

Does Diagnostic Math Testing Improve Student Learning?

Julian Betts

This project was supported with funding from the Donald Bren Foundation.
The California Academic Partnership Program also
provided support to the authors for related research.



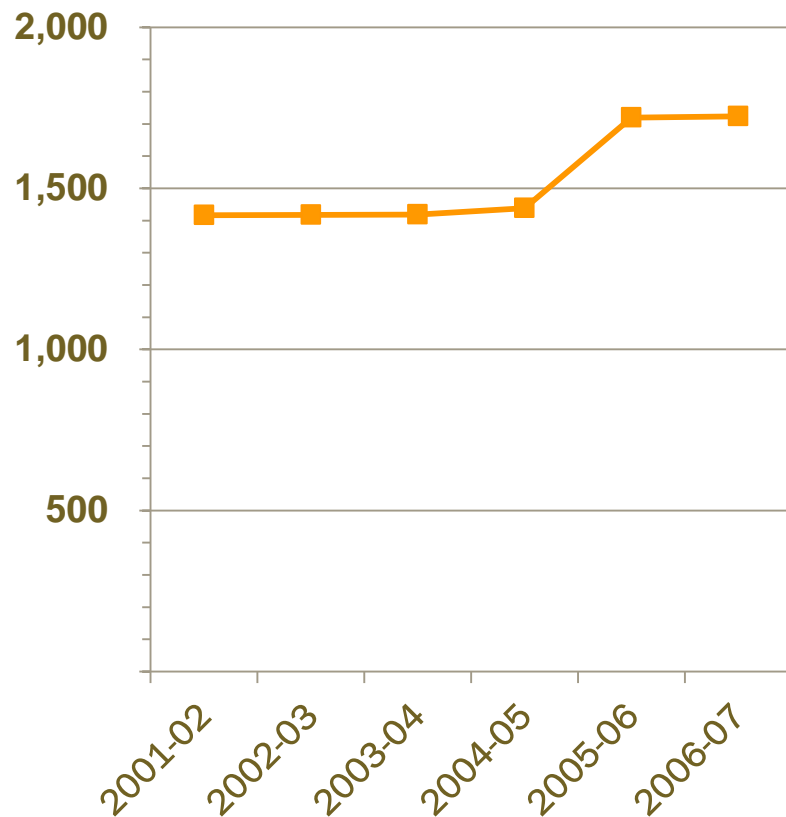
Outline

- Math Diagnostic Testing Project
- Examining San Diego Unified
- Results from San Diego Unified
- Summary and Conclusions

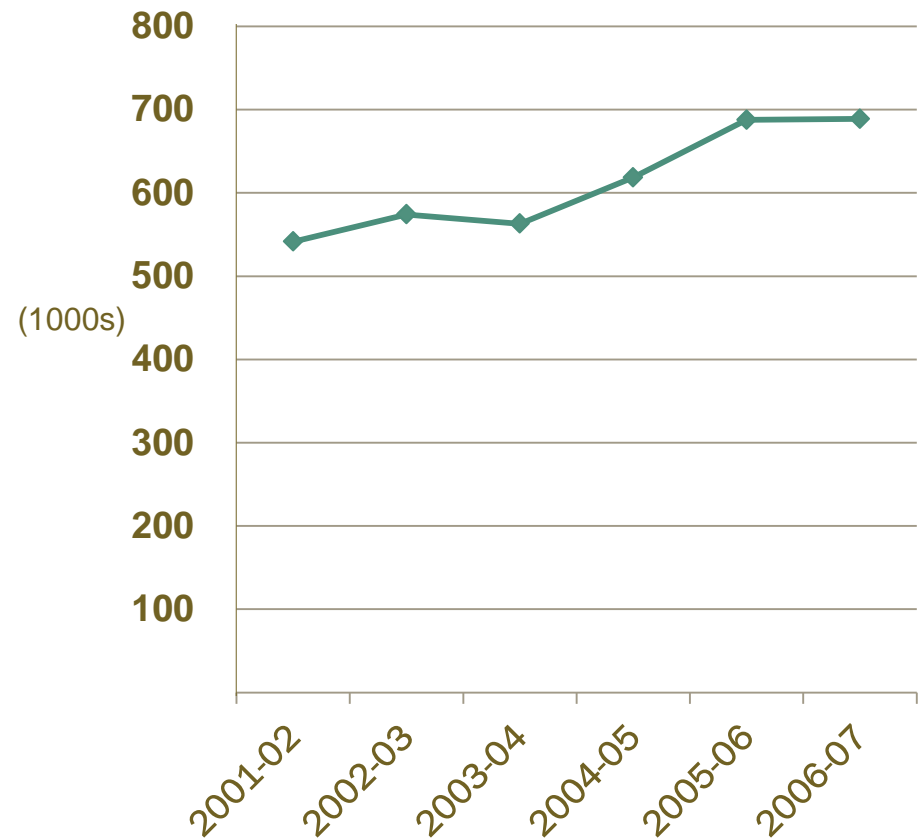
Math Diagnostic Testing Project

- Tests, diagnoses student math skills, problems
 - Provides fast, detailed feedback to teachers
- A joint CSU, UC project (1977)
 - Available to all California schools
 - Ten regional centers process tests, provide resources
- Differs from California Standards Test
 - Student/class intervention tool vs. school accountability measure
 - CST test results available only months later

