

Addressing Teacher Shortages in Disadvantaged Schools: Alternative Routes to Teacher Certification and Student Achievement

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**Elizabeth Warner • Jill Constantine • Melissa Clark
Vicki Bernstein • Russ Whitehurst**

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Highlighting Two IES Sponsored Studies

- **The Evaluation of Teachers Trained Through Different Routes to Certification (Constantine et al. 2009)**
 - Capitalizes on existing variation in amount of required coursework and content emphasis of teacher preparation

- **The Effectiveness of Secondary Math Teachers from Teach For America and the Teaching Fellows Programs (Clark et al. 2013)**
 - Focus on selectivity of teacher preparation programs

- **Addressing Teacher Shortages in Disadvantaged Schools: Lessons from Two Institute of Education Sciences Studies (Clark et al. 2013)**
 - Evaluation Brief: Synthesis of the two IES studies

Forum Overview

- **Can alternative certification routes broaden the pool of effective teachers in high-need schools?**
- **What have we learned that may inform teacher preparation policy?**

Speakers/Panelists

- **Elizabeth Warner, Institute of Education Sciences, U.S. Department of Education**
 - Moderator
- **Jill Constantine, Mathematica**
 - Presenter
- **Melissa Clark, Mathematica**
 - Presenter
- **Vicki Bernstein, New York City Department of Education**
 - Discussant
- **Grover “Russ” Whitehurst, Brookings Institution**
 - Discussant

Evaluation of Teachers Trained Through Different Routes to Certification

Jill Constantine

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Study Focus

- **Less selective alternative certification programs with admissions requirements similar to traditional certification programs**
 - Minimum G. P. A. requirement of 3.0 or less
 - No other stringent selection criteria (SAT scores or interviews)
- **Divided sample into alternative certification programs with relatively low and high coursework requirements**

Research Questions

- 1. What are the effects on student achievement of teachers trained through different routes to certification?**
- 2. What aspects of teacher preparation are associated with teacher effectiveness?**
 - Amount of coursework**
 - Timing of coursework**
 - Content of coursework**

Summary of Findings

- **Students of alternatively certified teachers performed the same, on average, as students of traditionally certified teachers in their schools**
- **Completing required coursework while teaching is associated with lower student achievement**
- **Variation in the amount and content of required coursework in teacher preparation was not linked to teachers' effectiveness in terms of student achievement**

Rigorous Random Assignment Design

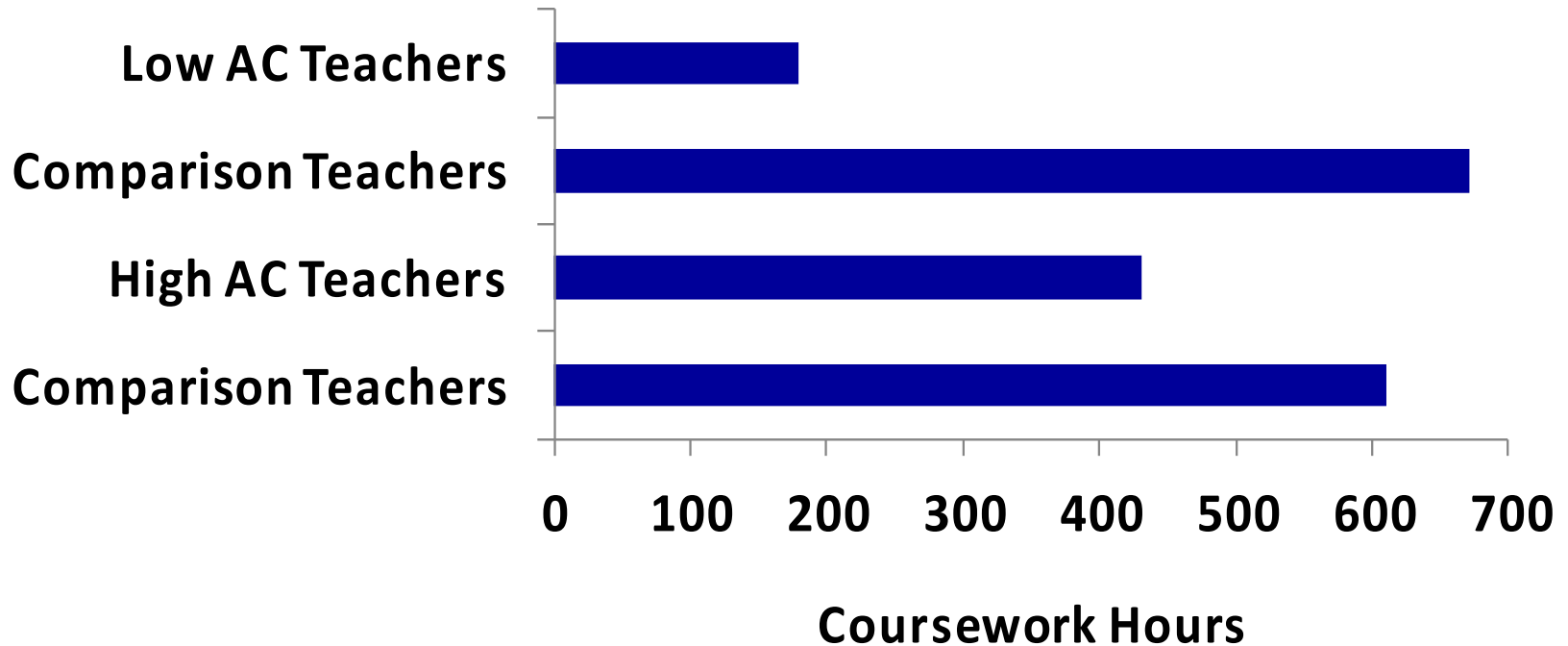
- **Research design and participants:** Randomly assigned students in same schools and grades to novice teachers from traditional or alternative certification programs
- **Analysis:** Compared outcomes of students randomly assigned to the different teachers
- **Study design:** Provided a test of the effectiveness of teachers from different preparation programs; we can't separate the effect of the teacher from the program

