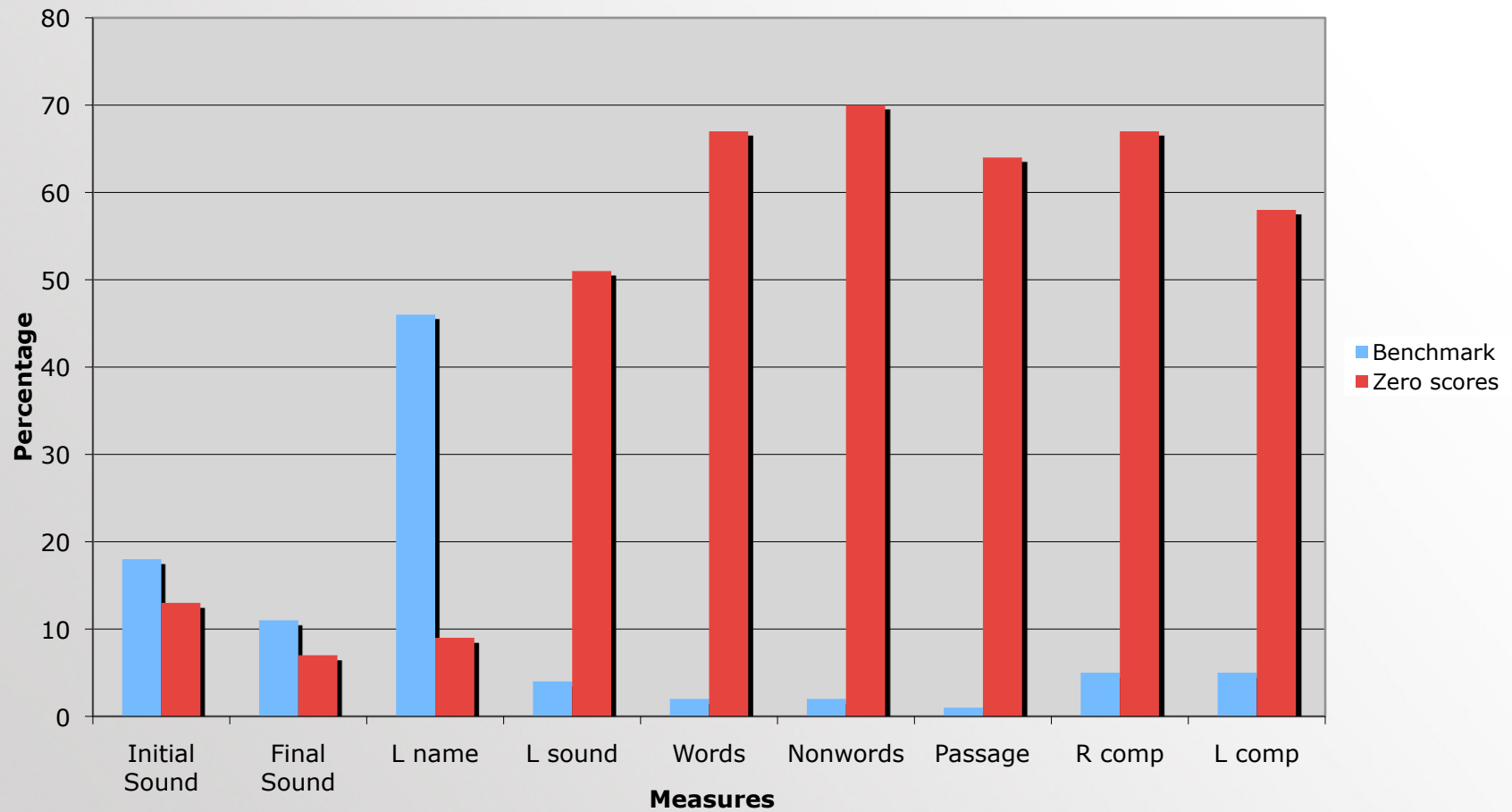
Girls' Improved Learning Outcomes Project (GILO)

Upper Egypt EGRA 2009

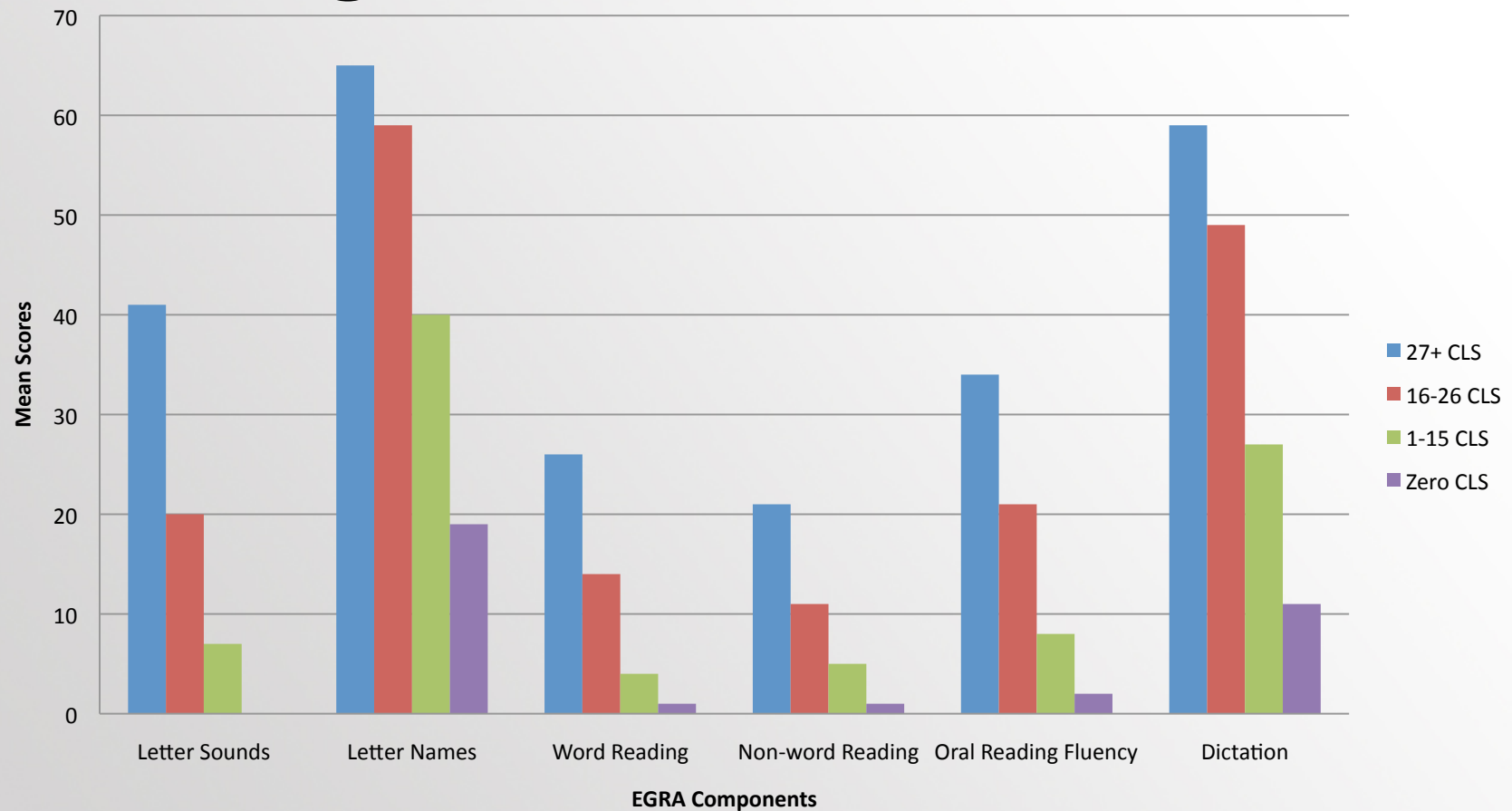
Grade Progression and Performance Patterns are Consistent Across All EGRA Measures



