



Research Workshop Series Session 5: Data Literacy

Jill Walston

4/24/2018

Workshop Series

2017

September 28 Data, Research, and Evidence
October 24 Surveys
November 15 Focus Groups

2018

January 17 Rubrics
April 24 Data Literacy
May 14 Communicating Research Findings



Today's goals

1. Learn about different kinds of variables and descriptive statistics.
2. Understand student growth percentiles.
3. Explore the WISEdash system.
4. Learn about evaluating research.
5. Explore the What Works Clearinghouse resource.

Types of variables

Categorical variables

- Sex
- Race/ethnicity
- Home language
- District
- Location (urban, suburban, rural)



Ordinal variables

- Some survey responses (never, rarely, sometimes, often)
- Performance levels (below basic, basic, proficient, advanced)
- Rank order (first, second, third, etc.)



Continuous variables

- Age
- Assessment scores
- A school's graduation rate
- Number of suspensions
- Grade point average



Descriptive statistics

Descriptive statistics

- Summarize characteristic of a group of units (for example, students, teachers, schools, or districts) with graphical display or with numerical descriptions of the data
- How we do this depends on the type of variable being summarized (categorical, ordinal, continuous)

Frequency distributions

Lists all possible values of a variable and the number of times each occurs. Can be expressed as proportion or percentage.

Home language	Number	Proportion	Percent
English	1,600	0.80	80%
Spanish	350	0.15	15%
Other	50	0.05	5%
Total	2,000	1.0	100%

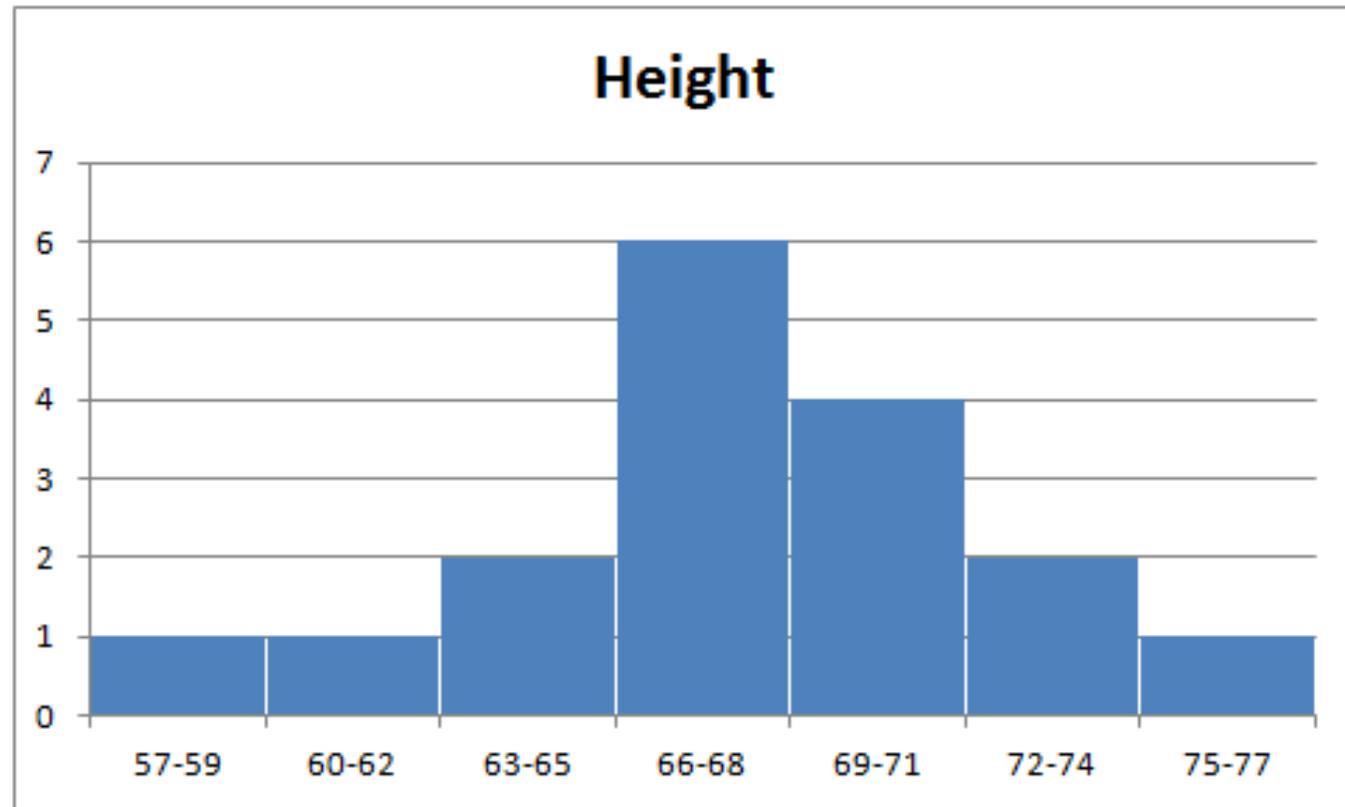
Frequency distributions can also be made for ordinal or for continuous variables where values are grouped.

Proficiency	Percent
Below basic	10%
Basic	25%
Proficient	55%
Advanced	10%
Total	100%