Large, Multi-State Study Sample

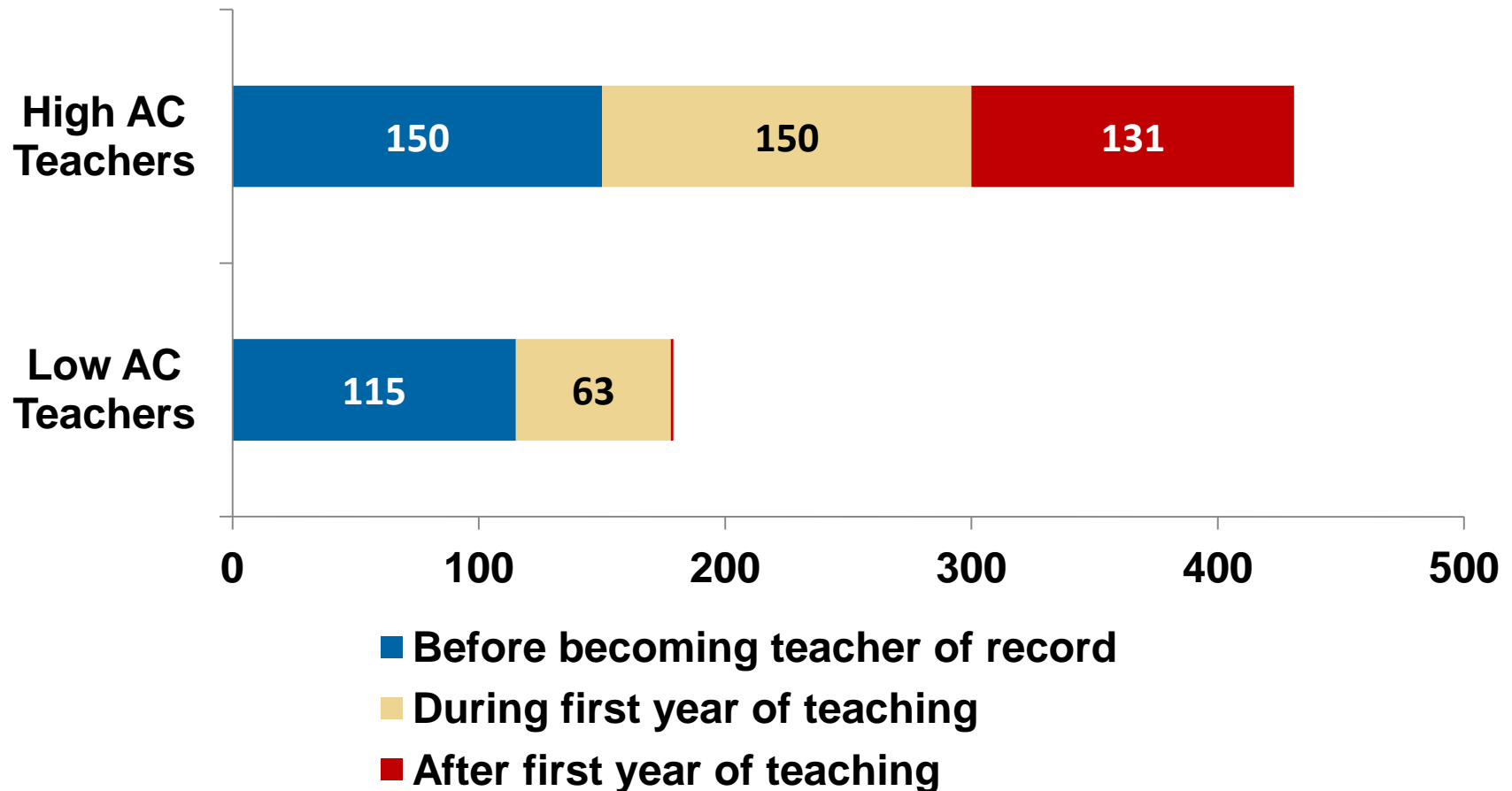
- In 7 states, 63 schools, 174 teachers
- Students
 - High poverty
 - Students in grades K–5, but two-thirds were in K–3; reflects typical placement of novice alternative route teachers
 - 92 percent minority
 - Below average test scores
- Collected data on teacher training programs, teachers, and students

Characteristics of Alternative Certification Programs

Alternatively Certified Teachers Required to Complete Fewer Coursework Hours



Alternatively Certified Teachers Required To Complete Many Hours Of Coursework While Teaching