Data Second Grade



Knowing sounds makes a difference



Basic EGMA Analysis

- Automaticity (timed) measures (*Number ID, Addition/Subtraction level 1*)
 - Frequency (Number correct per minute)
 - Accuracy (Correct/attempted)
- Untimed measures (*Quantity comparison, Number patterns, Addition/subtraction level 2, Word problems*)
- Can examine with and without zero-scores (??)
- Item-level analysis

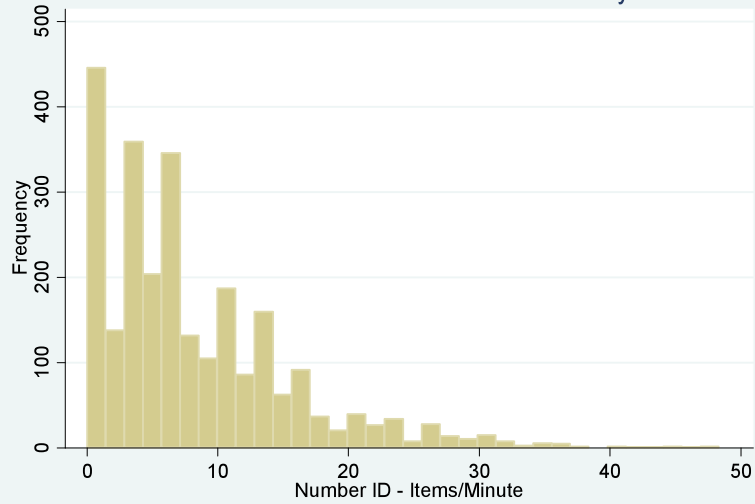
Basic EGMA Analysis

- Timed sections
 - Automaticity (items/minute) = $60 * (\# \text{ correct}) / (\text{Elapsed seconds})$

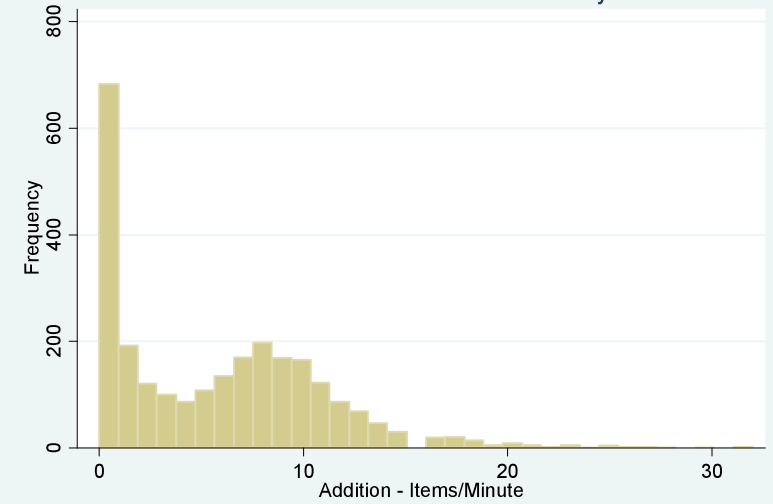
Sub-task	Mean Items/ Minute (all scores)	Mean Items/ Minute (non-zero only)
Number Identification	10.4	11.8
Addition	3.1	5.4
Subtraction	2.0	4.4

Basic EGMA Analysis

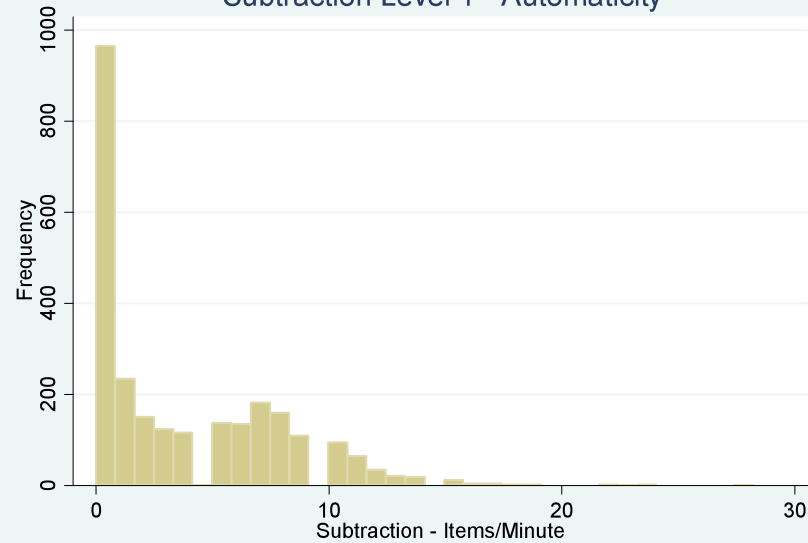
Number Identification - Automaticity



Addition Level 1 - Automaticity



Subtraction Level 1 - Automaticity



Basic EGMA Analysis

- Timed sections
 - Automaticity (items/minute) = $60 * (\# \text{ correct}) / (\text{Elapsed seconds})$
 - Accuracy (% correct/attempted) = $(\# \text{ corrected}) / (\# \text{ attempted})$