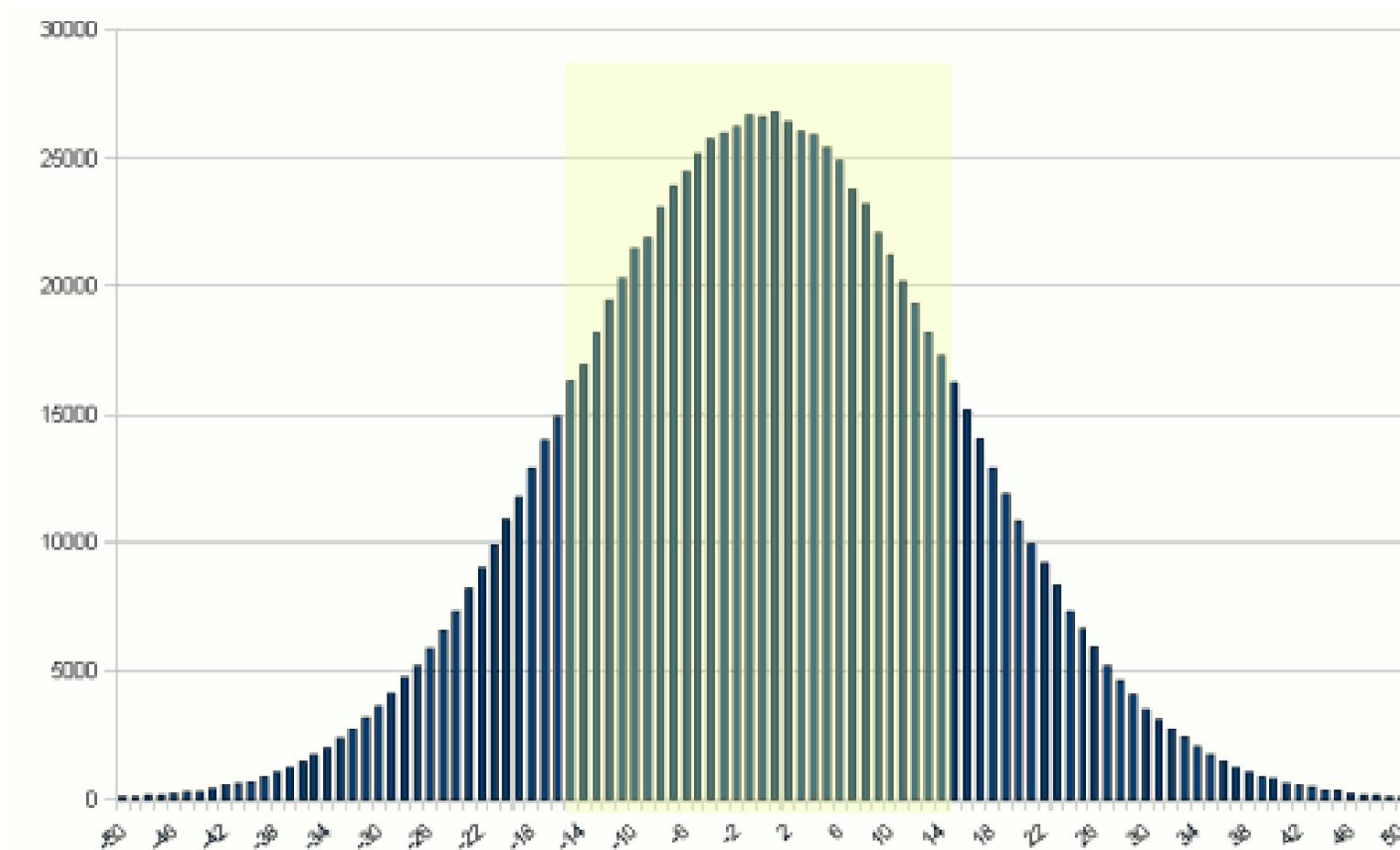
Score	Percent
Less than 60	10%
60–69	15%
70–79	25%
80–89	35%
90–100	15%
Total	100%

Frequency distributions can be graphed to show their shape.

Height (in inches) of 17 students

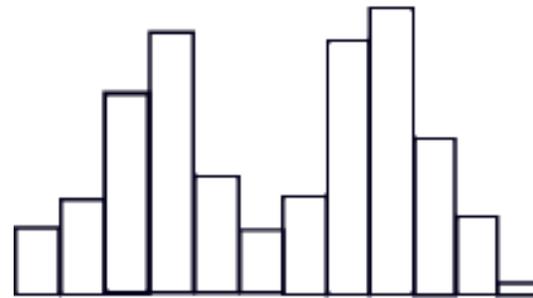


Distributions for continuous variables are often “normal” (bell shaped), with most values near the center.

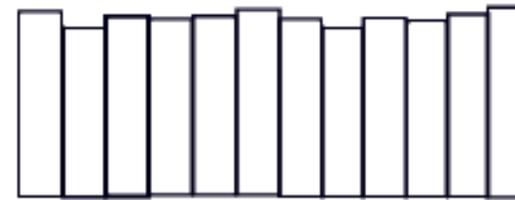


Other common distribution shapes

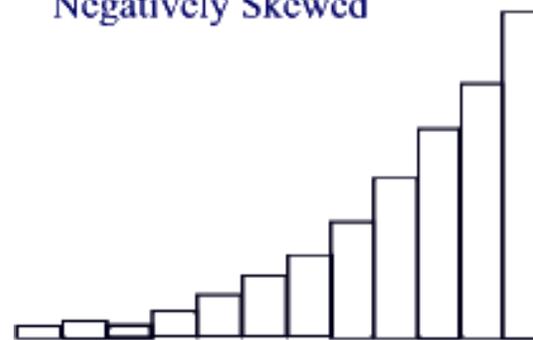
Bi-Modal Distribution



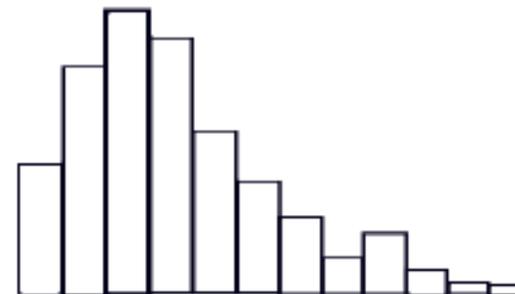
Unitary Distribution



Negatively Skewed



- Positively Skewed



Often we describe a distribution by a measure of its typical value (central tendency) and by how spread out it is (variability).

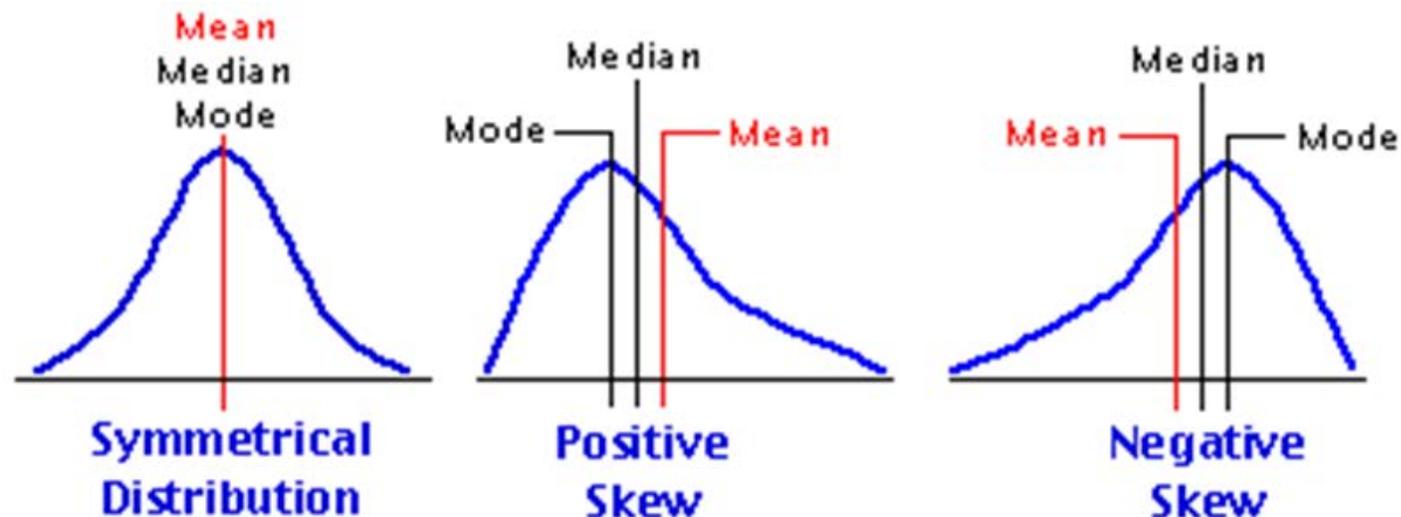
Mode: Most frequent value in the data

Median: Midpoint of ordered values; half of the values are higher and half are lower

Mean: Mathematical average; add all the values and divide by the number of values

Properties of mean and median

- For symmetric distributions, mean = median.
- For skewed distributions, mean is drawn in the direction of longer tail, relative to median.
- Mean is sensitive to “outliers” (median is often preferred for highly skewed distributions, for example, income).