MDTP Testing in State is Growing



Participating Schools



Tests Administered

Students Receive Detailed Reports of Discrete Math Tasks

Here are the diagnostic results from the "Mathematics Course Readiness Test", TR45K08, that you have recently taken. Your Score, the Critical Level, and the Total Possible score for each topic are reported below. The Critical Level for each topic is what MDTP considers to be the minimum number of correct responses for you to show adequate preparation in that topic.

	Your Score	Critical Level	Total Possible
Congratulations! Your results indicate that you have done well in each of the following topics:			
Literals & Equations	3	3	4
Data Analysis, Probability, & Statistics	5	4	6

However, your results indicate you need review in the following topics:

Integers	5	6	8
Fractions and their Applications	4	5	7
Decimals, their Operations & Applications; Percent	5	6	9
Exponents and Square Roots; Scientific Notation	2	3	4

Your results indicate you need substantial review in the following topics:

Geometric Measurement and Coordinate Geometry	2	5	7
---	---	---	---

Your total score is 26 out of 45, which is 58%. We hope you find this information helpful. Please contact your teacher for specific activities and assignments that will aid in any necessary review.

Outline

- Math Diagnostic Testing Project
- **Examining San Diego Unified**
- Results from San Diego Unified
- Summary and Conclusions

Dual Use of MDTP in San Diego

- SDUSD testing mandated for middle, high school
 - Began 2000-2001, ended after 2007-2008
- Goals
 - Ensure students placed in appropriate class
 - Identify students needing summer school
- Individual teachers testing independently, voluntarily
 - Before, during, and after mandate period
 - Most common use throughout state

Different Research Approaches Required for Two Testing Methods

- We compare growth of student math CST score
 - In years and grades with a mandated MDTP test, to years without testing
 - A natural experiment
- No similar natural experiment available for voluntary testing
 - Observed impact may stem from unusual factors of teachers and/or of classes tested

Data Sources

- Results from 2001-02 to 2006-07 school years, 165,863 tests
- Mandated tests
 - Annual student-level records
 - Other relevant information: previous scores, classroom setting, et al.
- Voluntary tests
 - San Diego MDTP office provided students, schools data
 - Matched to a database of complete student records
 - Identified about 80 percent of tested students

Participation Rates in Mandated MDTP Testing in San Diego

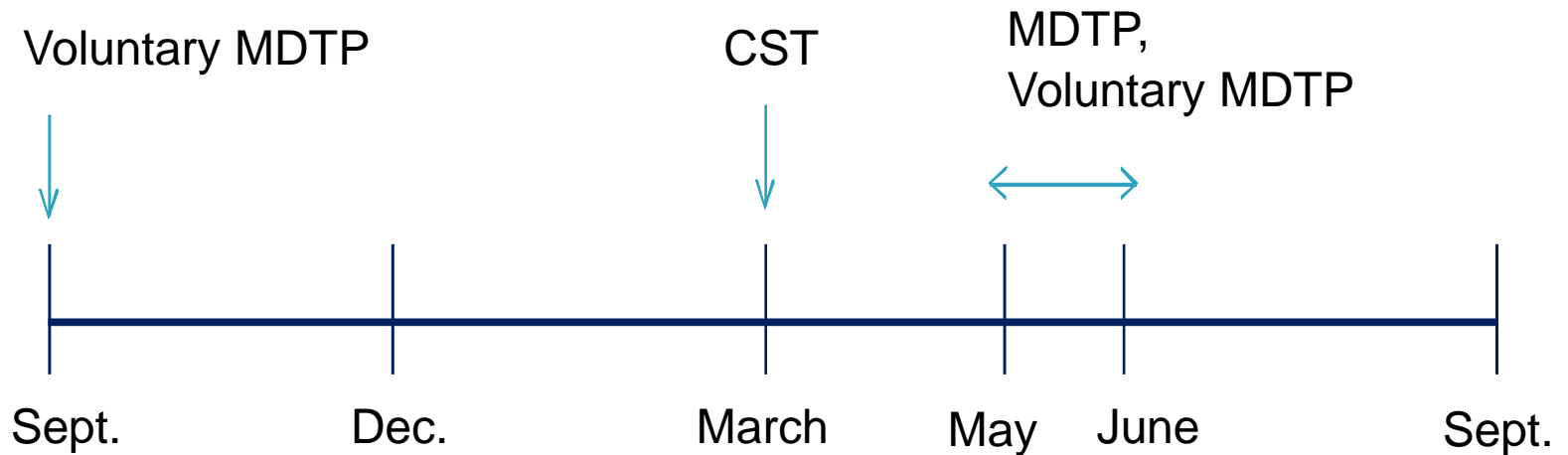
(percent)

