How effective are computer-based teacher training programs? Evidence from a randomized controlled trial in El Salvador

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Outline

1. Motivation
2. A look back: Results from the CAL-IMPACT project in 2018 (RCT on computer-assisted learning in primary schools in El Salvador)
3. Pilot study on content knowledge of primary-school teachers in El Salvador
4. First results of an RCT on computer-assisted teacher training in 2019

Part I

Motivation

The Problem: Learning Crisis

- Improved school enrollment rates in developing countries …
- … but poor learning outcomes
- „Schooling is not Learning“

➢ „Learning Crisis“ (World Bank)

THE PROBLEM: 2ND GRADE MATH QUESTIONS

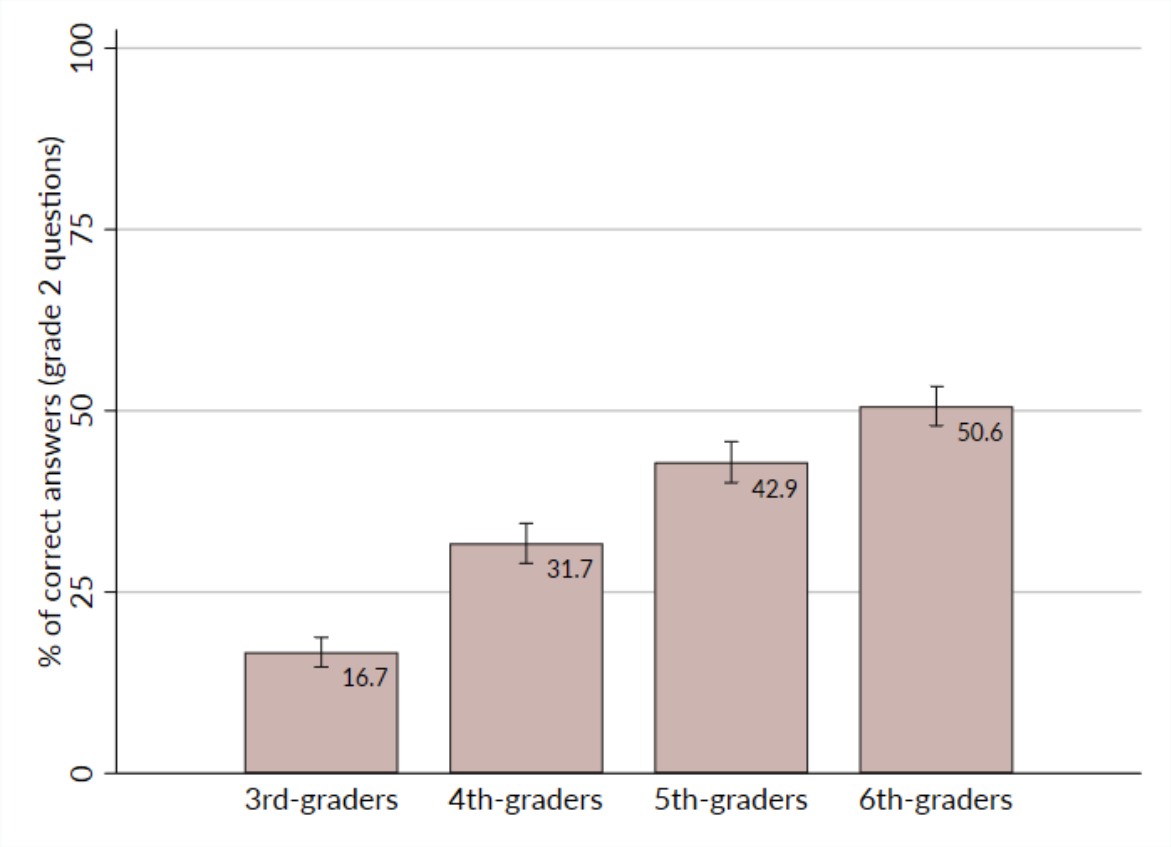


Figure: Percent of correct answers on *second grade math questions*, Source: Baseline data collected in February 2018 (N=3,532)

The Problem: Baseline Test scores

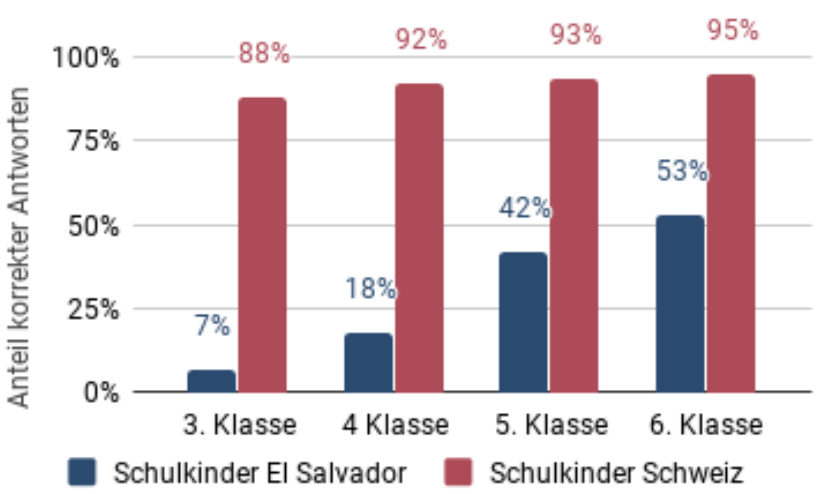
Example: 45 ÷ 9 = _____

Correct answers:

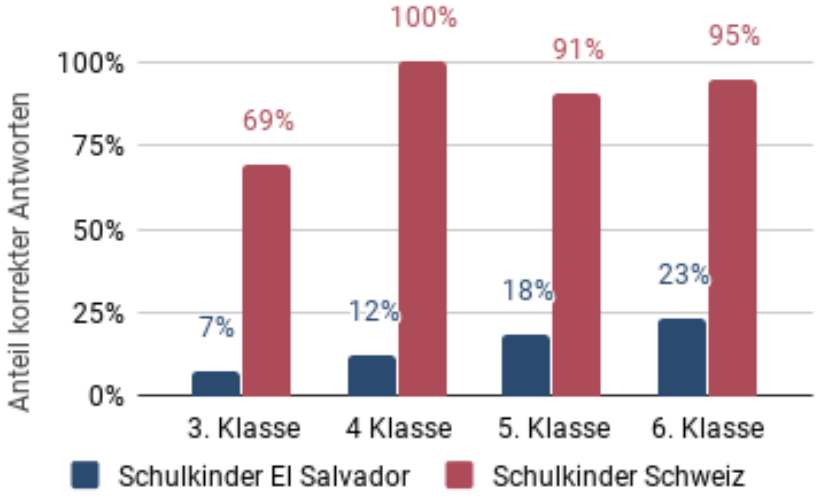
3rd gr.	3 %
4th gr.	9 %
5th gr.	28 %
6th gr.	39 %

The Problem: Baseline Test scores

What's 8 : 2?