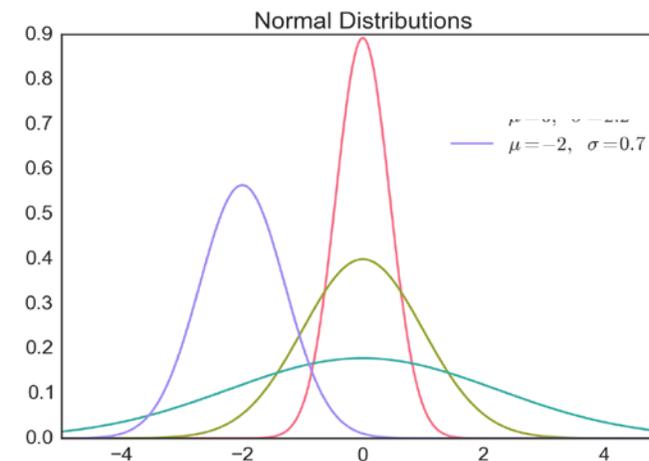


We can describe a distribution by a measure of how dispersed or spread out the values are (variability).

Range: Difference between largest and smallest value (highly sensitive to outliers)

Standard deviation: A common statistic calculated to indicate the “typical” distance from the mean.

Distributions with values that are highly variable have higher standard deviations than distributions where the values are all close together.



Bivariate distributions

So far we've talked about describing a single distribution of values.

We can also describe how values on two variables are distributed in relation to each other.

Two categorical variables

Cell counts

	Male	Female	total
grad	800	700	1500
non-grad	300	100	400
total	1100	800	1900

Cell and marginal percents

	Male	Female	total
grad	42%	37%	79%
non-grad	16%	5%	21%
total	58%	42%	100%

Contingency table:
Row percents

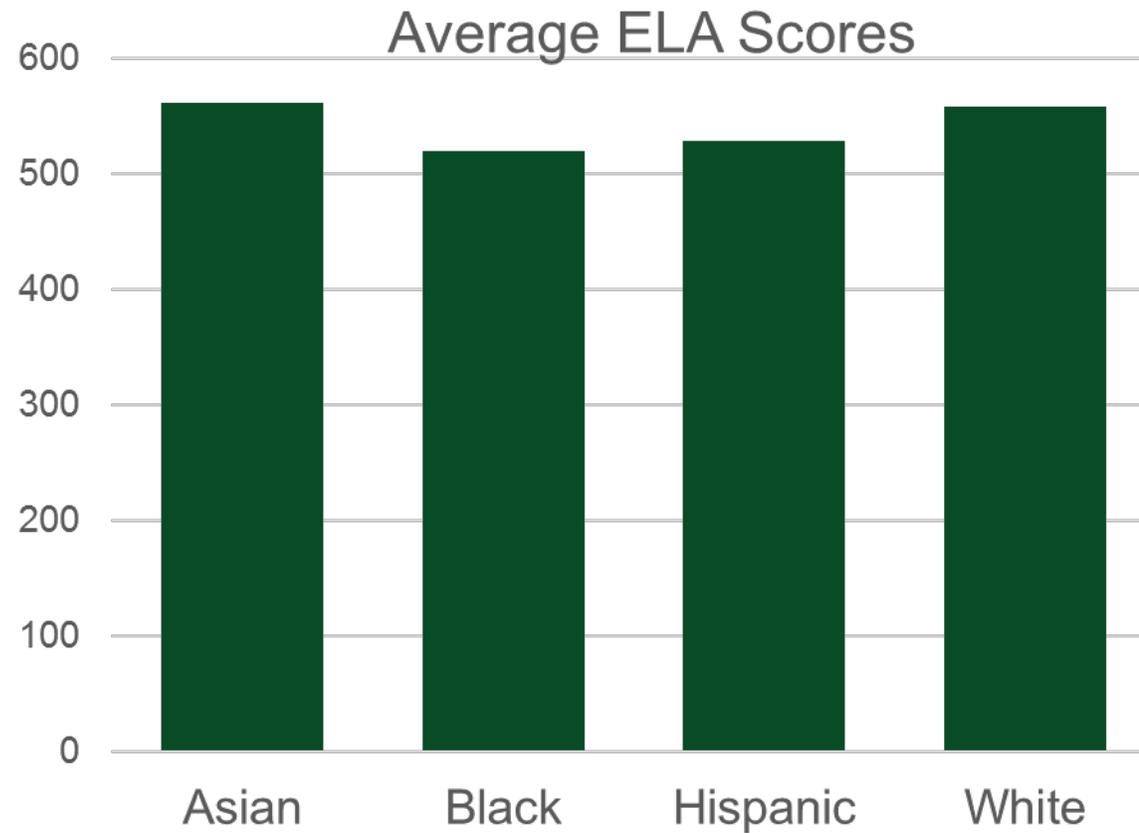
	Male	Female	total
grad	53%	47%	100%
non-grad	75%	25%	100%