Sub-task	Mean Items/Minute (all scores)	Mean Items/Minute (non-zero only)
Number ID	10.4	11.8
Addition	3.1	5.4
Subtraction	2.0	4.4

Addition Level 1

	Automaticity (items/min.)	Mean % Correct
Country 1	7.74	58%
Country 2	6.71	80%

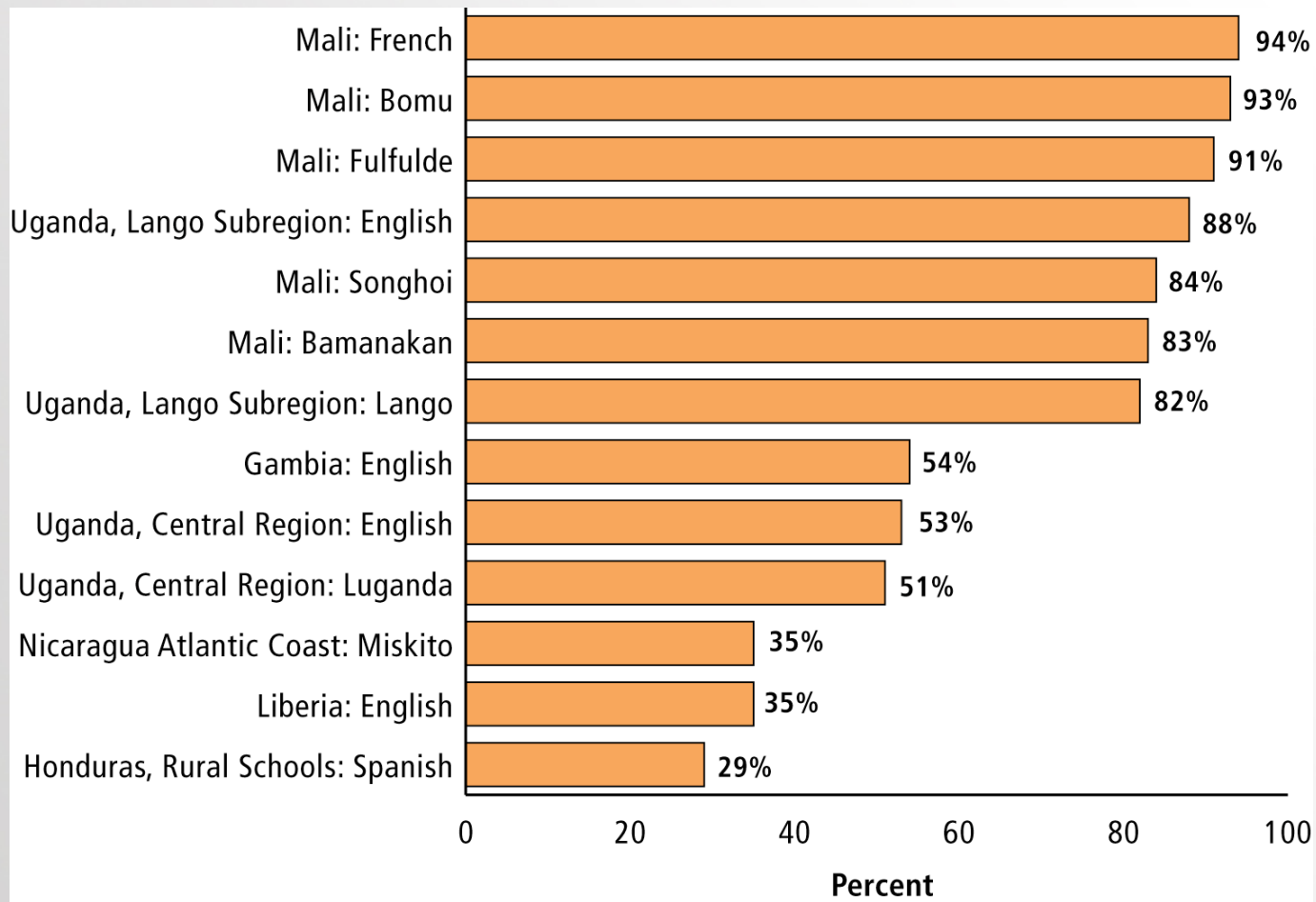
Basic EGMA Analysis

- Un-timed sections
 - Total score (# correct/total)

Sub-task	Percent with zero scores	Mean % Correct – with zero scores	Mean % Correct – without zero scores
Number Comparison	26%	44%	59%
Number Patterns	51%	20%	40%
Word Problems	21%	46%	58%