What time is it?

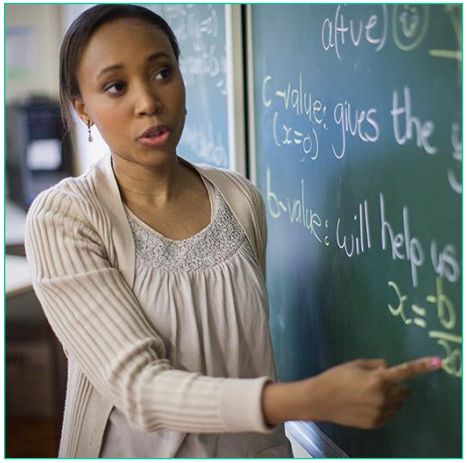


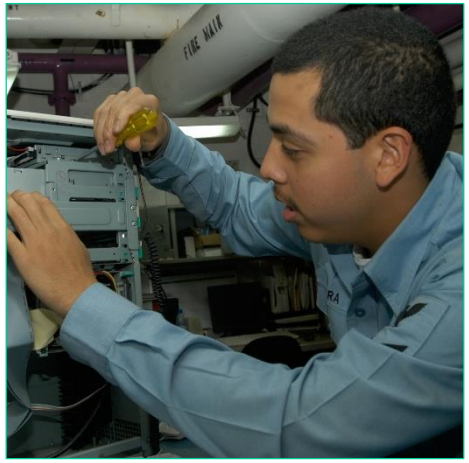
PART II
CAL-IMPACT 2018

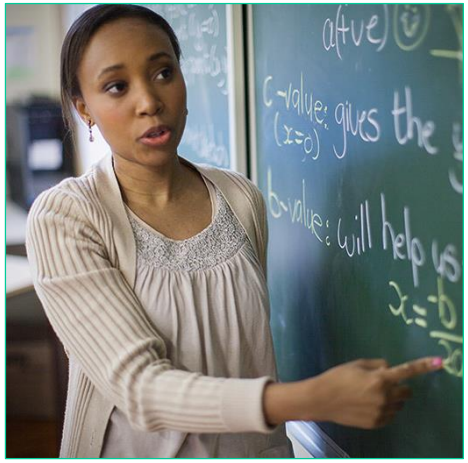
El Salvador


Mexico
Belize
Honduras
Guatamala
El Salvador
Nicaragua
Costa Rica
Panama

CAL-IMPACT: INTERVENTIONS (ADDITIONAL MATH LESSONS)







2 x 90 min./week

40 classes, ≈ 800 children

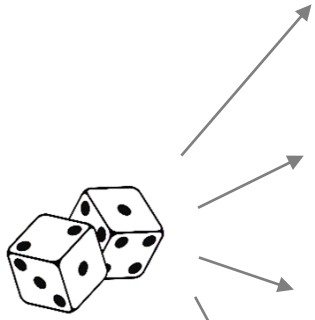
2 x 90 min./week

39 classes, ≈ 800 children

2 x 90 min./week

30 classes, ≈ 800 children

CAL-IMPACT: DESIGN (IMPLEMENTATION BY WWW.CONSCIENTE.CH)



Baseline Test

Endline Test

Control 1: Control classes in treatment schools (40 classes)

Control 2: Control classes from different schools (40 classes)

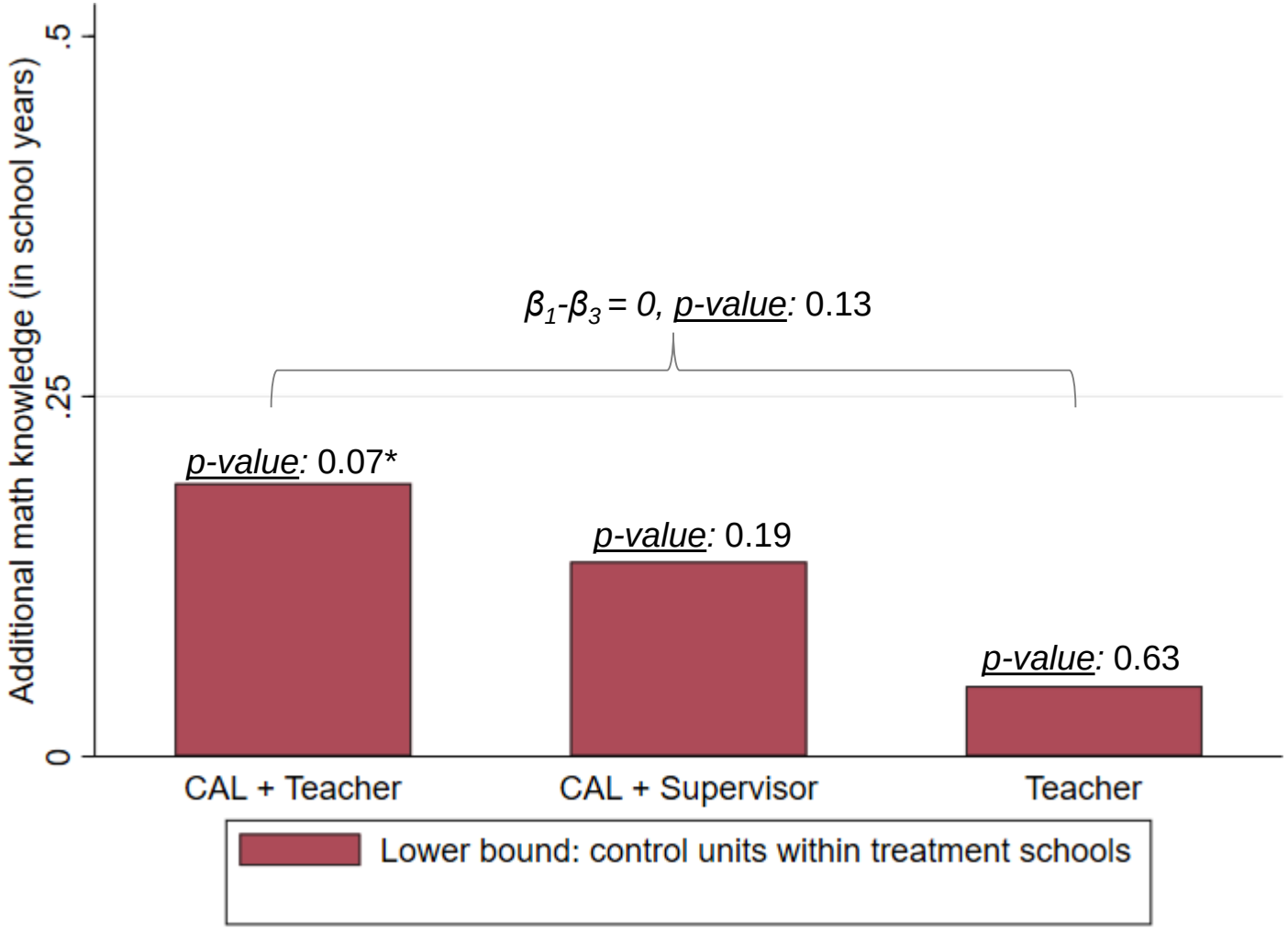
T 1: Additional CAL-classes with teacher (2x90min/week)