Contingency table:
Column percents

	Male	Female	
grad	73%	88%	
non-grad	27%	13%	
total	100%	100%	

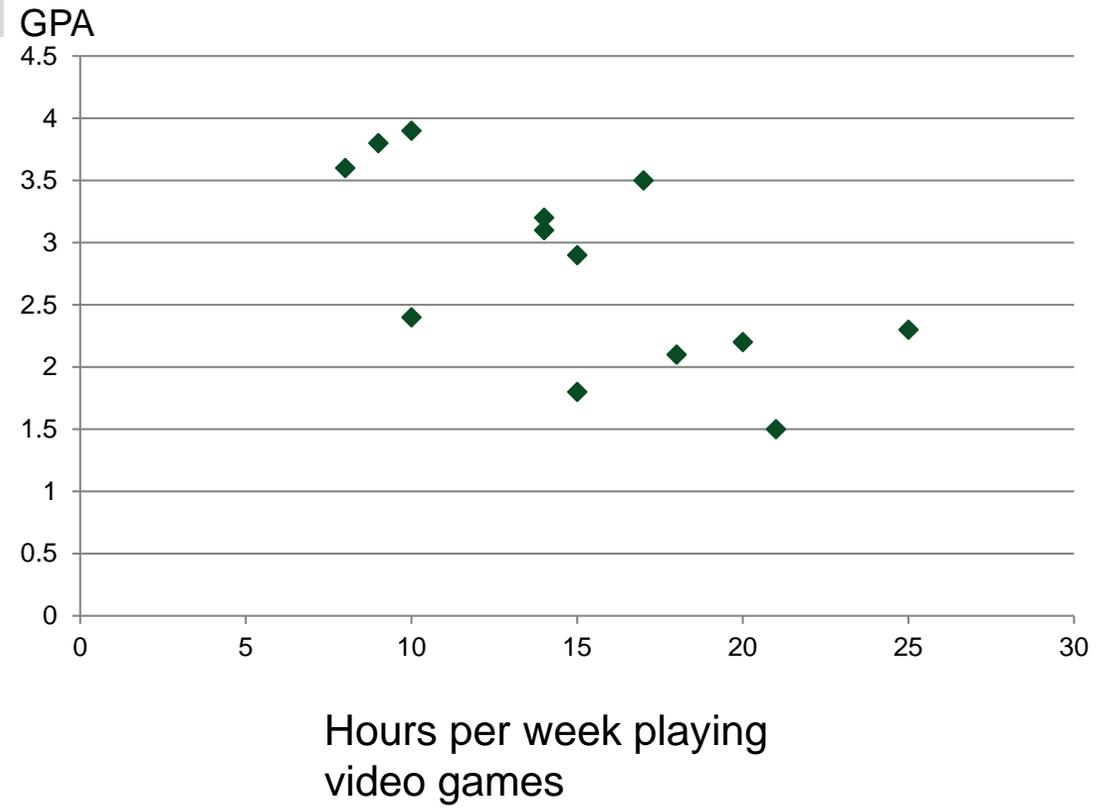
A categorical variable and a continuous variable

Race/ethnicity	Average ELA score
Asian	562
Black	520
Hispanic	529
White	559

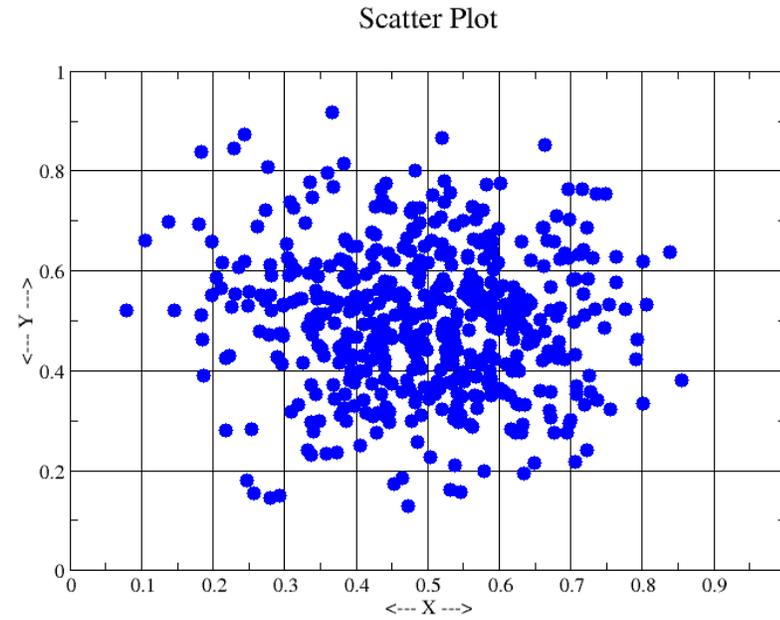
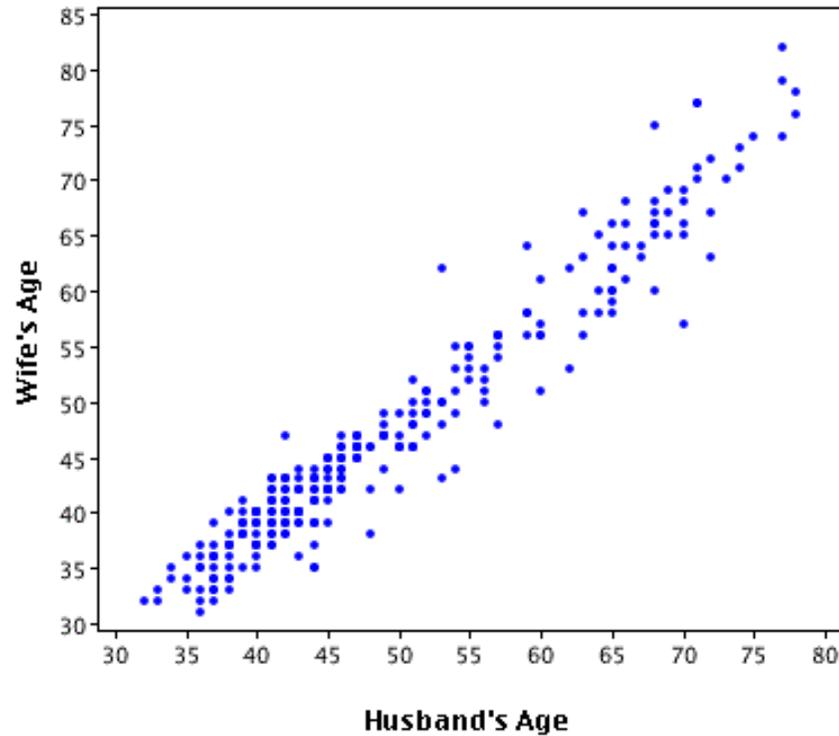