Across Countries

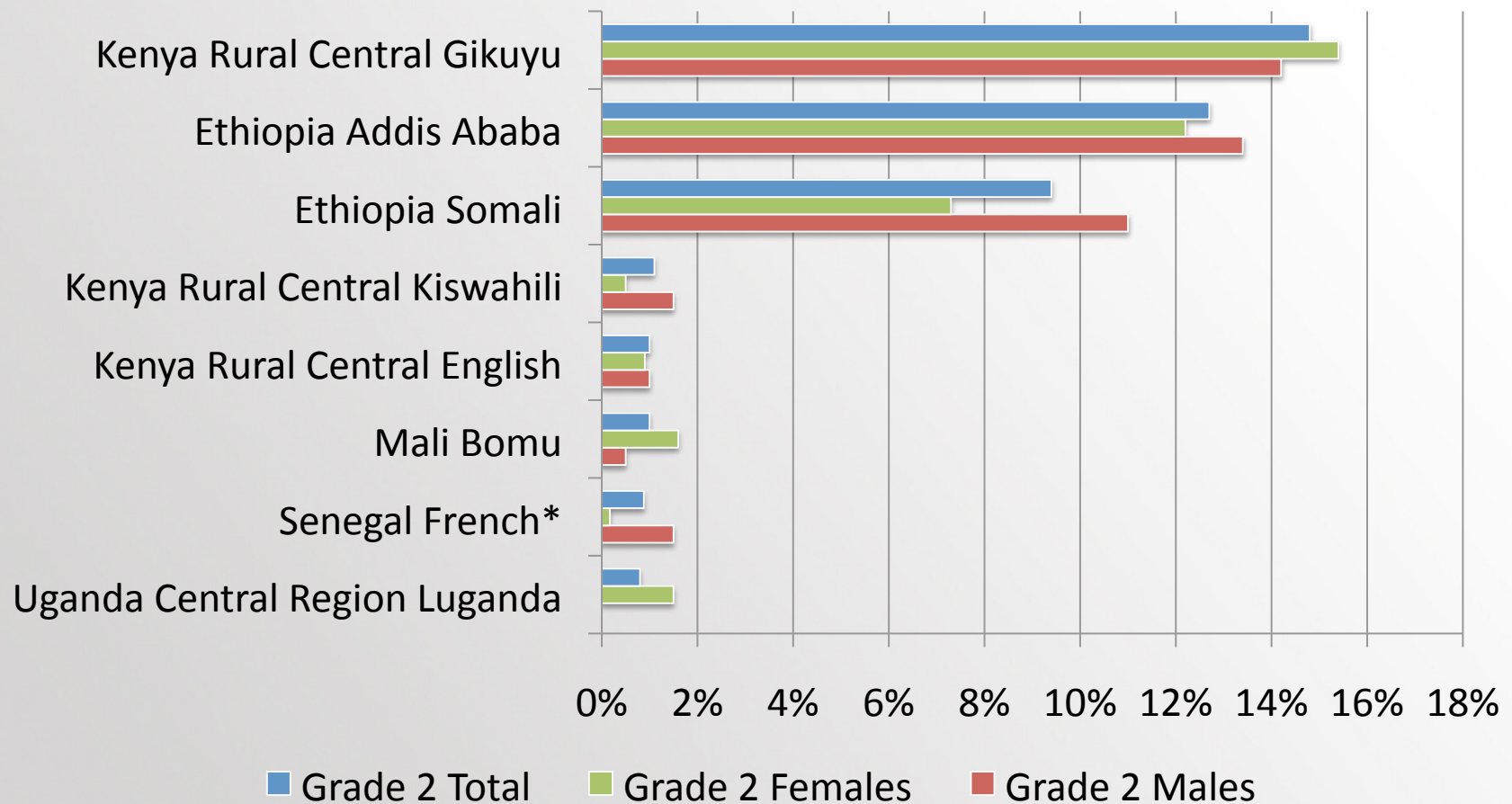
Percentage of Students Who Could not Read a Single Word, 2008-2009



Source: End of Grade 2 Early Reading Assessments. Complete reports available at www.eddataglobal.org

Across Countries

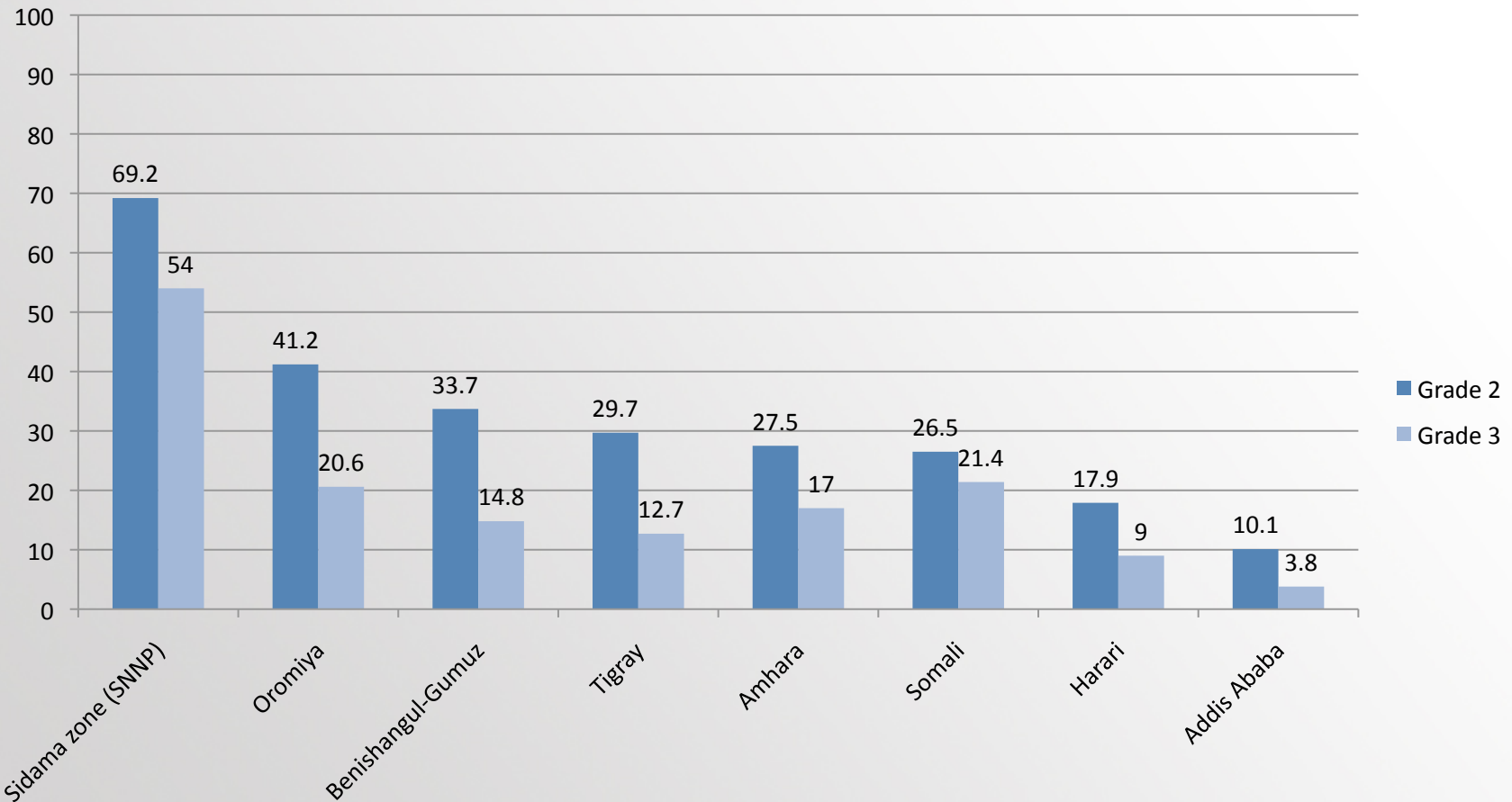
Percentage of Students Reading with at least 80% Comprehension, 2008-2010



*Senegal French is Grade 3

Within a Country

Percentage of Students Who Could not Read a Single Word, Ethiopia 2010 by Region



Experimental Design

- Experimental research has the goal of identifying relationships.
- It is necessary to identify effective practices.