T 2: Additional CAL-classes with supervisor (2x90min/week)

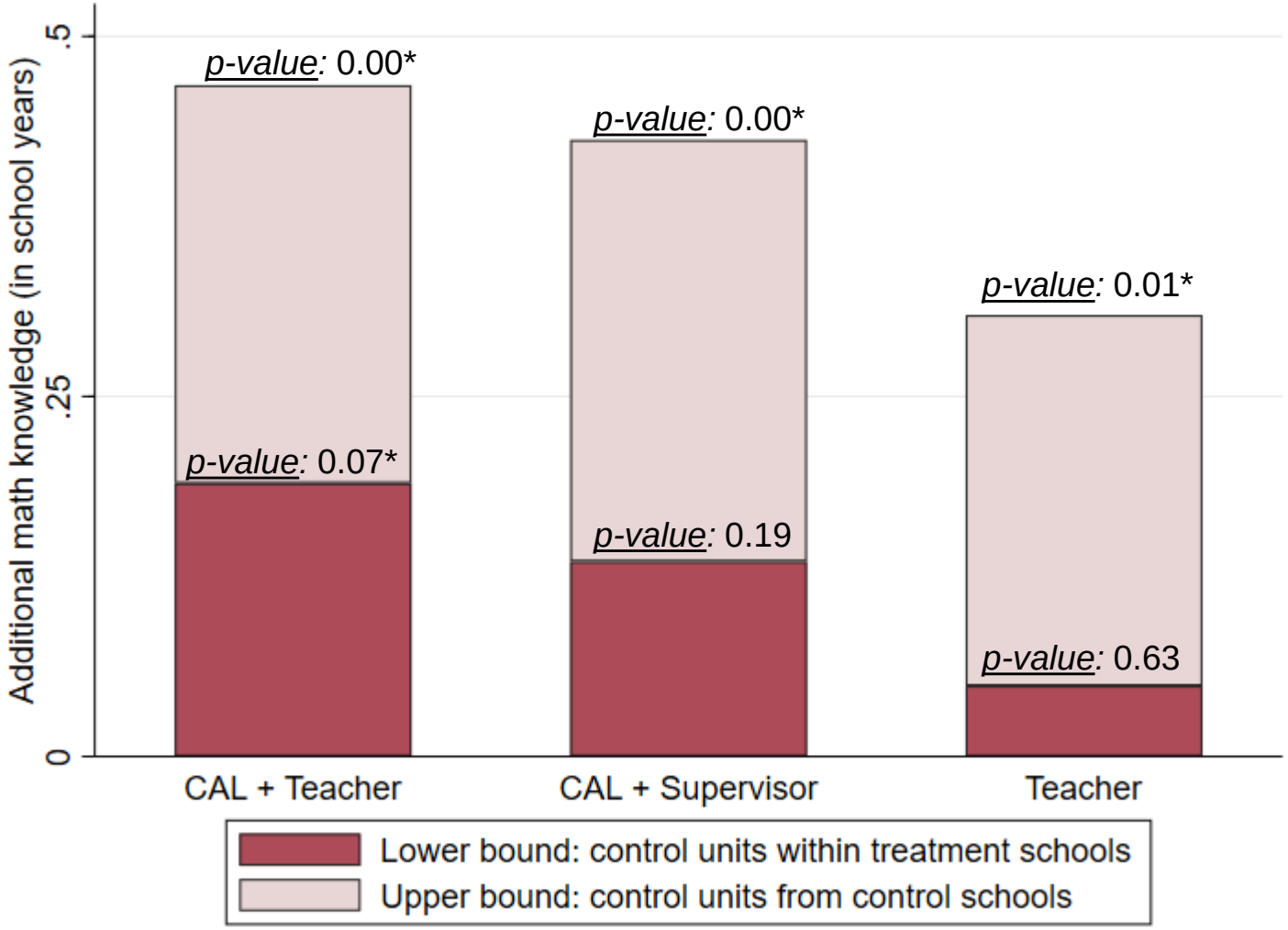
T 3: Additional traditional classes (2x90min/week)

5.5 Months

CAL-IMPACT: RESULTS



CAL-IMPACT: RESULTS



CAL-IMPACT: Lessons Learned

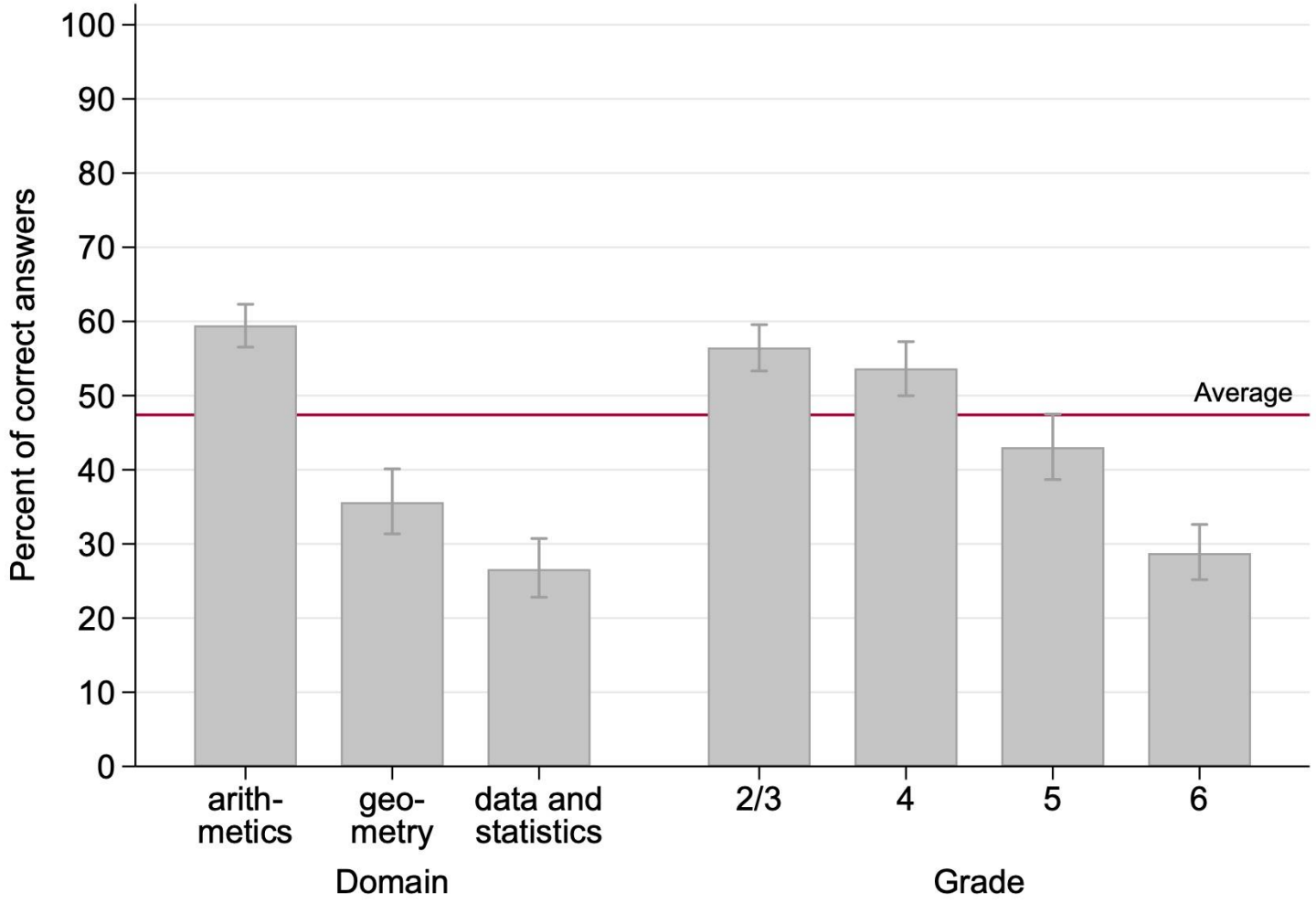
- CAL instructed by teachers has the largest impact.
- (Weak) evidence that CAL is more effective than additional lessons taught by teachers.
- Strong spillover effects.
- As a byproduct of the project, we noticed that teachers' knowledge of the content they were supposed to teach was really poor, therefore …