A categorical variable and a continuous variable

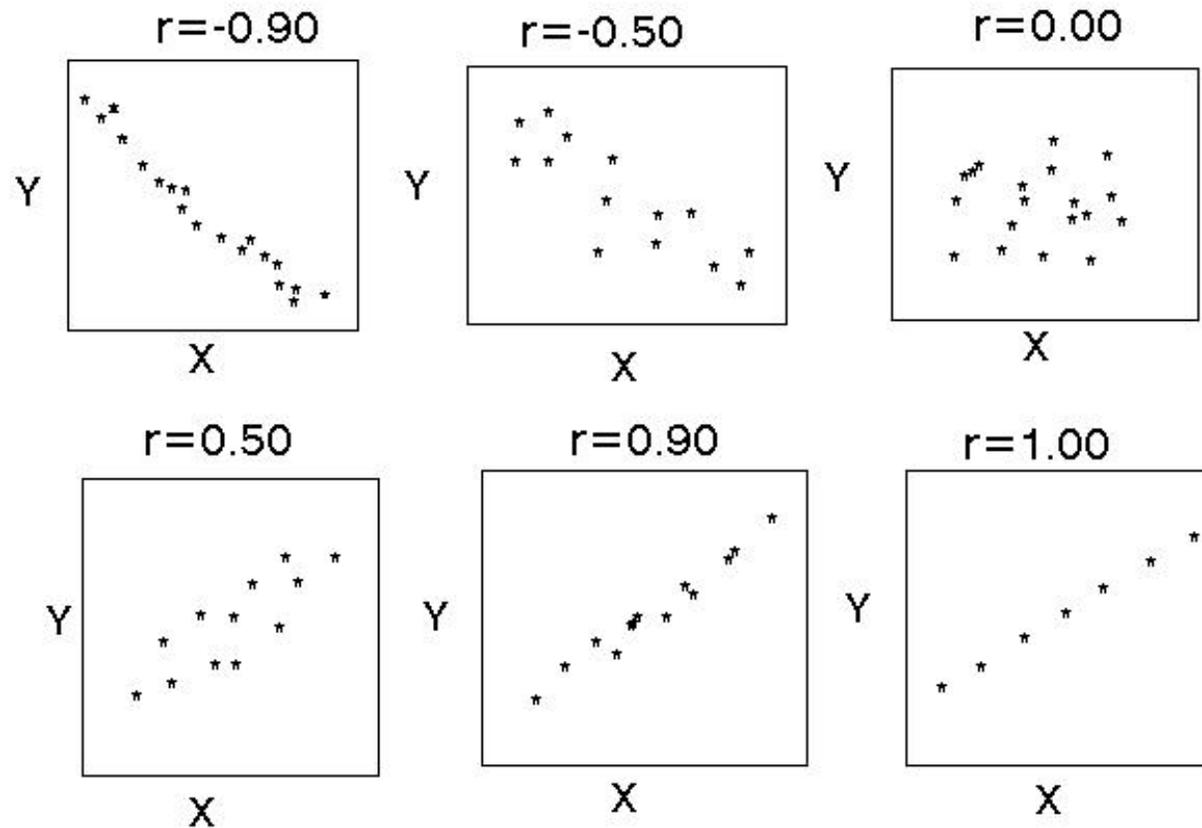
Student	Hours playing video games per week	GPA
1	21	1.5
2	15	1.8
3	18	2.1
4	20	2.2
5	25	2.3
6	10	2.4
7	15	2.9
8	14	3.1
9	14	3.2
10	17	3.5
11	8	3.6
12	9	3.8
13	10	3.9



Some variables are strongly related and some are not.



A **correlation coefficient** ranges from -1 to +1 and describes the direction and strength of relationship between two variables, x and y.



State assessment percentile scores

Percentiles

Assessment scores can be reported as percentiles.

A grade 5 student who has a 75th percentile rank in math scored better than 75 percent of other grade 5 students on the math assessment.

A grade 11 student who has a 15th percentile rank in English language arts scored better than 15 percent of other 11 grade students.

Individual Student Growth Percentile (SGP)

- Measures the academic progress each student has made in a year
- Measures a student's progress compared to other students with a similar score history
- Uses results from two separate administrations

A **Median** Student Growth Percentile...

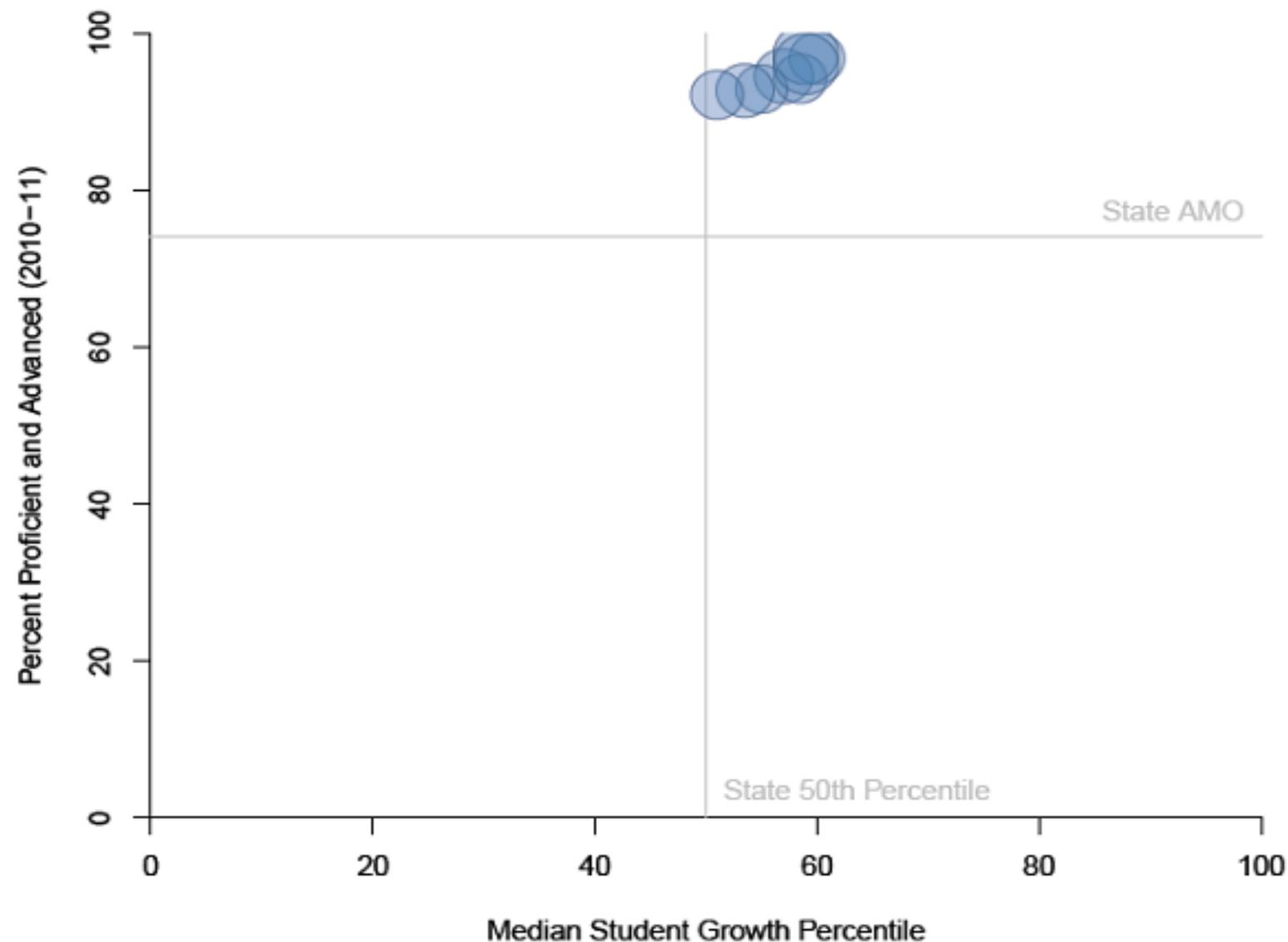
is calculated by aggregating all of the individual student growth percentiles from the group and identifying the median (or middle) number is a representation of “typical” growth for students in the group.