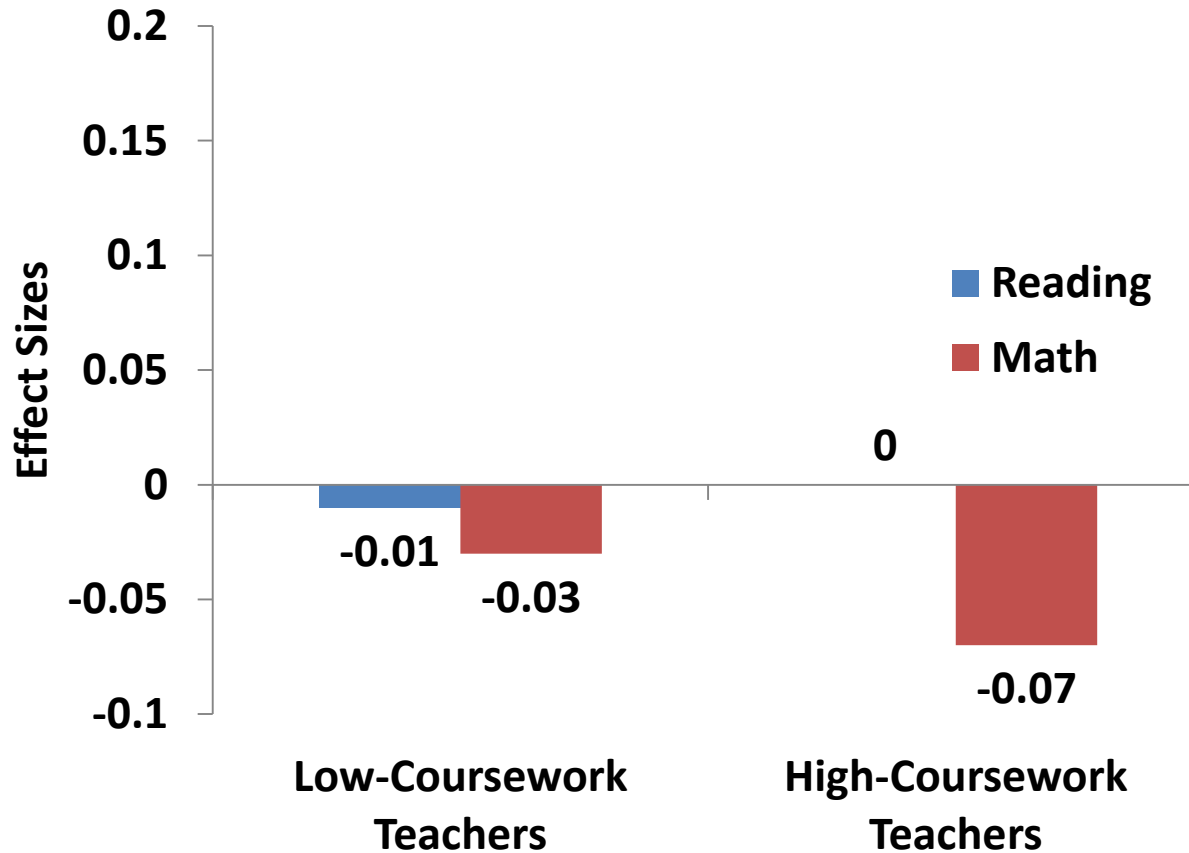


Personal and Professional Backgrounds of Teachers Differed

- **Alternatively certified teachers were:**
 - **Four to six years older than traditionally certified teachers**
 - **More likely to be African American**
 - **Less likely to be white**
 - **More likely to have children**
- **Less likely to major in education as undergraduates**
- **More likely to be taking coursework during the study year**

Findings on Teacher Effectiveness

Novice Alternatively Certified Teachers Neither More Nor Less Effective Than Novice Traditionally Certified Teachers



Note: None of the effects were significantly different from zero at the .05 level.

Differences in Student Math Achievement For Some Groups of Teachers

- **Students of alternatively certified teachers in California scored statistically lower in math than students of their traditionally certified comparisons**
- **Students of alternatively certified teachers taking coursework scored statistically lower in math than students of their traditionally certified counterparts**
- **No other teacher or program characteristics were related to teacher effectiveness**

The Effectiveness of Secondary Math Teachers from Teach For America and the Teaching Fellows Programs

Melissa Clark

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TFA and Teaching Fellows Programs

- **Follow similar models**
 - Recruit and select high-achieving individuals
 - Provide 5 to 7 weeks of training in summer
 - Place in high-poverty schools
 - Provide ongoing training and support
- **Programs differ in some ways**
 - TFA recruits mainly college graduates; Teaching Fellows programs recruit mainly professionals
 - TFA requires two-year commitment; Teaching Fellows programs expect long-term commitment

Research Questions

Compared with other teachers teaching the same math courses in the same schools...

- 1. How effective are secondary math teachers from TFA?**
- 2. How effective are secondary math teachers from the Teaching Fellows programs?**

Summary of Findings

- **Secondary math teachers from Teach For America (TFA) were *more effective* than other math teachers in the same schools**
- **Secondary math teachers from the Teaching Fellows programs were *at least as effective* as, and in some cases more effective than, other math teachers in the same schools**

Rigorous Random Assignment Design

- Randomly assigned students to teachers within same school and math course
 - Class taught by TFA or Teaching Fellows teacher
 - Class taught by “comparison teacher” who entered teaching via either alternative or traditional route
 - No limits on teacher experience
- Compared student math scores at end of year to estimate teacher effectiveness
 - Can’t compare effectiveness of TFA and Teaching Fellows teachers

Large Samples, Comprehensive Data Collection

- **TFA analysis sample**
 - 4,573 students, 136 teachers, 45 schools, 11 districts, 8 states
- **Teaching Fellows analysis sample**
 - 4,116 students, 153 teachers, 44 schools, 9 districts, 8 states
- **Data collection**
 - **Student math achievement**
 - State tests for middle school students
 - Study-administered, subject-specific tests for high school students (algebra I, II, geometry)
 - **Teacher characteristics**
 - Survey of background and preparation
 - Praxis II math scores to measure math content knowledge

Characteristics of Study Teachers

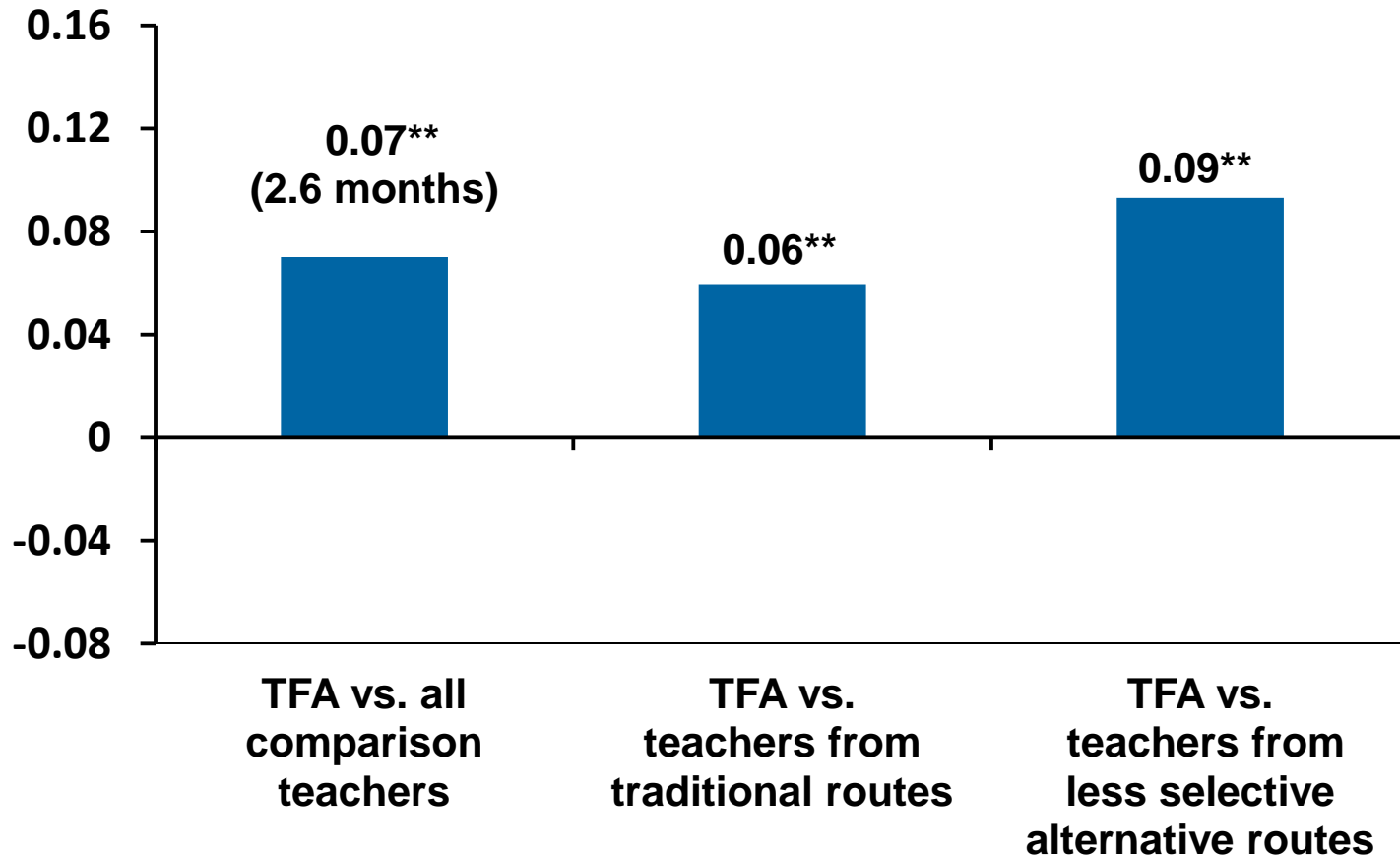
TFA and Teaching Fellows Programs Attract Different Types of Teachers into the Profession