Part III
Teacher Tests 2018

Teacher Tests 2018: Design

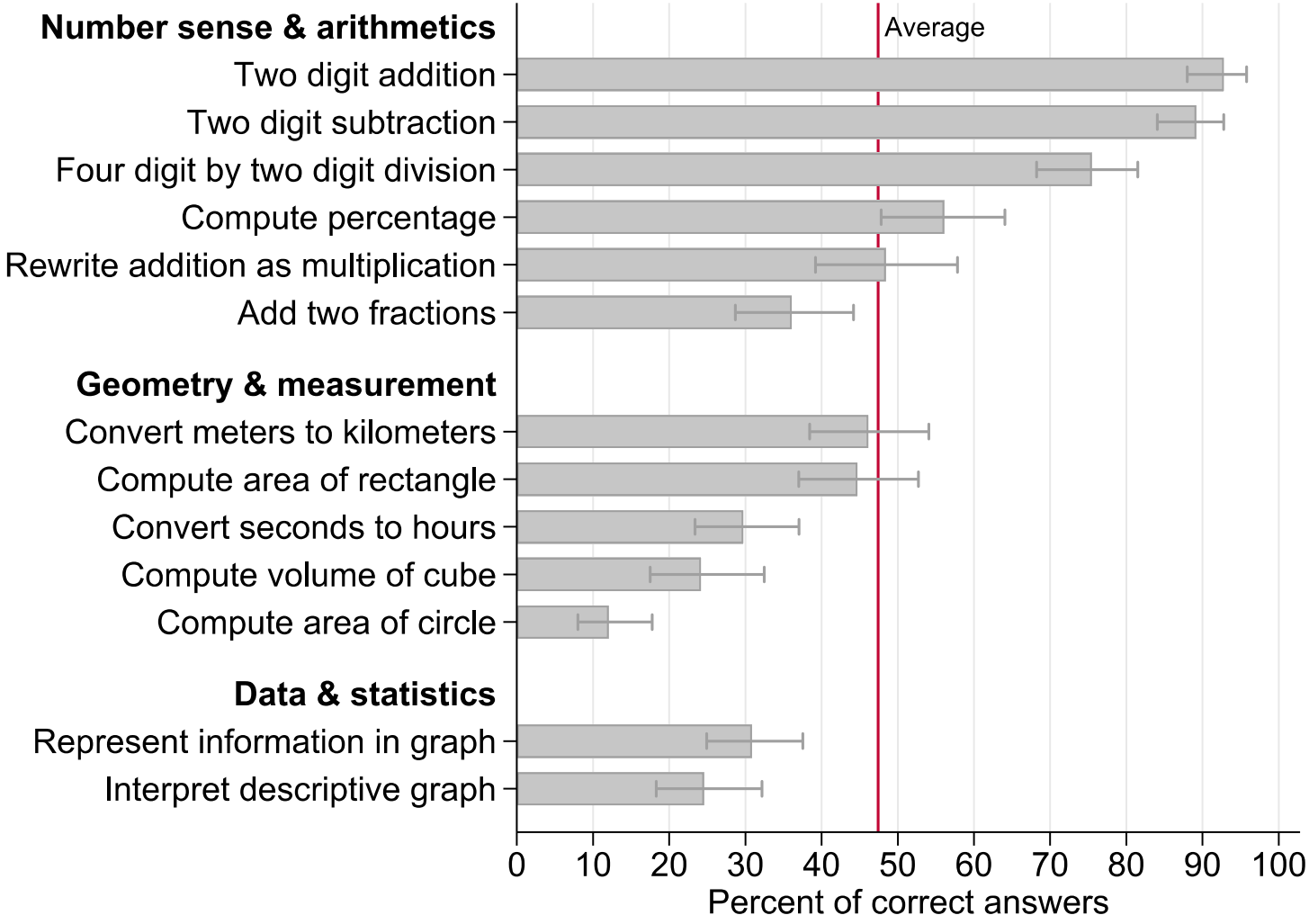
- Random sample of 224 primary-school math teachers in El Salvador (Department of Morazan)
- Math test covering topics taught in 2nd to 6th grade

Teacher Tests 2018: Results



N = 224; survey design taken into account

Teacher Tests 2018: Results



N = 224; survey design taken into account

And it seems to matter ...