Basic Definitions (Boudah, 2011)

Experimental design

- usually includes (a) selection of experimental participants, (b) direct manipulation of an independent variable, and (c) measurement of outcomes.
 - Dependent variable is the variable the researcher analyzes (outcome).

Basic Definitions (Boudah, 2011)

- Quasi-experimental research attempts to determine if an independent variable has a direct impact on a dependent variable **but** random assignment is problematic or impossible.

Basic Definitions (Boudah, 2011)

- Statistical significant: a change in a dependent variable is greater than the predicted change due to chance.
- Significance level (or probability): level at which mean difference in population is not due to chance (.05 = 5% probability the outcome is due to chance or 95% probability the outcome can be attributed to the intervention).
- Effect size: the degree of difference between groups or conditions (practical significance)

Basic Definitions (Boudah, 2011)

- Unit of analysis: the focus of the data analysis; it can be on individual performance, class performance, or school performance.
- Unit of analysis should match the unit of assignment.

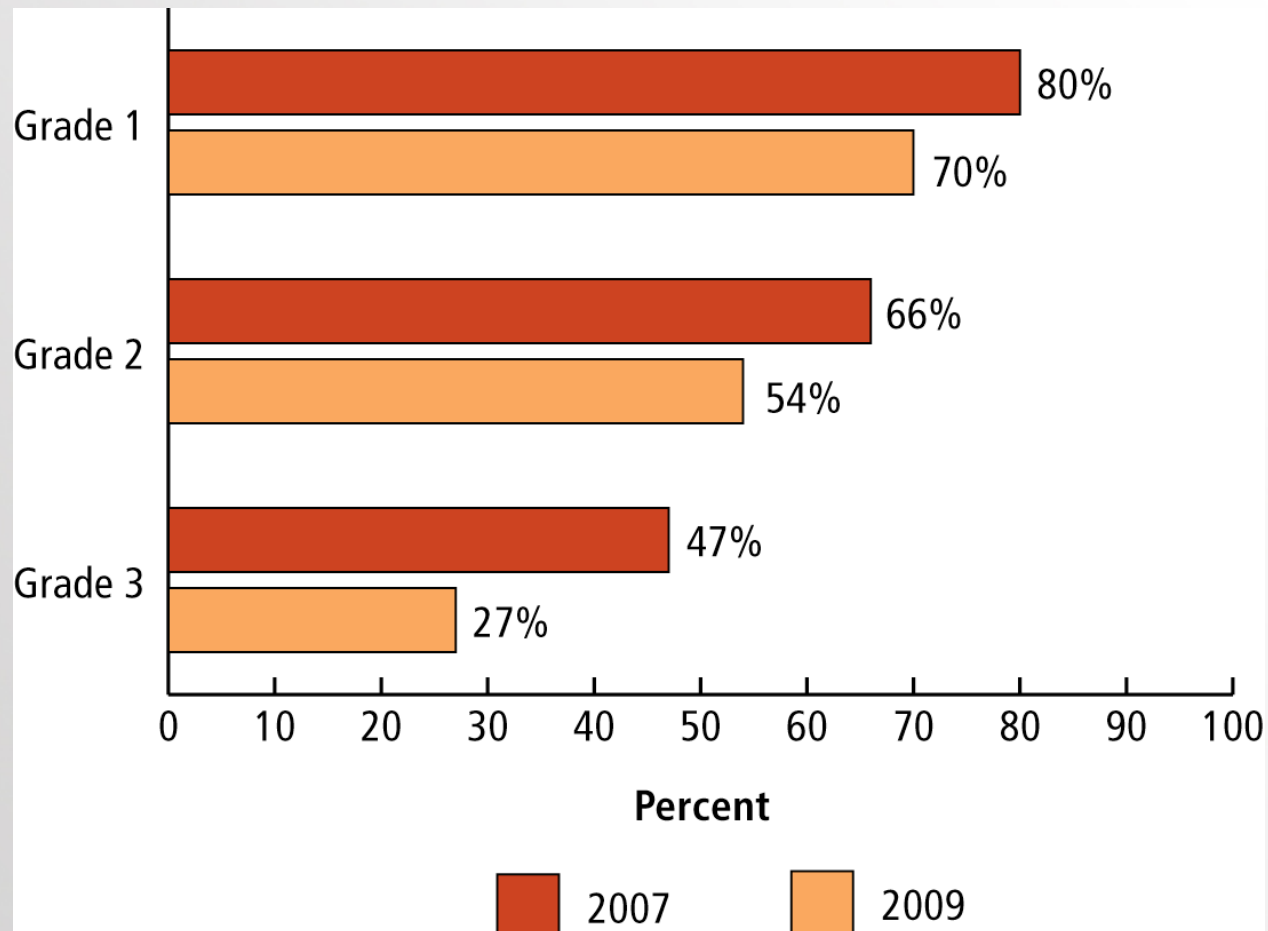
Results: Interventions

- Descriptive Statistics
- Inferential Statistics
 - Statistically significant difference between experimental and control groups