These can be calculated at the district, school, classroom, or subgroup level.

DRAFT Student Growth Percentile Report

District: Sample District
Report Level: All Schools

Subject: Reading
School Years: 2009-10 to 2010-11



School Name	Median SGP	N Prof & Adv	N	% Prof & Adv
Sample School 1	60	243	251	96.8
Sample School 2	57	313	331	94.5
Sample School 3	58.5	196	208	94.2
Sample School 4	55	183	197	92.8
Sample School 5	59	516	530	97.3
Sample School 6	53.5	280	302	92.7
Sample School 7	51	188	204	92.1
Sample School 8	59	516	537	96.0

WVCE_only

Separate into teams.

Each team should have

- at least one person with a laptop,
- a member of the DWDS team, and
- at least one person with access to WISEdash for districts

In your group:

- 1) Find out how to set Presentation Mode in WISEdash for Districts? When should you use presentation mode?
- 2) Find the spring assessment snapshot dashboard. How would you use this dashboard?
- 3) Find the dropout rate for one district of your choice and compare it to the state dropout rate.
- 4) Find the count of non-disabled students statewide who had in-school suspensions for 2015-16.
- 5) Find the WISEdash for districts' enrollment by grade for Chequamegon. Compare this to the WISE Public by grade with remaining filters left as defaults. Why are they different?

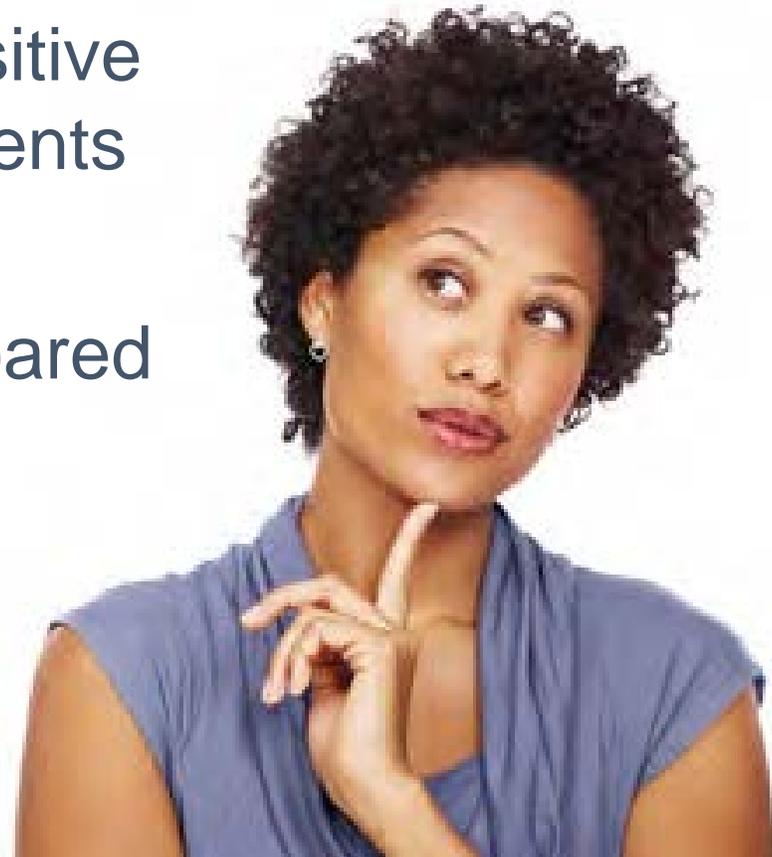
Evaluating research

How do we decide what programs, practices, and policies will be effective?

- Anecdotal evidence
- Descriptions of outcomes over time – before and after implementation
- Comparison of outcomes for those with and without the intervention
- Causal analysis

Questions to Consider about a Program or Intervention

- What kind of research has been done?
- Does the research show positive effects? If so, for which students and under what conditions?
- How large is the effect compared with other programs?
- How strong is the evidence?



Levels of Evidence in the Every Student Succeeds Act (ESSA)

Tier 1 Strong Evidence

- at least one well-designed and well-implemented **experimental** study
- significant favorable outcomes
- large sample
- similar types of students and settings as intended application

Levels of Evidence in the Every Student Succeeds Act (ESSA)

Tier 1 Strong Evidence	Tier 2 Moderate Evidence
<ul style="list-style-type: none">• at least one well-designed and well-implemented experimental study• significant favorable outcomes• large sample• similar types of students and settings as intended application	<ul style="list-style-type: none">• at least one well-designed and well-implemented quasi-experimental study• significant favorable outcomes• large sample• similar types of students or settings as intended application

Levels of Evidence in the Every Student Succeeds Act (ESSA)

Tier 1 Strong Evidence	Tier 2 Moderate Evidence	Tier 3 Promising Evidence
<ul style="list-style-type: none">• at least one well-designed and well-implemented experimental study• significant favorable outcomes• large sample• similar types of students and settings as intended application	<ul style="list-style-type: none">• at least one well-designed and well-implemented quasi-experimental study• significant favorable outcomes• large sample• similar types of students and settings as intended application	<ul style="list-style-type: none">• at least one well-designed and well-implemented correlational study• significant favorable outcomes

Levels of Evidence in the Every Student Succeeds Act (ESSA)

Tier 4 Demonstrates a Rationale

- includes a well-specified **logic model**
- efforts to study the effects are planned or underway

What Works Clearinghouse

What Works Clearinghouse

- What types of **interventions** are reviewed?
 - Programs, policies, practices
 - Academic, behavioral, student subgroups, teacher excellence, dropout prevention, postsecondary success

What Works Clearinghouse

- What types of **studies** are reviewed by this clearinghouse?
 - Experimental and quasi-experimental designs

What Works Clearinghouse

- What **criteria** are factored into ratings?
 - Study design
 - Study outcomes do not factor into ratings.

What Works Clearinghouse

- What **information** do they provide on sample size, population, and setting?
 - Intervention report and evidence snapshot pages provide sample size, setting, and student demographic breakdowns for each intervention.