Table 2: Relation between teacher's test score and students' learning over a eight month evaluation period

	(1)	(2)	(3)	(4)	(5)
Years-of-schooling effect					
– grade-specific score (in 10 PP)	0.131**	0.125**	0.133**	0.155***	0.146*
	(0.042)	(0.043)	(0.039)	(0.037)	(0.057)
– overall score (in 10 PP)	0.124**	0.117**	0.130***	0.151***	0.159**
	(0.038)	(0.039)	(0.036)	(0.033)	(0.058)
Standardized learning effect					
– grade-specific score (std.)	0.093**	0.088**	0.095**	0.111***	0.103*
	(0.032)	(0.032)	(0.029)	(0.028)	(0.043)
– overall score (std.)	0.098**	0.092**	0.102**	0.121***	0.125*
	(0.031)	(0.032)	(0.030)	(0.028)	(0.048)
Class level controls	No	Yes	Yes	Yes	Yes
School level controls	No	No	Yes	Yes	No
Teacher controls	No	No	No	Yes	Yes
School fixed effects	No	No	No	No	Yes

Standard errors in parentheses (clustered by schools).
All models include controls for grade and CAL treatment assignment.
Number of observations: 2765 students, 119 teachers, 48 schools.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

PART IV
COMPUTER-ASSISTED TEACHER TRAINING 2019

CATT: Computer-Assisted Teacher Training

In-service teacher training program to …

- improve teacher content knowledge in math
- to improve their teaching,
- and, hopefully, to improve student math skills

Treatment (incentivized):

- self-studying using computer-assisted learning software
- participation in four workshops (problems solving, recapitulation)

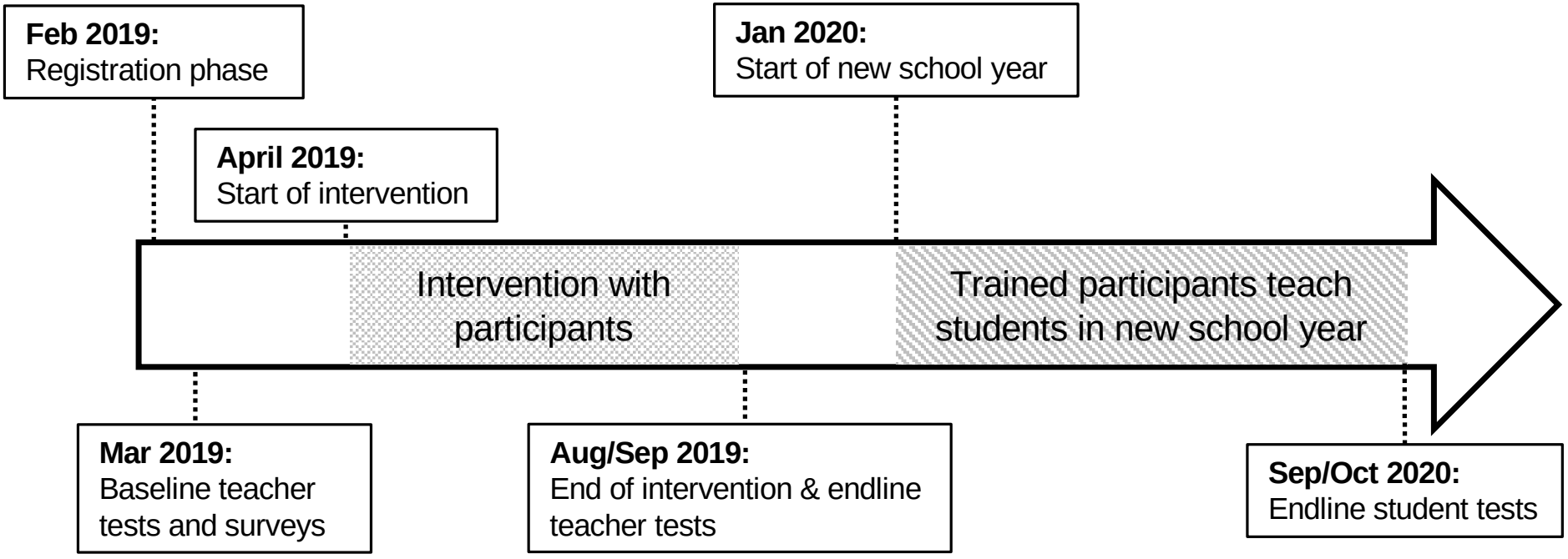
Implementation:

- Using *Kolibri* with *Khan Academy* contents
- In cooperation with NGO Consciente (www.consciente.ch)

