

## ABSTRACT

This paper examines outcomes of studies accepted by the What Works Clearinghouse (WWC) depending on intervention duration. The data were obtained from the WWC Individual Study Database file and studies eligible for WWC standards (WWC, 2017) in the areas of elementary and secondary reading/literacy and mathematics (K–12) were included in the sample. A total of 671 outcomes across 171 studies were analyzed using meta-regression model with robust variance estimation (Hedges, Tipton, & Johnson, 2010). The analysis revealed no effect of intervention duration ( $\beta = -.00$ ,  $p = .44$ ) when controlling for other variables (e.g., sample size, outcome measures). Further analysis found a quite strong correlation between duration and sample size ( $r = -.42$ ), level of assignment ( $r = -.43$ ), and research design ( $r = -.40$ ). These results showed that briefer studies usually involved a small sample and used student level assignments and quasi-experimental designs more often than longer studies. Implications for research and practice are discussed as well as solutions for the use of researcher-made measures in program evaluation reviews

## INTRODUCTION

In 2015, the U.S. Congress passed the Every Student Succeeds Act (ESSA), which for the first time defines what it means for educational programs to have evidence of effectiveness and requires that very low-achieving schools seeking school improvement funding adopt programs meeting one of these standards.

The ESSA law is a demonstration of the growing confidence of educational policy makers in the use of evidence in decision-making. It creates a **new urgency** for educators to know which programs are proven and which are not and for researchers to discover methodological factors that may affect outcomes of experimental evaluations.

Previous studies have reported evidence on the effects of design issues on conclusions of meta-analyses, such as research design (randomized vs. quasi-experiment) and outcome measure (independent vs. researcher-made), and intervention duration (de Boer et al., 2014).

**The purpose of this study is to determine the effect of intervention duration on outcomes of experiments using a large sample of studies included in the What Works Clearinghouse reviews on reading and mathematics (K-12). We controlled for other variables such as design features and subject areas.**

## METHOD

The data were obtained from the WWC Individual Study Database file. All accepted studies in WWC reviews in the areas of elementary and secondary reading/literacy and mathematics (K–12) were included in the analysis.

The sample consisted of **671 outcomes of 171 studies**.

**Intervention duration was coded in weeks**, taking the information from the What Works Clearinghouse intervention reports or, if needed, from the original studies.

The following variables were considered in the analysis:

- ❖ **subject**
- ❖ **research design**
- ❖ **level of assignment**
- ❖ **date of publication**
- ❖ **type of outcome measure**

We used a **meta-regression model with robust variance estimation** to conduct the meta-analysis (Hedges, Tipton, & Johnson, 2010), because in the 171 studies included in this analysis, there were an average of 3.92 outcomes per study ( $SD = 3.64$ ). Mean effect sizes across studies were calculated after assigning each study a weight based on inverse variance (Lipsey & Wilson, 2001), adjusted as suggested by Hedges (2007) which inflates the variances from school- and class-assigned studies.

The packages **metafor** and **ClubSandwich** were used to estimate all random-effects models with RVE (Pustejovsky & Tipton, 2018; Viechtbauer, 2010).

# Effects of Intervention Duration on Outcomes of Experiments in Education

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## PRELIMINARY FINDINGS

The analysis revealed **no effect of intervention duration** ( $\beta = -.00$ ,  $p = .44$ ) when controlling for the other variables. Further analysis found a quite **strong correlation** between duration and sample size ( $r = -.42$ ), level of assignment ( $r = -.43$ ), and research design ( $r = -.40$ ).

TABLE 1

Study characteristics.

Characteristics		
Total Studies		171
Total Findings		671
Continuous Variables		Mean (SD)
Findings per study		3.92 (3.64)
Sample size		746.65 (1666.37)
Categorical Variables		N (%)
Subject	Math	45 (26.3)
	Reading/literacy	126 (73.7)
Date of Publication	2005-2016	100 (58.5)
	1984-2004	71 (41.5)
Research Design	QED	62 (36.3)
	RCT	109 (63.7)
Level of Assignment	Cluster-Assigned	86 (50.3)
	Student-Assigned	85 (49.7)
Measure Type	Independent	549
	Researcher-made	122

TABLE 2

Results of meta-regression.

Coefficient	beta	SE	tstat	df	p_Satt
Intercept	0.344	0.061	5.641	54.742	0.000
Duration	-0.000	0.000	-0.797	15.244	0.438
Researcher measures	-0.198	0.053	-3.752	32.766	0.001
Reading	0.055	0.033	1.655	47.826	0.104
Pre-2005	0.100	0.037	2.689	68.579	0.009
Matched	-0.013	0.031	-0.426	57.586	0.671
Student level analysis	0.003	0.038	0.083	15.569	0.935

## DISCUSSION

This study's findings revealed that intervention duration has no effect controlling for other variables that affect effect sizes. However, we found strong correlations between intervention duration and other factors, which make it hard to separate the effect of duration from the effect of measure type, research design, and level of assignment.

Despite these results, **intervention duration is an important attribute in program evaluations** because briefer studies provide results hard to **replicate in real school settings**, where interventions are used over many months or years. Longer interventions, in addition to using higher methodological standards, as shown from the correlation coefficients, are more likely to be replicated in school over extended periods.

Given the growing importance of evidence in educational decision-making, methodological features are essential elements to be studied to know which factors affect effect sizes in experiments in education.