What Works Clearinghouse—Ratings

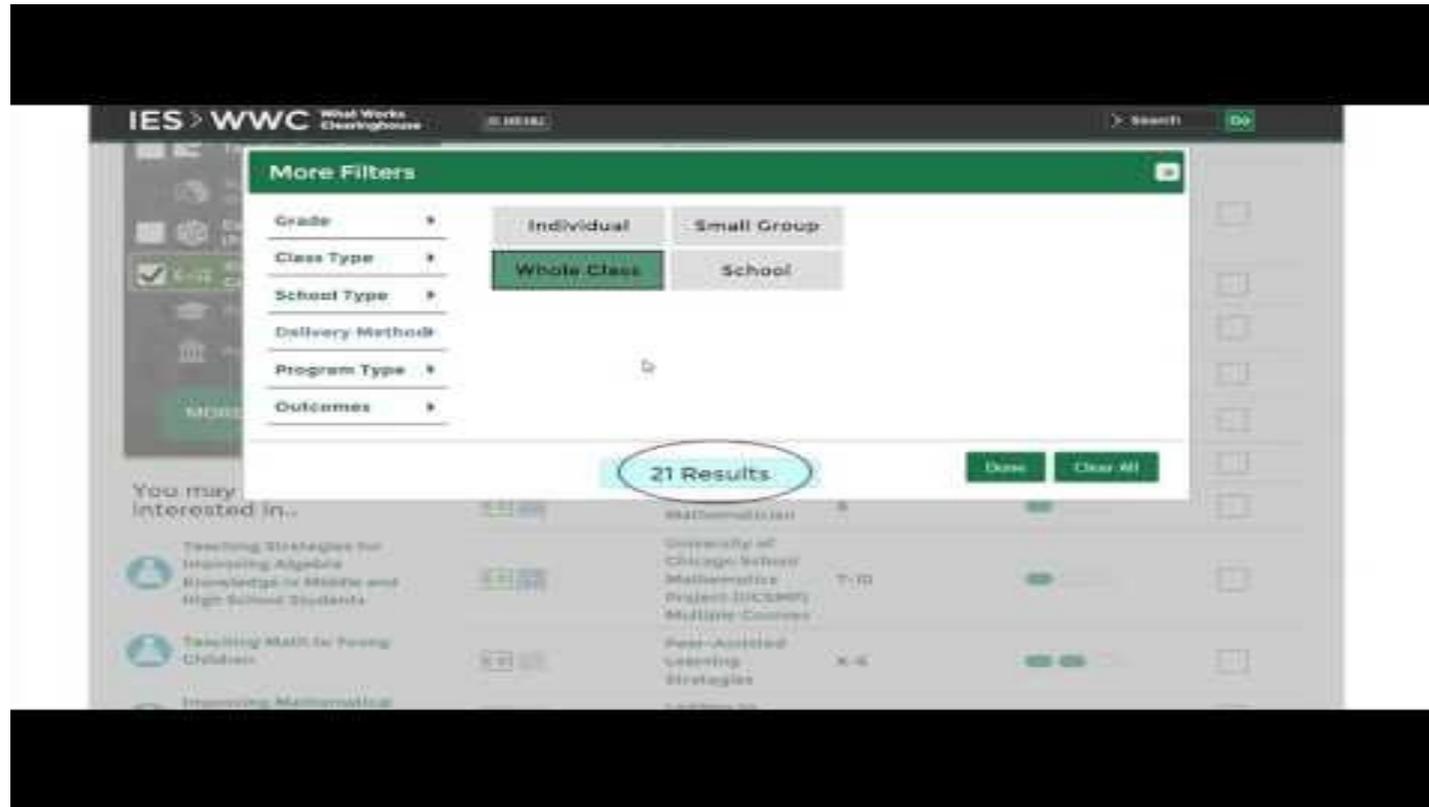
Three ratings for RCTs and QEDs:

- Meets Group Design Standards **without** Reservations
- Meets Group Design Standards **with** Reservations
- Does **Not Meet** Group Design Standards

Ratings for single case designs and regression discontinuity designs (RDD):

- Meets **without** Reservations,
- Meets **with** Reservations, and
- Does **Not Meet** Standards

What Works Clearinghouse



WWC-ESSA—Alignment

WWC standard	Positive/ potentially positive	Large, multisite sample	ESSA standard
Meets standards without reservations	✓	✓	Strong Evidence (Tier 1)
	✓	⊘	Promising Evidence (Tier 3)
	⊘	⊘	Does not meet ESSA Tiers 1–3
Meets standards with reservations	✓	✓	Moderate Evidence (Tier 2)
	✓	⊘	Promising Evidence (Tier 3)
	⊘	⊘	Does not meet ESSA Tiers 1–3

WWC: Finding interventions with positive outcomes

Evidence of effectiveness icons (by intervention)

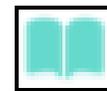
223 Results filtered by:

Literacy x

Evidence of effectiveness ⓘ

Intervention ⓘ

	Literacy Express
	Phonological Awareness



Positive/potentially positive effects



Mixed/no discernable evidence



No evidence



WWC: Finding interventions with positive outcomes

Six effectiveness ratings (by outcome):

--	-	0	+-	+	++
----	---	---	----	---	----

Negative

Potentially negative

No discernable

Mixed



WWC: Finding interventions with positive outcomes

Six effectiveness ratings (by outcome):

--	-	0	+ -	+	++
----	---	---	-----	---	----

Potentially positive
Positive

 ESSA Tiers 1-3

WWC: Finding interventions with positive outcomes

FIND RESEARCH WITH STUDENTS LIKE YOURS ▶

Filter by topic

- Literacy
- Mathematics
- Science
- Behavior
- Children and Youth

223 Results filtered by:

Literacy ✕

How to Use FWW Print

Evidence of effectiveness	Intervention	Grades examined	Compare
	Literacy Express		<input type="checkbox"/>
	Phonological Awareness Training	PK	<input type="checkbox"/>
	Reading Recovery®	1	<input type="checkbox"/>
	READ 180®	4-10	<input type="checkbox"/>
	Sound Partners	K-1	<input type="checkbox"/>

Click on an intervention

WWC: Summary of evidence pages

Beginning Reading

September 2017

[EVIDENCE SNAPSHOT](#) [INTERVENTION REPORT \(863 KB\)](#) [REVIEW PROTOCOL](#)

Outcome domain ⓘ	Effectiveness rating ⓘ	Studies meeting standards ⓘ	Grades examined ⓘ	Students ⓘ	Improvement index ⓘ
Alphabetics	0	1 study meets standards	K-2	422	--
Reading achievement	++	2 studies meet standards	K-2	747	11
Reading fluency	+	1 study meets standards	K-2	281	11

WWC: Summary of evidence pages

Beginning Reading

September 2017

[EVIDENCE SNAPSHOT](#) [INTERVENTION REPORT \(863 KB\)](#) [REVIEW PROTOCOL](#)

Outcome domain ⓘ	Effectiveness rating ⓘ	Studies meeting standards ⓘ	Grades examined ⓘ	Students ⓘ	Improvement index ⓘ
Alphabetics	0	1 study meets standards	K-2	422	--
Reading achievement	++	2 studies meet standards	K-2	747	11
Reading fluency	+	1 study meets standards	K-2	281	11