DESCRIPTIVE STATISTICS

Change in zero scores

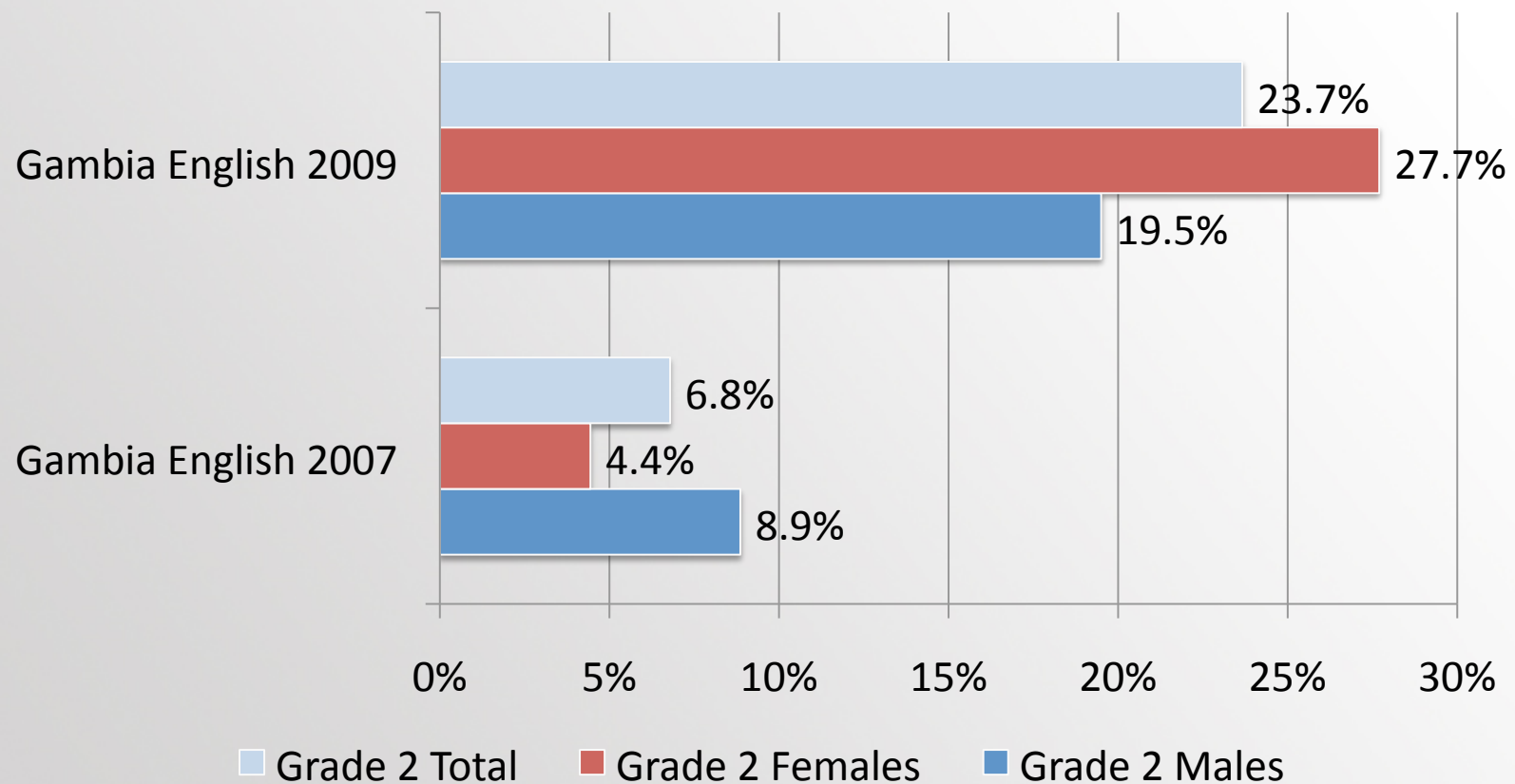
Percentage of Students Who Could not Read a Single Word, 2007 and 2009



Source: Sprenger-Charolles, 2008; Ministry of Basic and Secondary Education, 2009.