- **Relative to comparison teachers, TFA and Teaching Fellows teachers:**
 - **Younger and more likely to be white**
 - **More likely to have attended a selective college**
 - **Have less teaching experience**
 - **Less likely to have a math degree, but scored higher on Praxis II math assessment**
 - **More likely to have taken coursework during study year (TFA only)**

Effectiveness of TFA Teachers

TFA Teachers More Effective Than Comparison Teachers

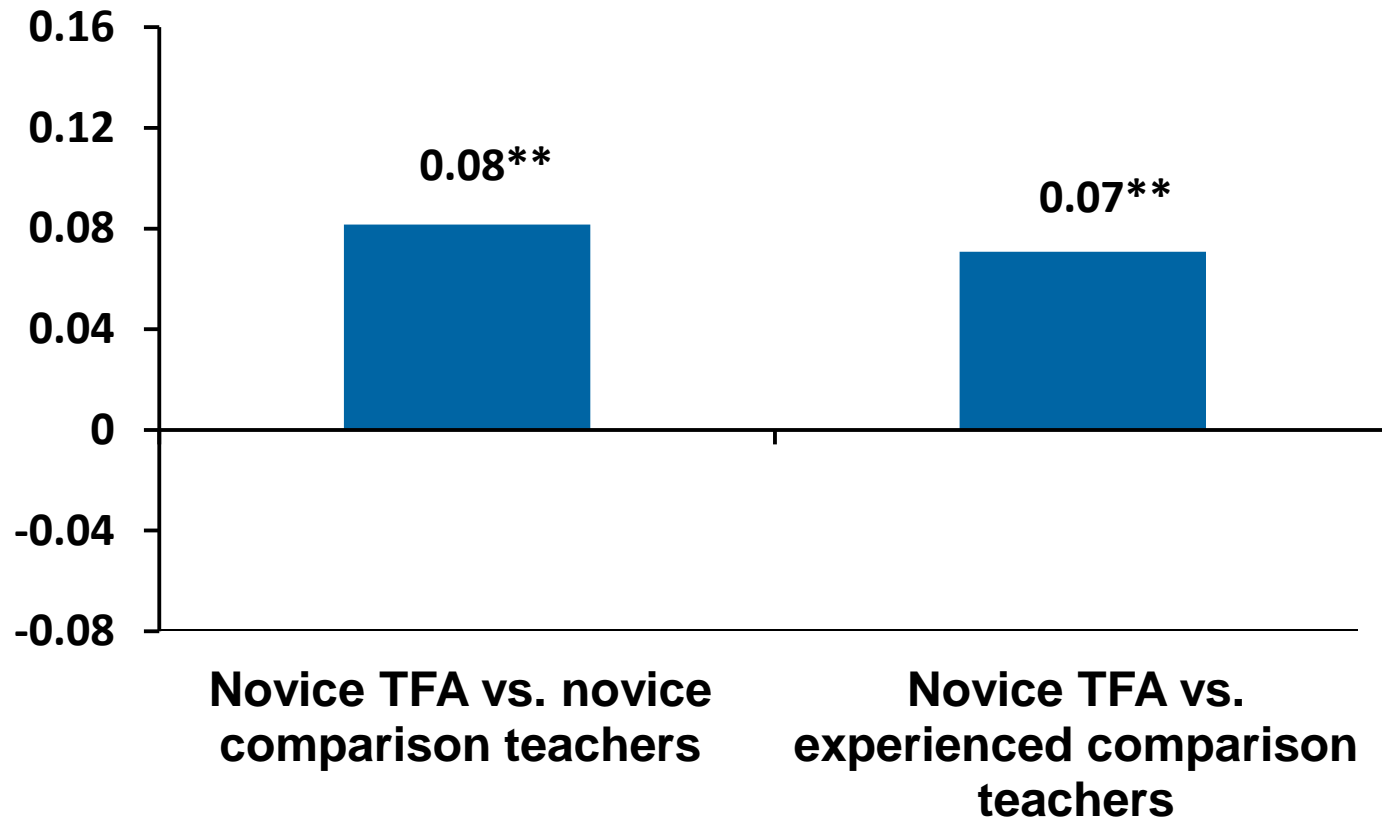
Difference in effectiveness (in standard deviations of test scores)



Difference is statistically significant at 5% (*) or 1% (**) level.

Novice TFA Teachers More Effective Than Both Novice and Experienced Comparison Teachers

Difference in effectiveness (in standard deviations of test scores)