WWC: Summary of evidence pages

Beginning Reading					
September 2017					
		EVIDENCE SNAPSHOT	INTERVENTION REPORT (863 KB)	REVIEW PROTOCOL	
Outcome domain	Effectiveness rating	Studies meeting standards	Grades examined	Students	Improvement index
Alphabetics		1 study meets standards	K-2	422	--
Reading achievement		2 studies meet standards	K-2	747	
		Ransford-Kaldon, C., Flynt, E. S., Ross, C. L., Franceschini, L., Zoblotsky, T., Huang, Y., & Gallagher, B. (2010)	K-2	427	
		Ransford-Kaldon, C., Ross, C., Lee, C., Sutton Flynt, E., Franceschini, L., & Zoblotsky, T. (2010)	K-2	320	
Reading fluency		1 study meets standards	K-2	281	

WWC: Summary of evidence pages

RANDOMIZED CONTROLLED TRIAL EXAMINING 320 STUDENTS, GRADES K-2

Review Details Findings Sample Characteristics Study Details

Reviewed: September 2017

For:

 **Leveled Literacy Intervention Intervention Report - Beginning Reading**

Using:

 **Beginning Reading Review Protocol 3.0**

 **Review Standards 3.0**

Rating:

Meets WWC standards without reservations because it is a randomized controlled trial with low attrition.

This review may not reflect the full body of research evidence for this intervention. Please see the **WWC summary of evidence for Leveled Literacy Intervention.**



MEETS WWC
STANDARDS
WITHOUT
RESERVATIONS



AT LEAST ONE
STATISTICALLY
SIGNIFICANT
POSITIVE FINDING

WWC: Summary of evidence pages

Review Details

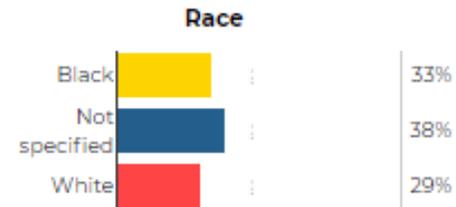
Findings

Sample Characteristics

Study Details

Additional Sources

Characteristics of study sample as reported by study author.



WWC: Summary of evidence pages

Review Details | Findings | Sample Characteristics | **Study Details** | Additional Sources

Setting

The study took place in five rural elementary schools in Tifton, Georgia and four suburban elementary schools in Middletown, New York.

Study sample

The study participants, who were in grades K-2, were predominantly economically disadvantaged, with 84% being eligible for free or reduced-price lunch. The study included predominantly minority students; 37% were Hispanic, 33% were African American, and 29% were White. Approximately 13% of students were classified as English learners.

WWC: Summary of evidence pages

RANDOMIZED CONTROLLED TRIAL EXAMINING 320 STUDENTS, GRADES K-2

Review Details

Findings

Sample Characteristics

Study Details

Reviewed: September 2017

For:

 **Leveled Literacy Intervention Intervention Report - Beginning Reading**

Using:

 **Beginning Reading Review Protocol 3.0**

 **Review Standards 3.0**

Rating:

Meets WWC standards without reservations because it is a randomized controlled trial with low attrition.

This review may not reflect the full body of research evidence for this intervention. Please see the **WWC summary of evidence for Leveled Literacy Intervention.**



MEETS WWC
STANDARDS
WITHOUT
RESERVATIONS



AT LEAST ONE
STATISTICALLY
SIGNIFICANT
POSITIVE FINDING

WWC: Summary of evidence pages

Beginning Reading

September 2017

[EVIDENCE SNAPSHOT](#) [INTERVENTION REPORT \(863 KB\)](#) [REVIEW PROTOCOL](#)

Outcome domain ⓘ	Effectiveness rating ⓘ	Studies meeting standards ⓘ	Grades examined ⓘ	Students ⓘ	Improvement index ⓘ
Alphabetics	0	Does not meet Tiers 1–3	2	422	--
Reading achievement	+	Strong evidence (Tier 1)	2	747	11
Reading fluency	+	Promising evidence (Tier 3)	2	281	11

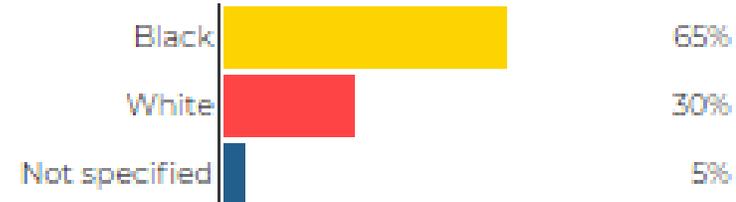
WWC: Contextual information provided

Evidence snapshots:

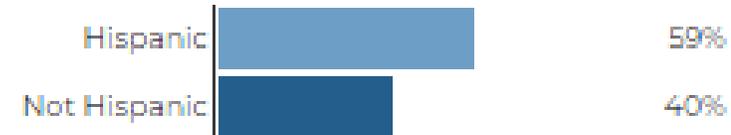
- Summary of all research settings and samples from studies meeting standards can include:
 - Race/ethnicity
 - Gender
 - English learners
 - Free/Reduced Lunch
 - Delivery method
 - Locale

Summary of all Research Settings and Samples that Met Standards

Race



Ethnicity



Gender



Male: 50%
Female: 49%

Free & Reduced-Price Lunch



82%

English Learners



28%

WWC: Meeting the needs of diverse learners

Literacy interventions can also be reviewed under other topics, such as:

- Early childhood
- English learners
- Students with disabilities



WWC: Meeting the needs of diverse learners

FIND RESEARCH WITH STUDENTS LIKE YOURS ▶

Filter by topic

- Literacy
- Mathematics
- Science
- Behavior
- Children and Youth with Disabilities
- English Learners
- Teacher Excellence

20 Results filtered by:

Literacy x Children and Youth with Disabilities x

Evidence of effectiveness	Intervention	Grades examined	Compare
	Phonological Awareness Training	PK	<input type="checkbox"/>
	Dialogic Reading	PK	<input type="checkbox"/>
	Peer-Assisted Learning Strategies	K-6	<input type="checkbox"/>
	Fast Track: Elementary School	K	<input type="checkbox"/>
	Lindamood Phoneme Sequencing® (LiPS®)	1-4	<input type="checkbox"/>
	Read Naturally®	2-6	<input type="checkbox"/>
	Self-Regulated Strategy Development	2-10	<input type="checkbox"/>
	Repeated Reading	5-12	<input type="checkbox"/>

WWC: Meeting the needs of diverse learners

Reviewed Research

Beginning Reading | Adolescent Literacy | English Language Learners | **Students with a Specific Learning Disability**

July 2010 EVIDENCE SNAPSHOT INTERVENTION REPORT (205 KB) REVIEW PROTOCOL

Outcome domain ⓘ	Effectiveness rating ⓘ	Studies meeting standards ⓘ	Grades examined ⓘ	Students ⓘ	Improvement index ⓘ
Reading fluency	0	1 study meets standards	4-6	20	--
Writing achievement	+	1 study meets standards	4-6	20	



Jill Walston

jwalston@air.org