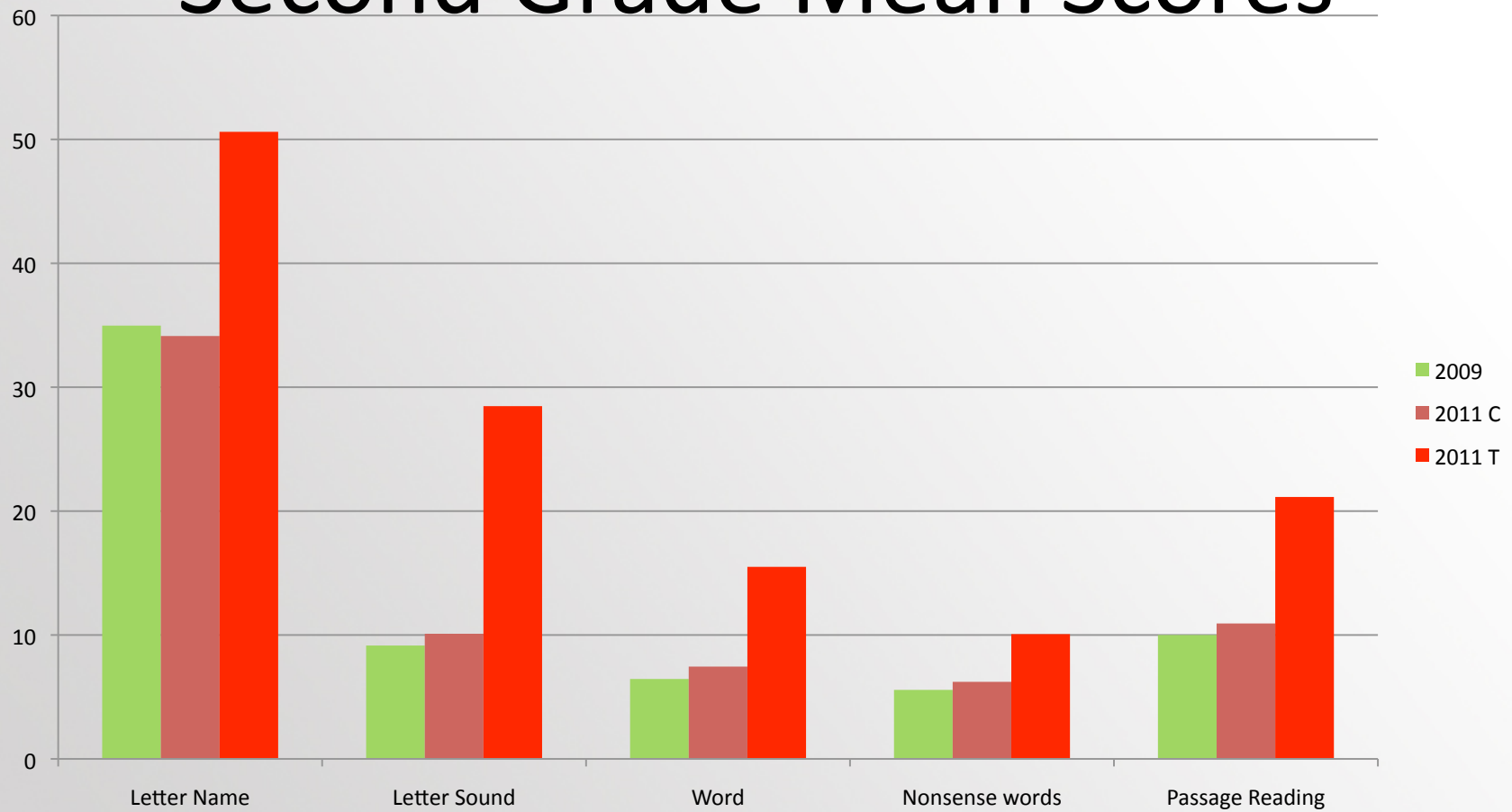
Change: Percent meeting benchmark

Percentage of Grade 2 Students Reading with at least 80% Comprehension

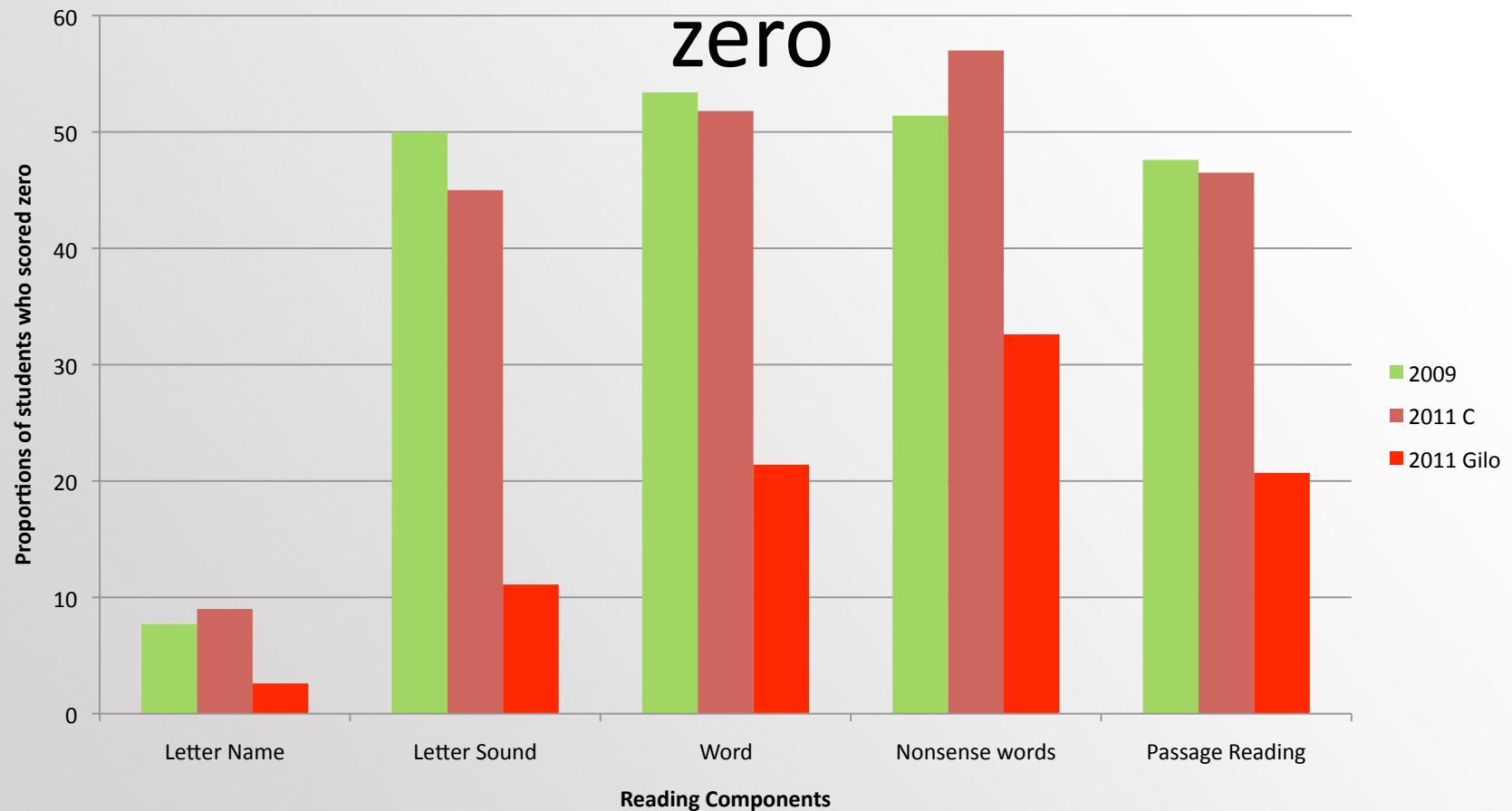


Source: Sprenger-Charolles, 2008; Ministry of Basic and Secondary Education, 2009.