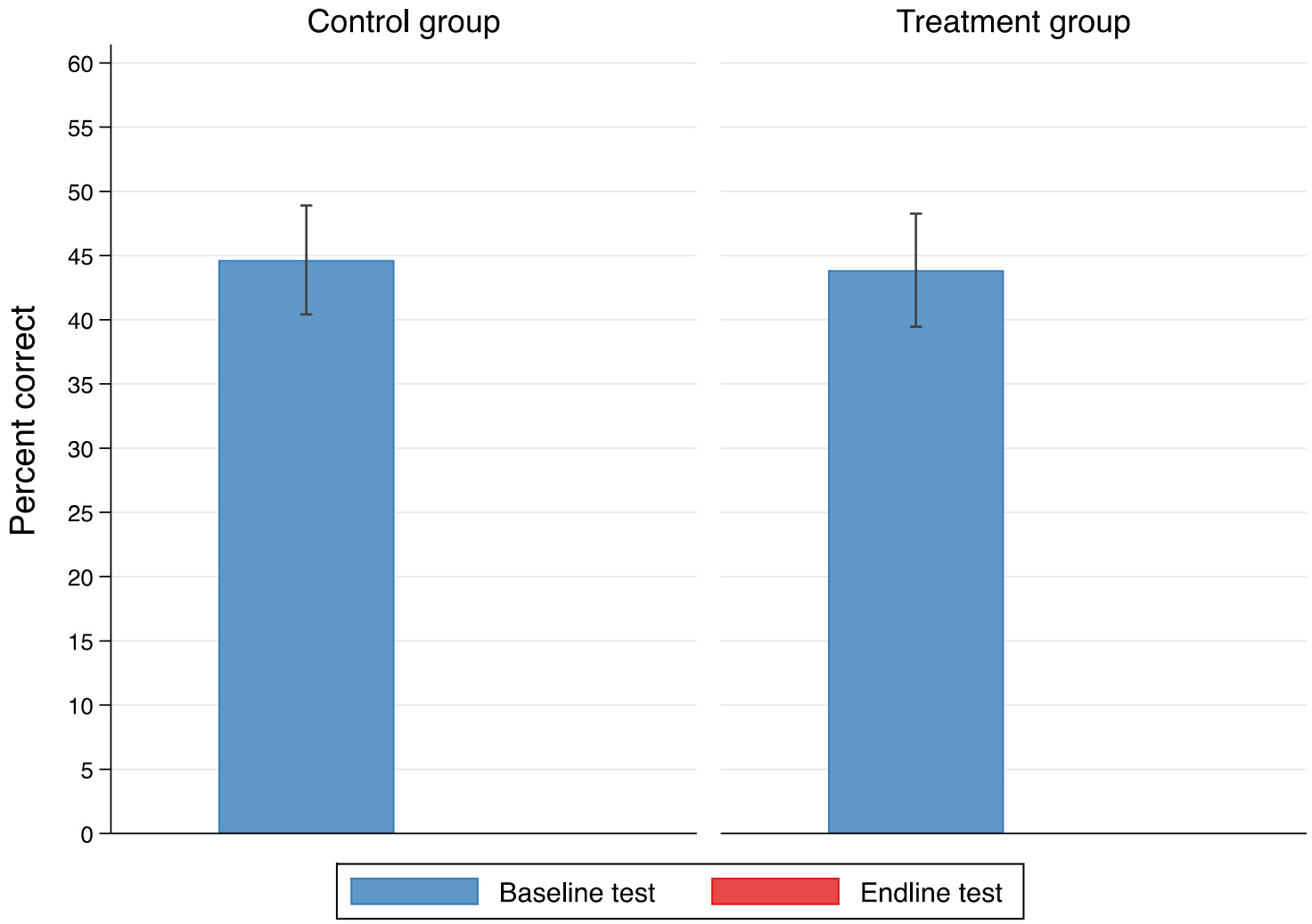
CATT: Sample/Design

Population:	primary school math teachers in Morazán
Sample:	313 teachers from 175 different schools applied for participation in the study selection of the worst performing teacher of every school
Randomization:	87 teachers in the treatment group 88 teachers control group stratified by baseline test scores and gender
Balance:	almost identical baseline test results and balanced in variables such as gender, experience, and education
Attrition:	no endline test for 11 teachers (6%)

CATT: Timeline



CATT: Preliminary Results



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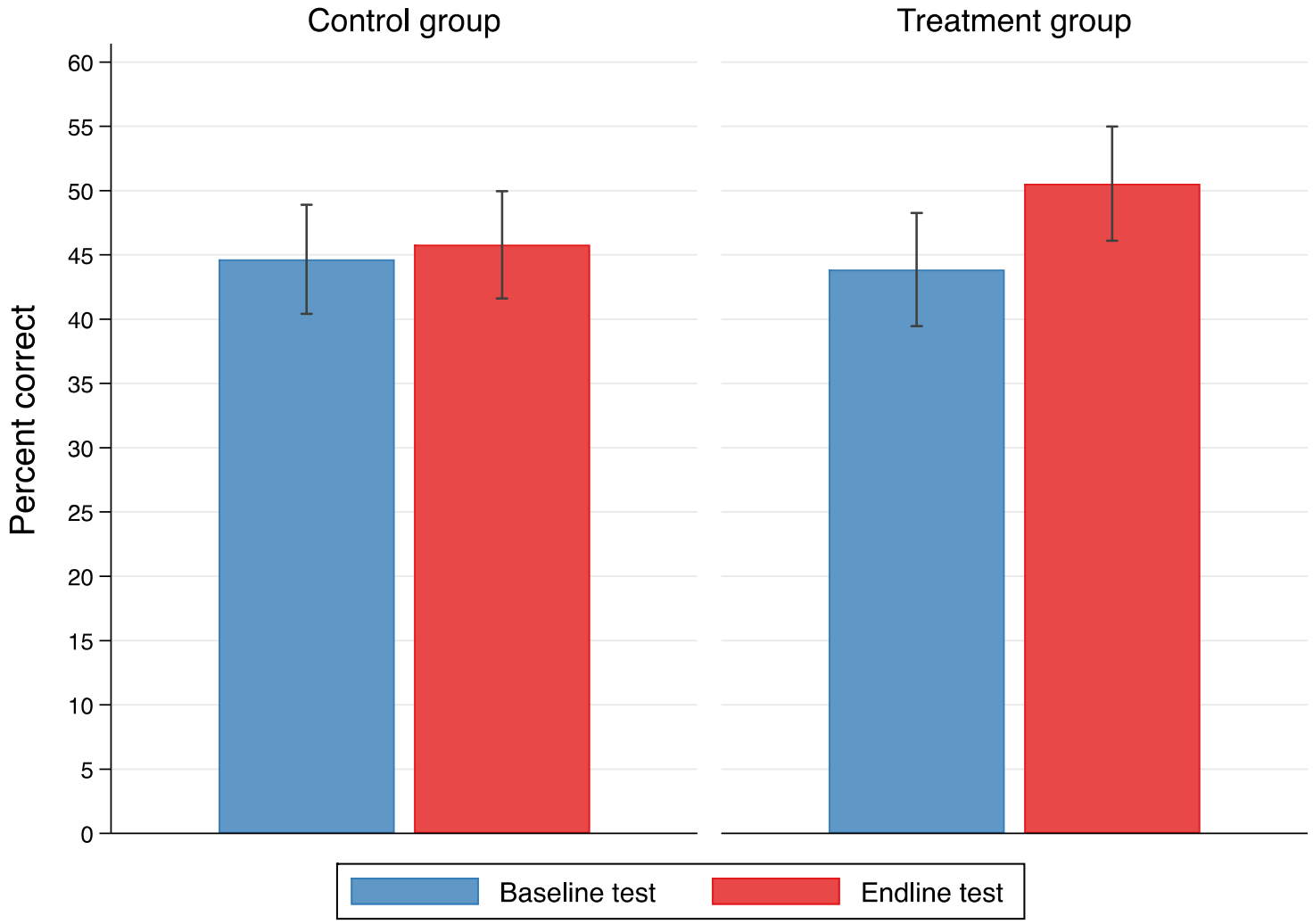