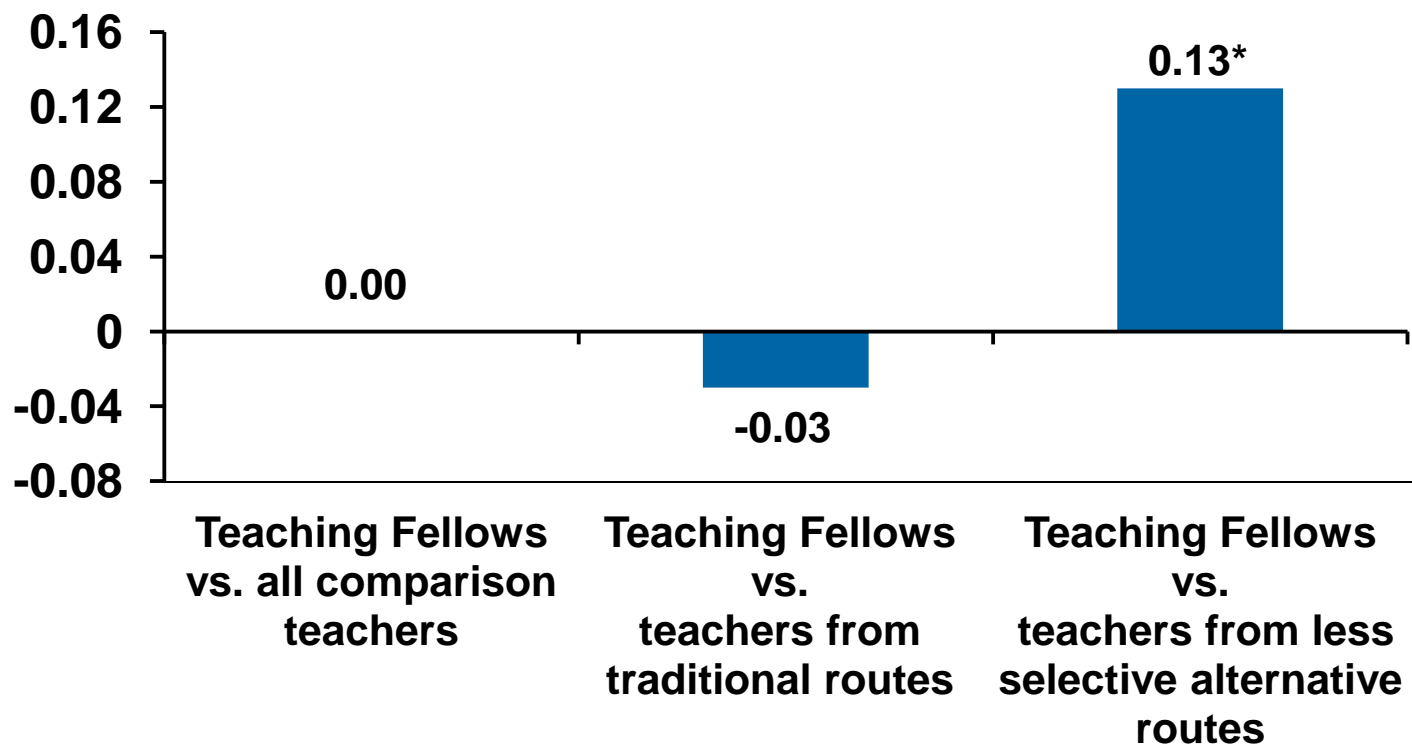


Difference is statistically significant at 5% (*) or 1% (**) level.

Effectiveness of Teaching Fellows

Teaching Fellows Just as Effective as Comparison Teachers, and in Some Cases More Effective

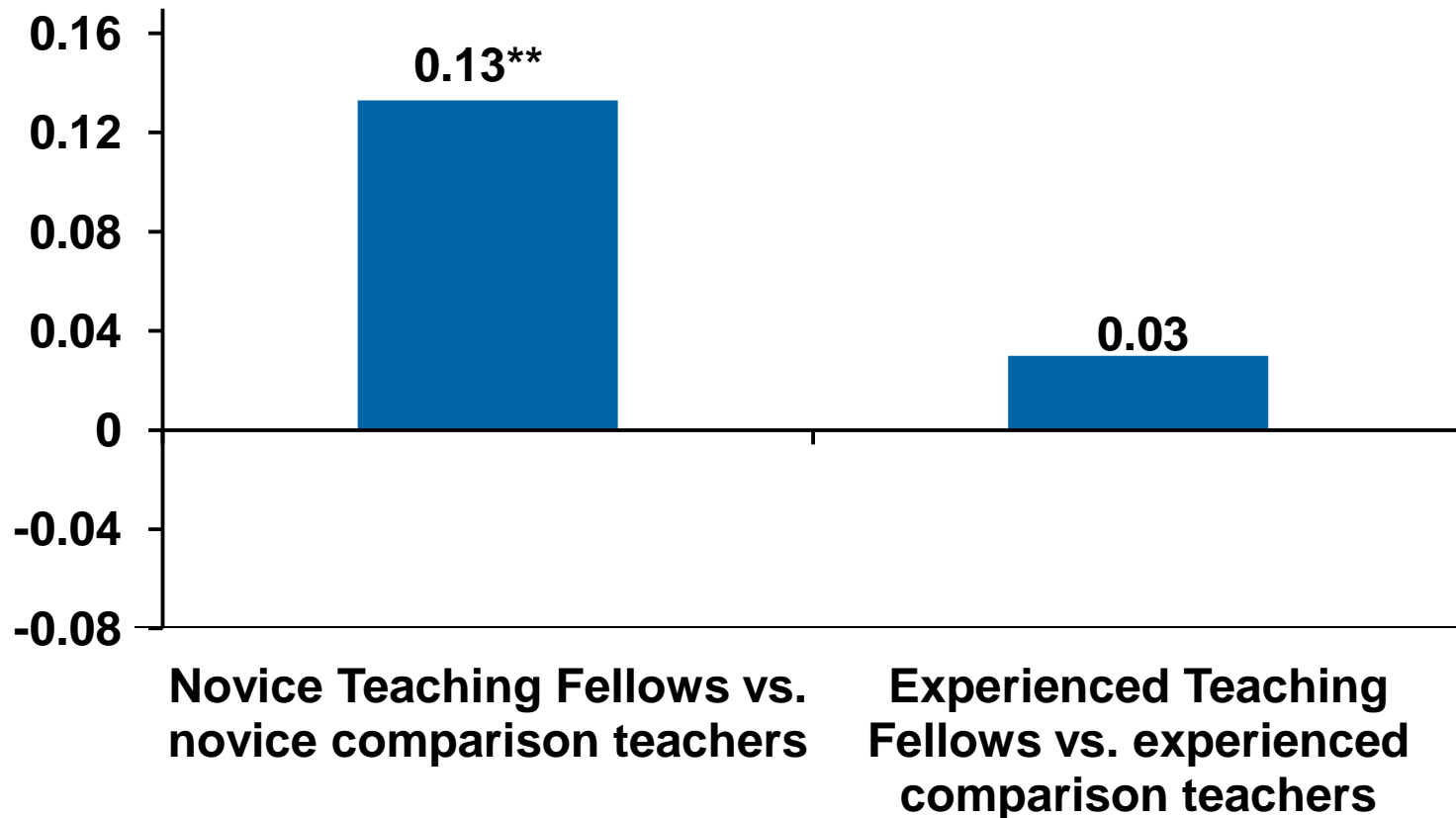
Difference in effectiveness (in standard deviations of test scores)



Difference is statistically significant at 5% (*) or 1% (**) level.