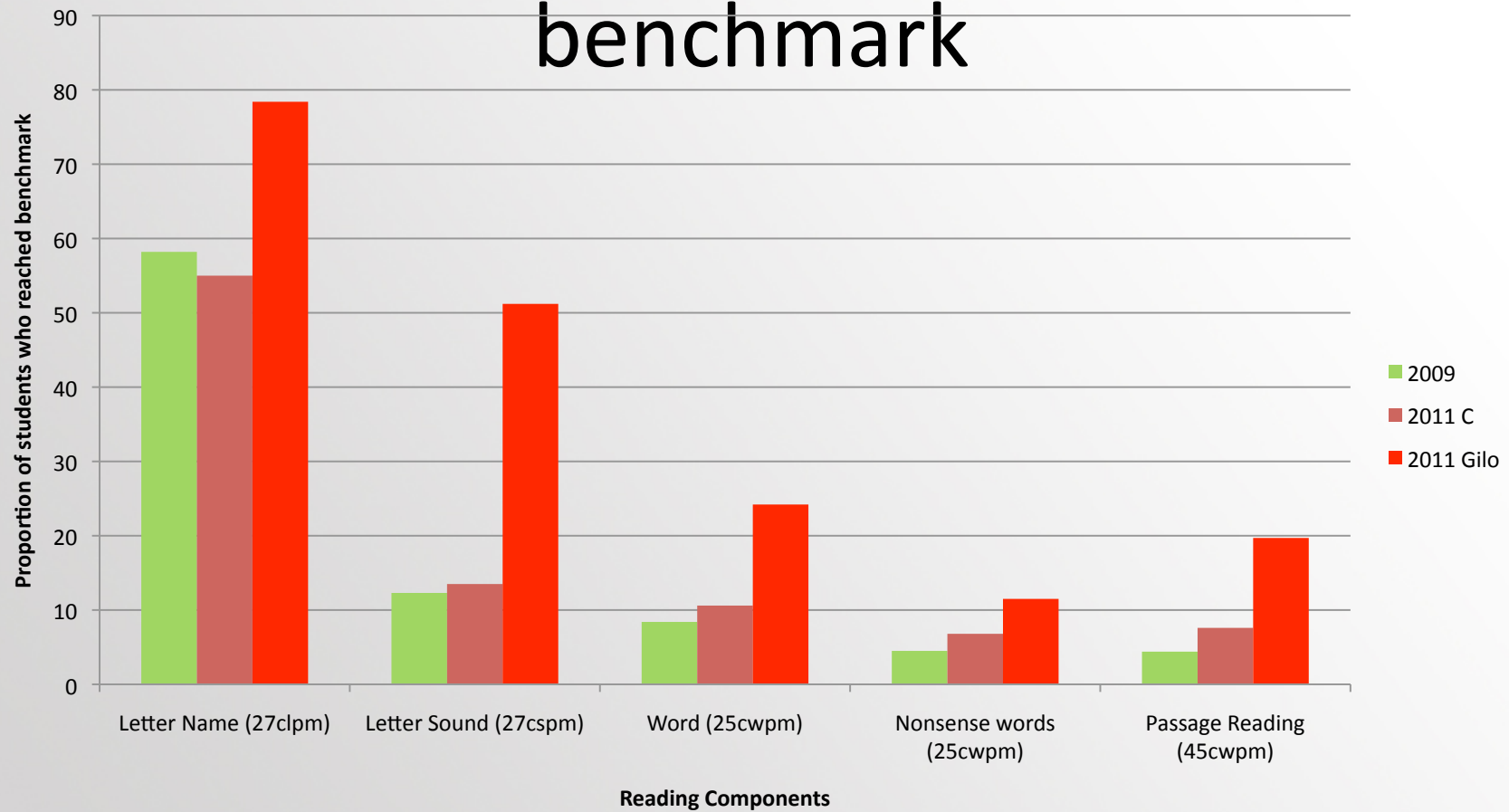
Second Grade Mean Scores



Proportion of students who scored

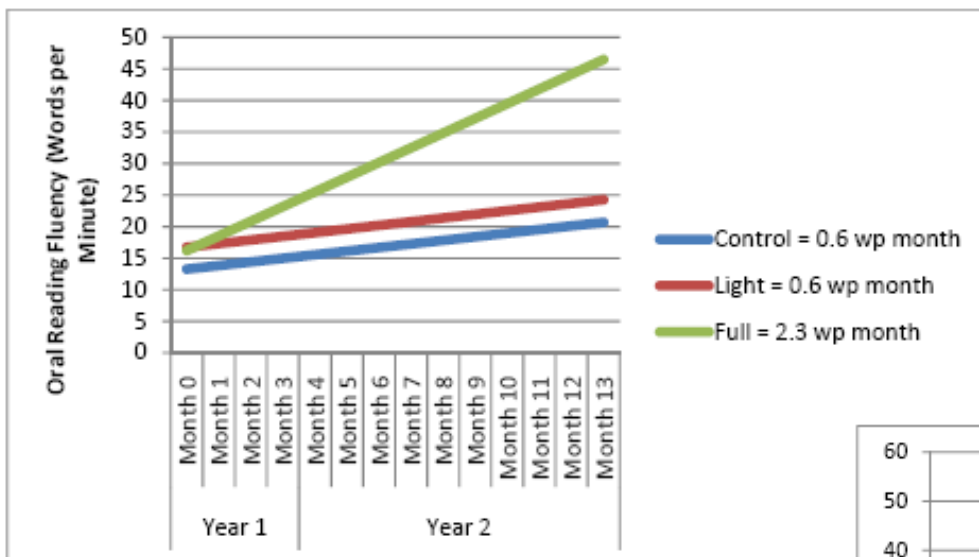


Proportion of students who met benchmark

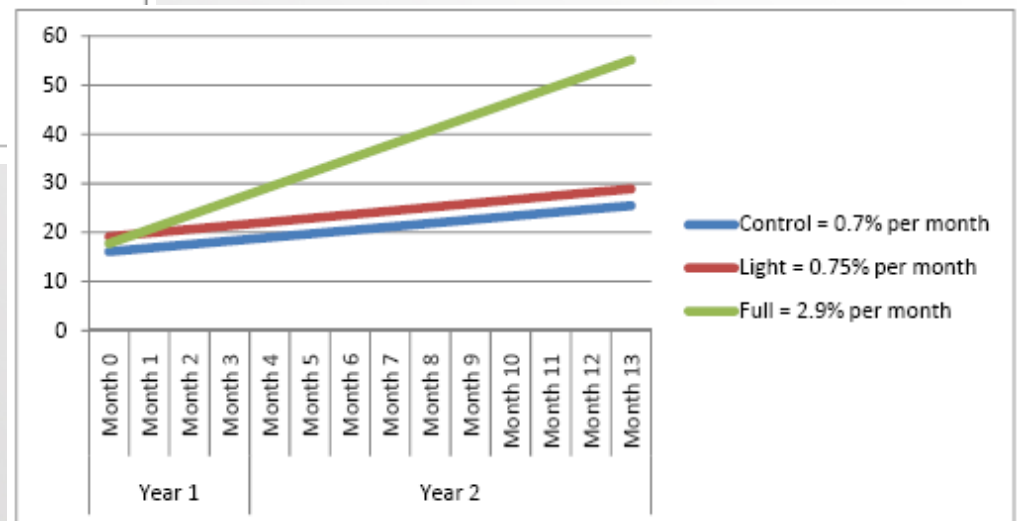


Change: Using slope

Rate of Improvement in Treatment and Control Schools:
Oral Reading Fluency



Rate of Improvement in Treatment and Control Schools:
Comprehension



Source: End of Grade 2 Results. Hasbrouck and Tindal, (2006); Piper (forthcoming).

Quick quiz

- What would you rather see, 100% growth or 400% growth?
- It depends.
- ORF score from 10 \longrightarrow 20
- ORF score from 2 \longrightarrow 8

INFERENCEAL STATISTICS

Inferential Statistics

- Are used to determine whether there is a statistically significant difference between groups on outcome measures.

Effect Sizes

- Usually only calculated for comparisons with a statistically significant difference
- Group effect sizes
 - Program posttest mean minus control posttest mean divided by pooled posttest SD (Hedges g)

- Questions????
- Comments.

Exercises