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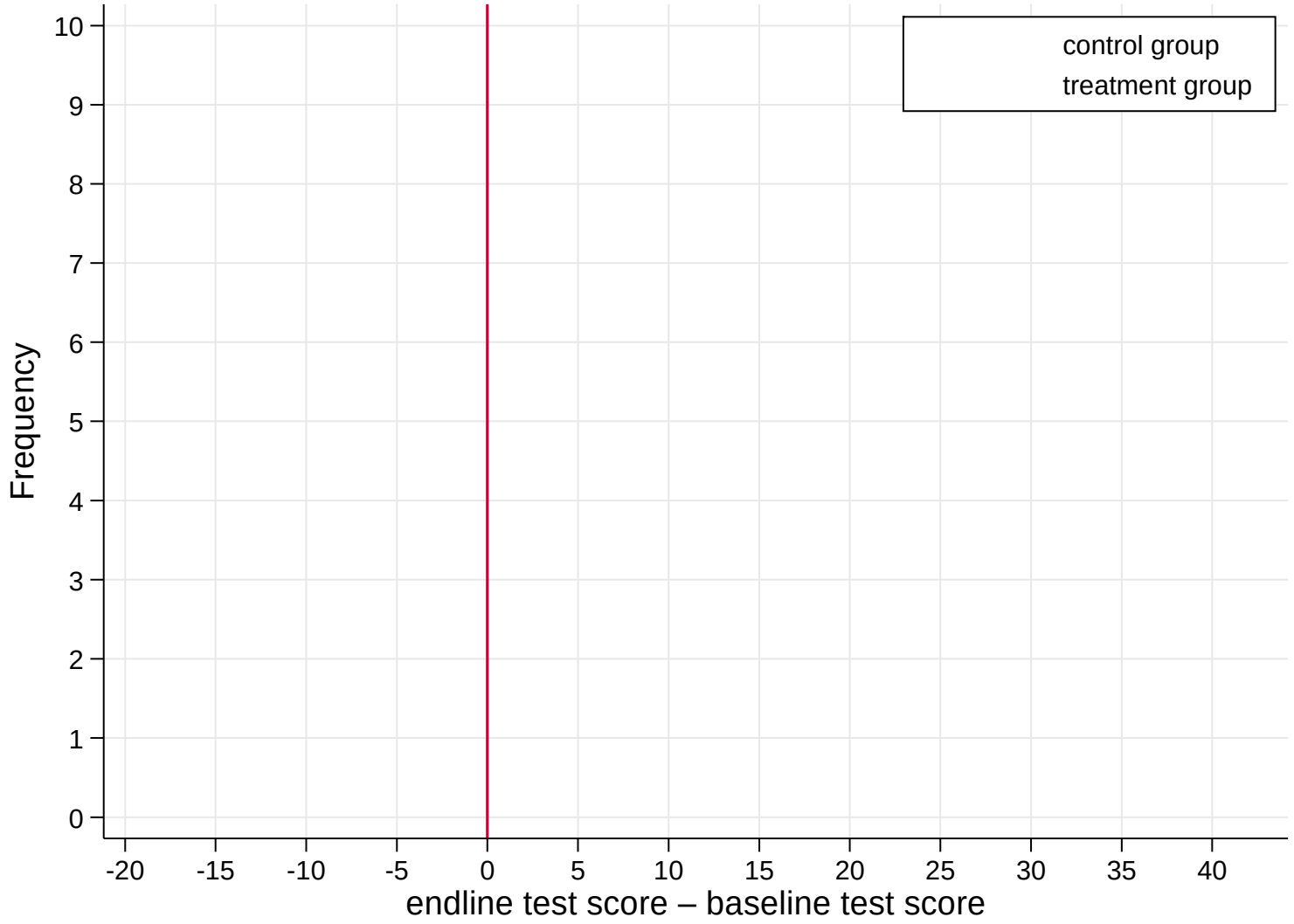

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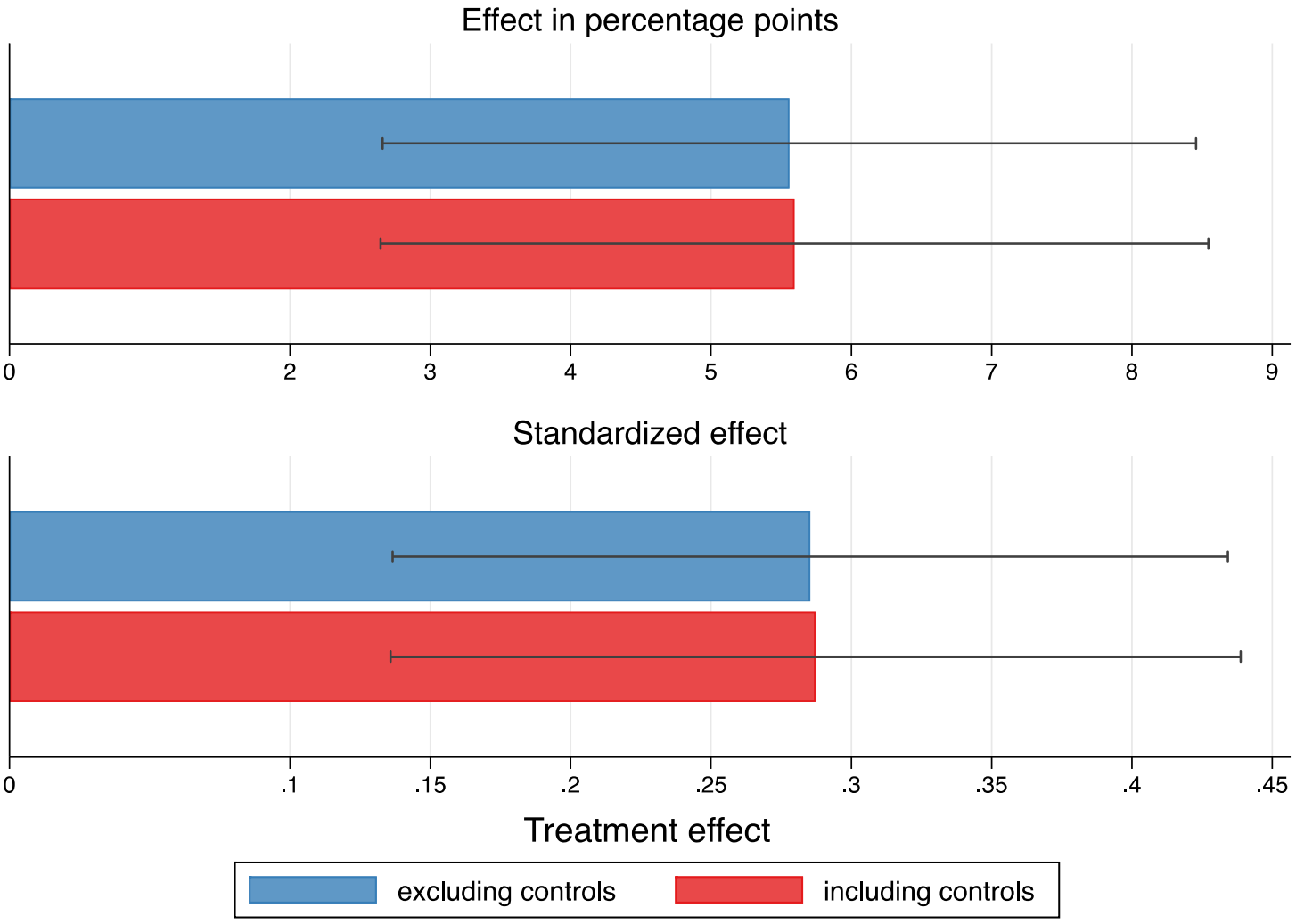