Novice Teaching Fellows More Effective Than Novice Comparison Teachers

Difference in effectiveness
(in standard deviations of test scores)



Difference is statistically significant at 5% (*) or 1% (**) level.

Analysis of Factors That Predict Teacher Effectiveness

Difficult to Predict Teacher Effectiveness

- **Examined a range of teacher characteristics**
 - Selectivity of college, college courses taken, math content knowledge, student teaching experience, coursework
- **With a few exceptions, none of the characteristics examined predicted teacher effectiveness**
 - Teaching experience and content knowledge at high school level associated with increased effectiveness
 - Coursework taken while teaching associated with decreased effectiveness

Lessons Learned from the Two Studies

- **Teachers from both highly selective and less selective alternative certification programs can help fill teacher shortages without decreasing student achievement**
 - Secondary math teachers from TFA, and in some cases Teaching Fellows, can increase student achievement
- **Coursework taken while teaching may decrease teacher effectiveness**
- **Difficult to predict teacher effectiveness**

Vicki Bernstein



**Department of
Education**

Dennis M. Walcott, Chancellor

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Grover “Russ” Whitehurst

BROOKINGS

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Questions and Answers

- **Moderator: Elizabeth Warner (IES)**
- **Presenters**
 - Jill Constantine
 - Melissa Clark
- **Discussants**
 - Vicki Bernstein
 - Russ Whitehurst

For More Information

Evaluation Brief

<http://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=NCEE20134018>

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Jill Constantine: Back-up Slides

Novice Alternatively Certified Teachers Were Neither More Nor Less Effective Than Novice Traditionally Certified Teachers

	AC Classroom Average Score	TC Classroom Average Score	Effect Size
Reading			
Overall	38.51	38.62	-0.01
Low coursework	38.29	38.50	-0.01
High coursework	38.76	38.76	0.00
Math			
Overall	41.75	42.77	-0.05
Low coursework	41.52	42.12	-0.03
High coursework	42.03	43.53	-0.07

Comprehensive Data Collection

- **Student achievement**
 - Study team administered California Achievement Test, 5th edition
- **Teacher practices**
 - Trained observers rated classroom practices using the Vermont Classroom Observation Tool
 - Principal ratings
- **Teacher characteristics**
 - Teacher survey
- **Program characteristics**
 - In depth phone and in person interviews with directors alternative and traditional certification programs

Teacher Characteristics (1)

	Low Coursework			High Coursework		
	AC	TC	p-Value	AC	TC	p-Value
White	49%	74%	.02*	41%	70%	.01*
Black	40%	20%	.01*	32%	8%	.01*
Female	96%	98%	.56	79%	89%	.21
Have children	70	28	0.00**	38	30	0.41
Experience (yrs)	2.4	3.0	.06	2.7	2.8	.51
Age (yrs)	34	28	.00**	34	30	.01*
N	46	46		42	44	

*Significantly different at the 5% level

**Significantly different at the 1% level.

Teacher Characteristics (2)

	Low Coursework			High Coursework		
	AC	TC	p-Value	AC	TC	p-Value
SAT score	930	959	0.43	1,010	1,013	0.95
Selective undergraduate (%)	15.0	31.0	0.09	26.0	33.3	0.50
Education major	*	78.3	0.00**	21.4	56.8	0.00**
Currently taking courses	30.4	19.6	0.24	57.1	29.5	0.01**
N	46	46		42	44	

***Significantly different at the 5% level**

****Significantly different at the 1% level**

Geographic Distribution of Sample

	Districts	Schools	Teachers		
			AC	TC	Total
California	5	15	20	18	38
Illinois, Wisconsin, Louisiana, Georgia	7	12	15	16	31
New Jersey	3	9	9	9	18
Texas	5	23	43	44	87
Total	20	63	87	87	174

Grade Distribution of Sample

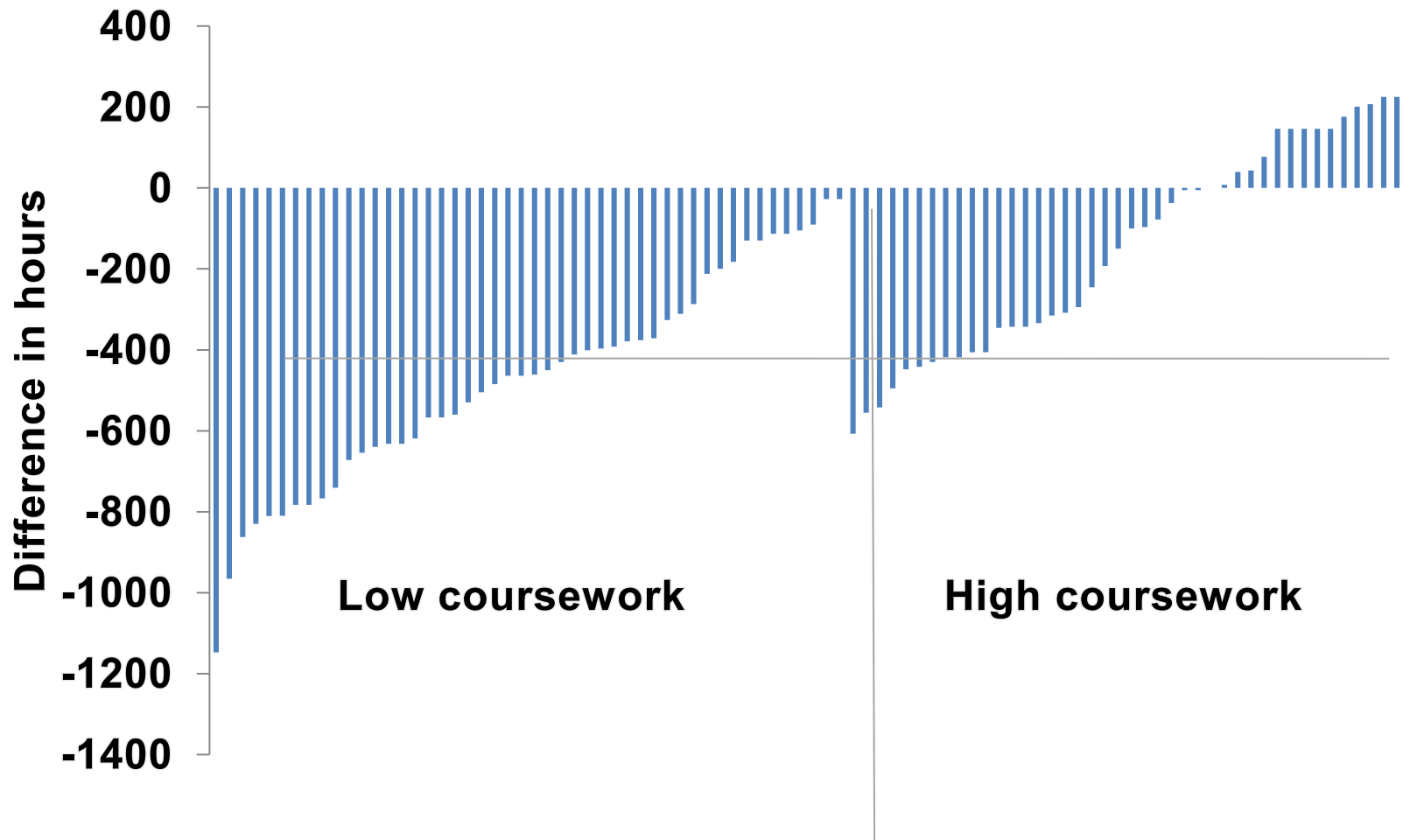
Grade	Number of Mini-Experiments
Kindergarten	20
First	30
Second	14
Third	9
Fourth	11
Fifth	6
Total	90