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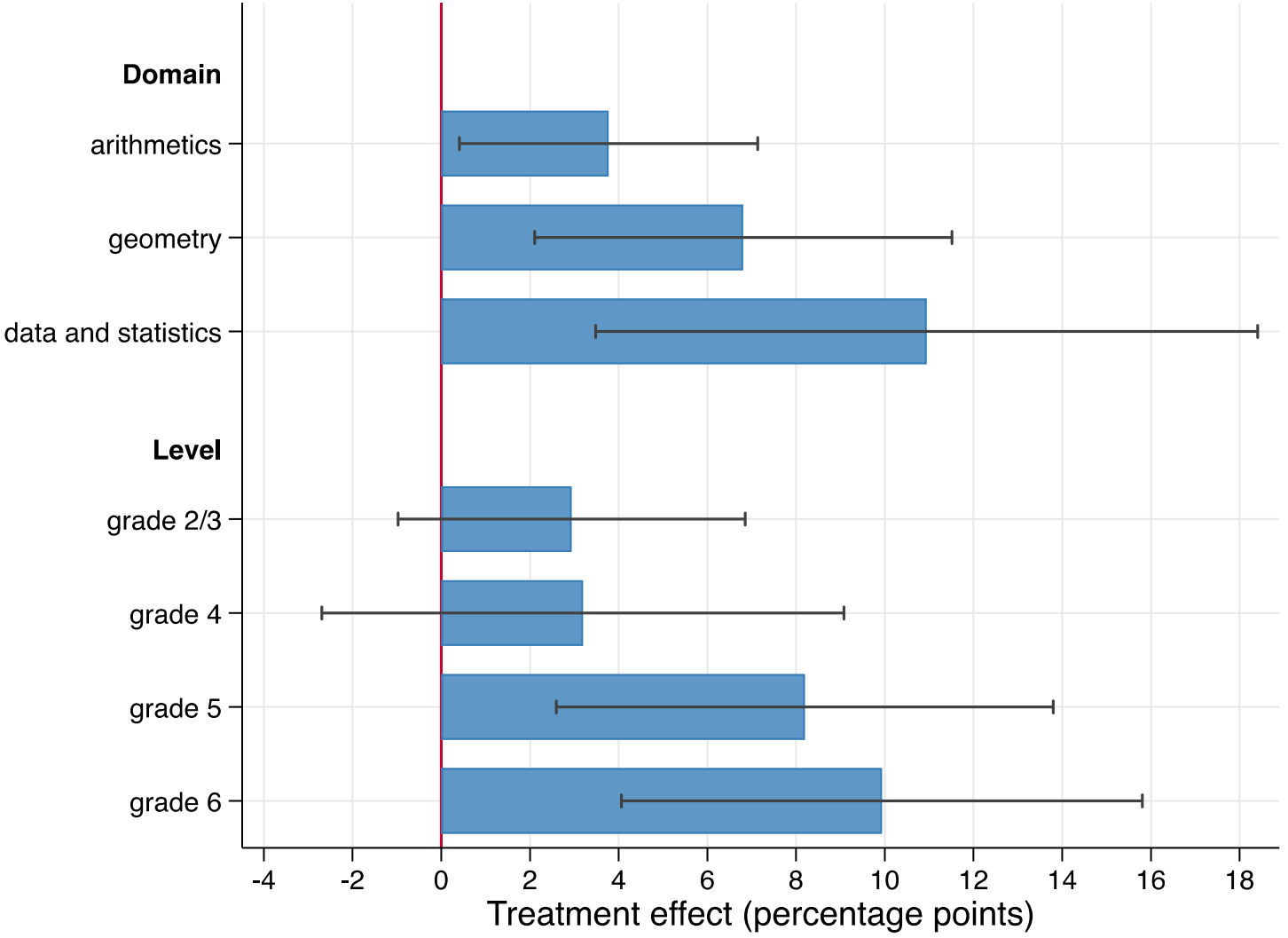

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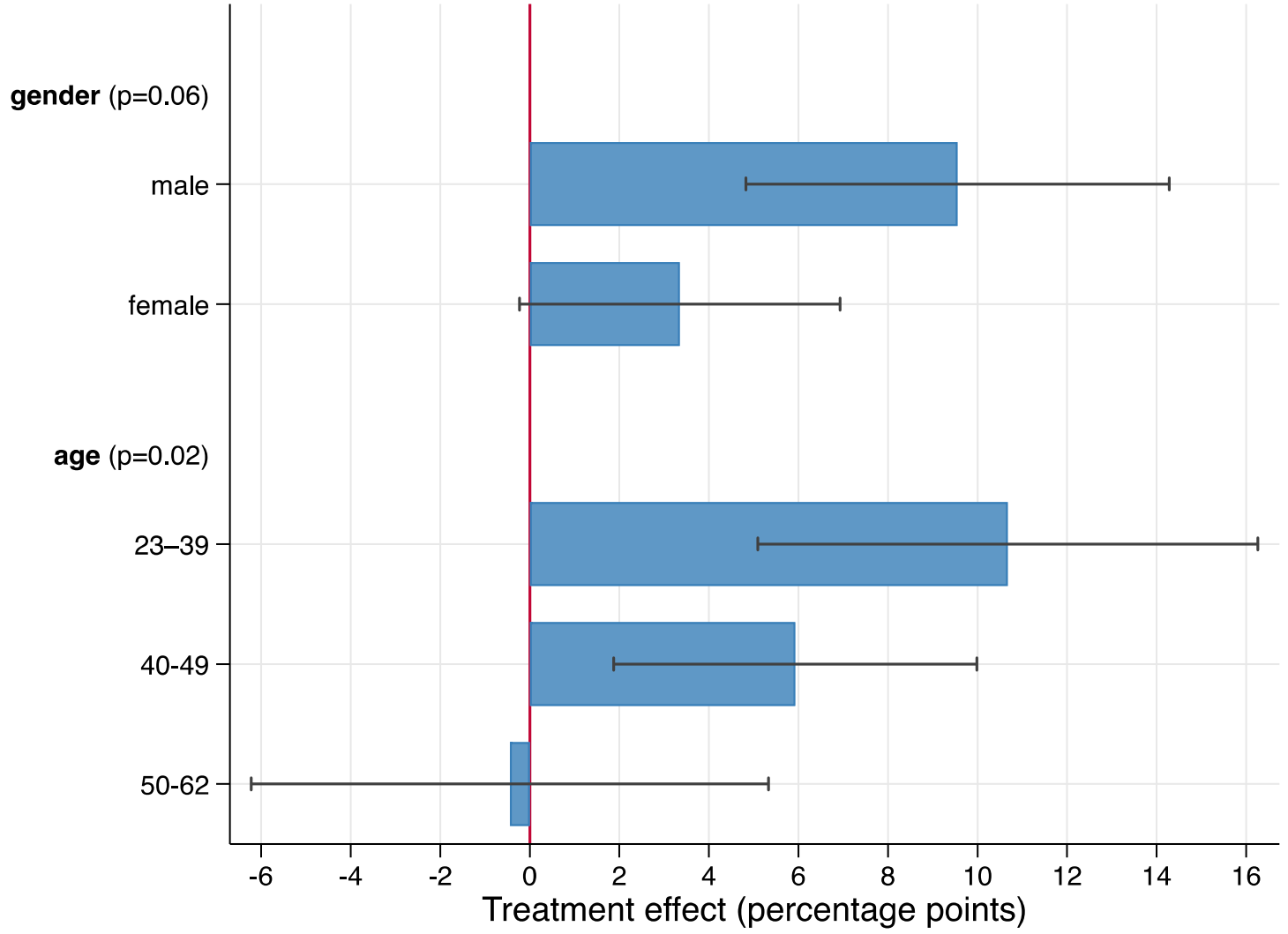

To Be Continued …

Next year we will see whether teachers' knowledge gain translates into better learning outcomes among students.