Baseline Measures of Students

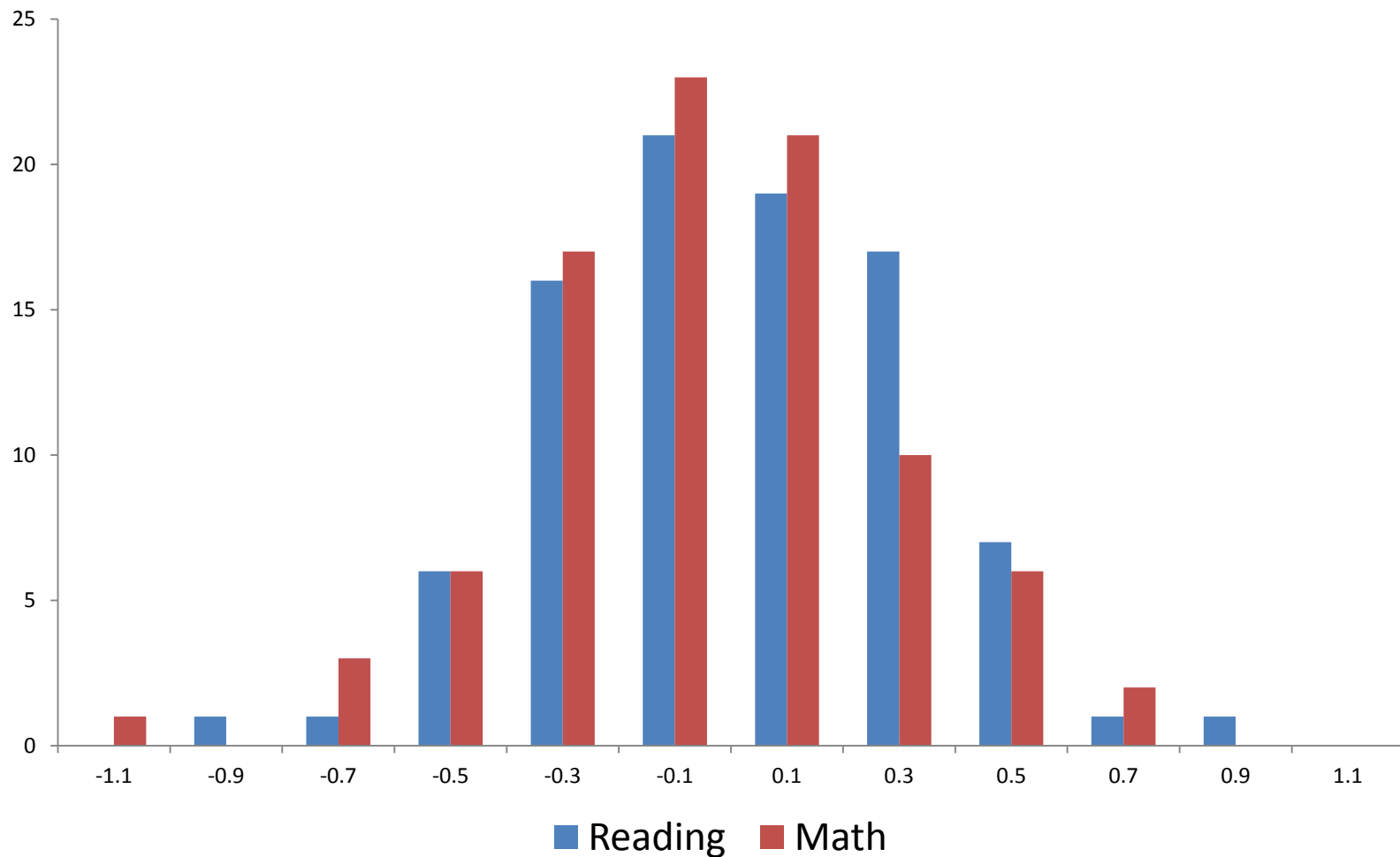
	AC Classrooms	TC Classrooms	P-Value
Reading pretest	38.71	38.03	0.38
Math pretest	42.07	42.14	0.92
Eligible for free or reduced-price lunch	75%	78%	0.08
Male	51%	49%	0.37
Nonwhite	92%	91%	0.56
Total students	1,276	1,334	

Alternative and Traditional Certification

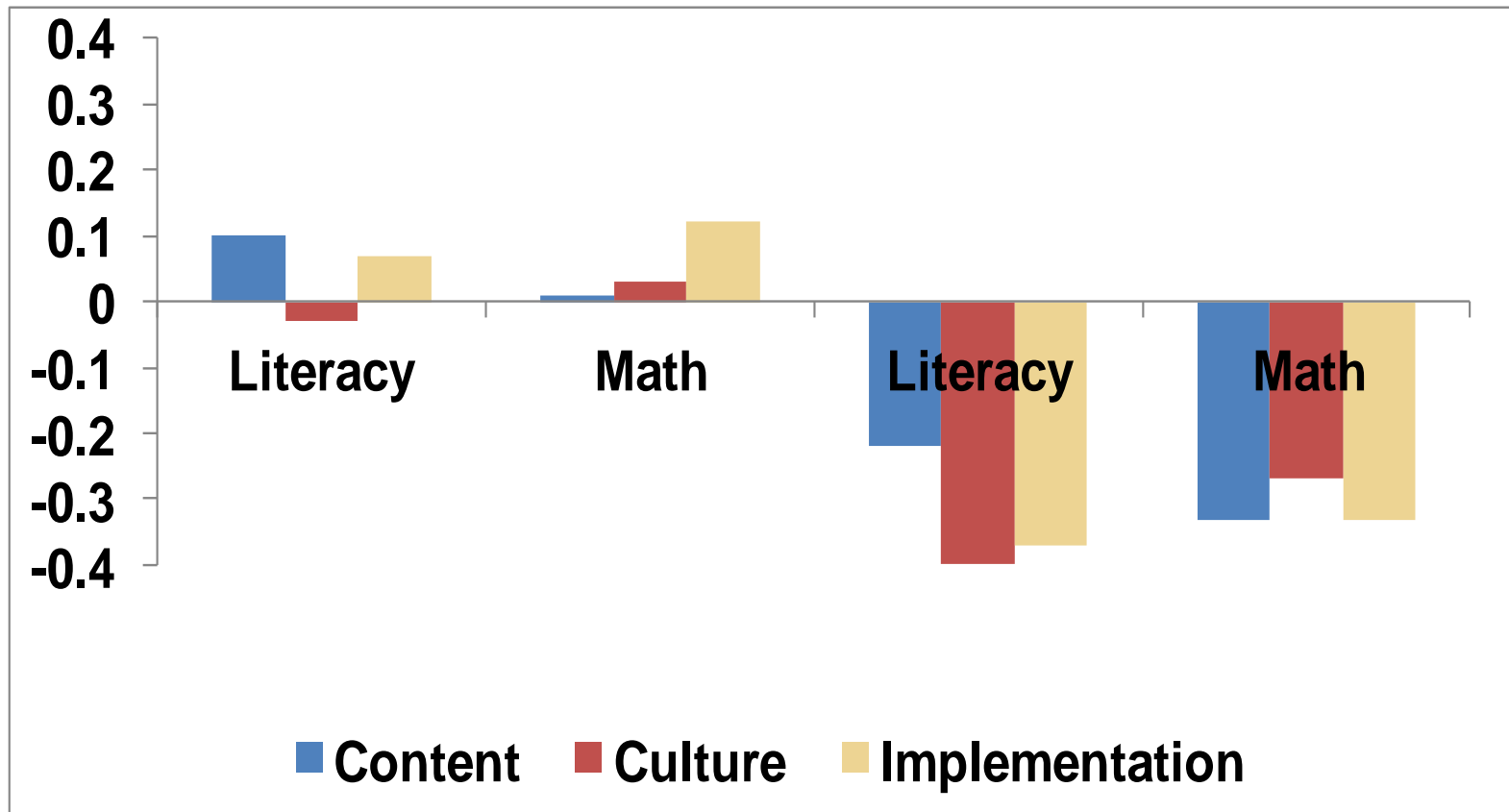
Differences in Required Coursework



Distribution of Effects



Teacher Practices



Novice Alternatively Certified Teachers Were Neither More Nor Less Effective Than Novice Traditionally Certified Teachers

	AC Classroom Average Score	TC Classroom Average Score	Effect Size	<i>p</i> -Value
Reading				
Overall	38.51	38.62	-0.01	0.84
Low coursework	38.29	38.50	-0.01	0.81
High coursework	38.76	38.76	0.00	1.00
Math				
Overall	41.75	42.77	-0.05	0.12
Low coursework	41.52	42.12	-0.03	0.56
High coursework	42.03	43.53	-0.07	0.10

Melissa Clark: Back-up Slides

Study Schools Were Similar to Schools with Secondary Math Teachers from the Programs Nationwide

For schools in the TFA sample....

	Study Schools with TFA Teachers	All Secondary Schools with TFA Teachers	All Secondary Schools Nationwide
% Black	57%	57%	19%**
% Hispanic	31%	32%	20%*
% FRP	79%	80%	51%**
% Title I Eligible	82%	89%	60%**
% Urban	80%	70%	26%**
Enrollment per grade	240	184**	135**

Difference from study schools is statistically significant at 5% (*) or 1% (**) level.

Study Schools Were Similar to Schools with Secondary Math Teachers from the Programs Nationwide

...and for schools in the Teaching Fellows sample

	Study Schools with Teaching Fellows	All Secondary Schools with Teaching Fellows	All Secondary Schools Nationwide
% Black	47%	46%	19%**
% Hispanic	40%	35%	20%**
% FRP	80%	74%	51%**
% Title I Eligible	82%	87%	60%**
% Urban	>95%	78%**	26%**
Enrollment per grade	298	248	135**

Difference from study schools is statistically significant at 5% (*) or 1% (**) level.

Demographics and Experience

	TFA Sample		Teaching Fellows Sample	
	TFA Teachers	Comparison Teachers	Teaching Fellows	Comparison Teachers
Average Age	25	38**	33	41**
% Female	61	79*	54	57
% White	89	30**	71	43**
Years of Work Experience				
Non-teaching	0	3**	5	3
Teaching	2	10**	4	13**

Difference between TFA and comparison teachers or Teaching Fellows and comparison teachers statistically significant at the 1% (**) or 5% (*) level, two-tailed test.

Education and Content Knowledge

	TFA Sample		Teaching Fellows Sample	
	TFA Teachers	Comparison Teachers	Teaching Fellows	Comparison Teachers
% from Selective College	81	23**	72	34**
% with Math Major	8	26*	25	43*
% with Graduate Degree	41	70**	83	80
# College-Level Math Courses	5	8**	10	11
Average Praxis Score				
Middle School Math	180	158**	187	170**
High School Math	162	140*	158	139**

Difference between TFA and comparison teachers or Teaching Fellows and comparison teachers statistically significant at the 1% (**) or 5% (*) level, two-tailed test.

Training and Support

	TFA Sample		Teaching Fellows Sample	
	TFA Teachers	Comparison Teachers	Teaching Fellows	Comparison Teachers
Days Student Teaching	18	25	11	38**
Hours Math Pedagogy	35	37	49	48
Took Coursework During Study Year (%)	50	21**	29	23
Had Mentor During Study Year (%)	67	29**	23	17

Difference between TFA and comparison teachers or Teaching Fellows and comparison teachers statistically significant at the 1% (**) or 5% (*) level, two-tailed test.

Observed Factors Do Not Explain TFA Impact

- **Math content knowledge**
 - Accounts for only 16 percent of impact
- **Coursework taken during school year**
 - Coursework negatively associated with effectiveness, but TFA teachers took *more* coursework
 - Cannot explain TFA impact
- **Teaching experience**
 - Positively associated with effectiveness, but TFA teachers had *less* experience
 - Cannot explain TFA impact