	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
2001-02	0	.3	81	51	.4
2002-03	0	.3	60	43	.3
2003-04	0	88	.2	0	0
2004-05	23*	91	0	0	0
2005-06	95	88	0	0	0
2006-07	63	63	.1	0	0

*Selected schools only

Bold indicates mandated testing

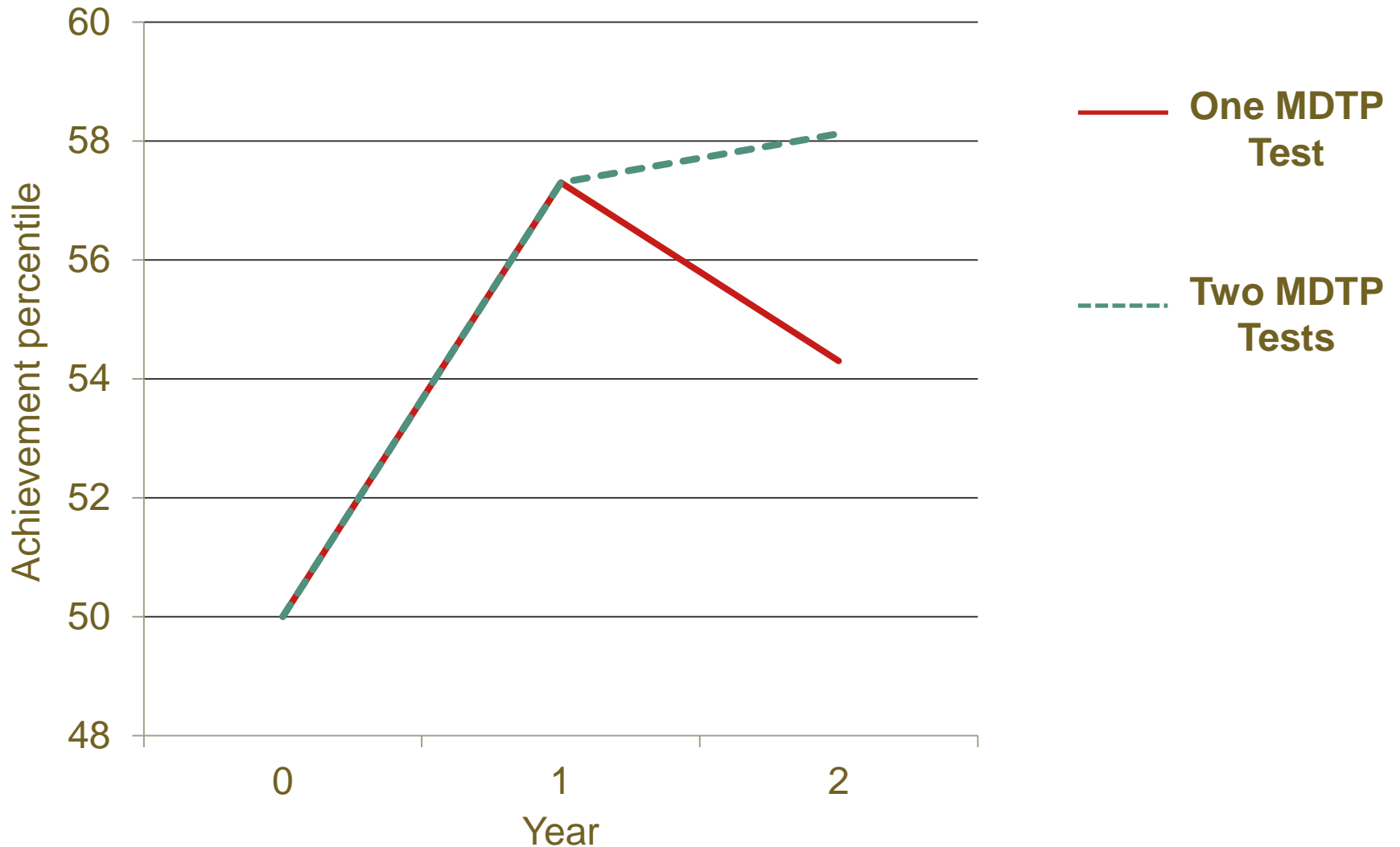
CST and MDTP on Separate Schedules



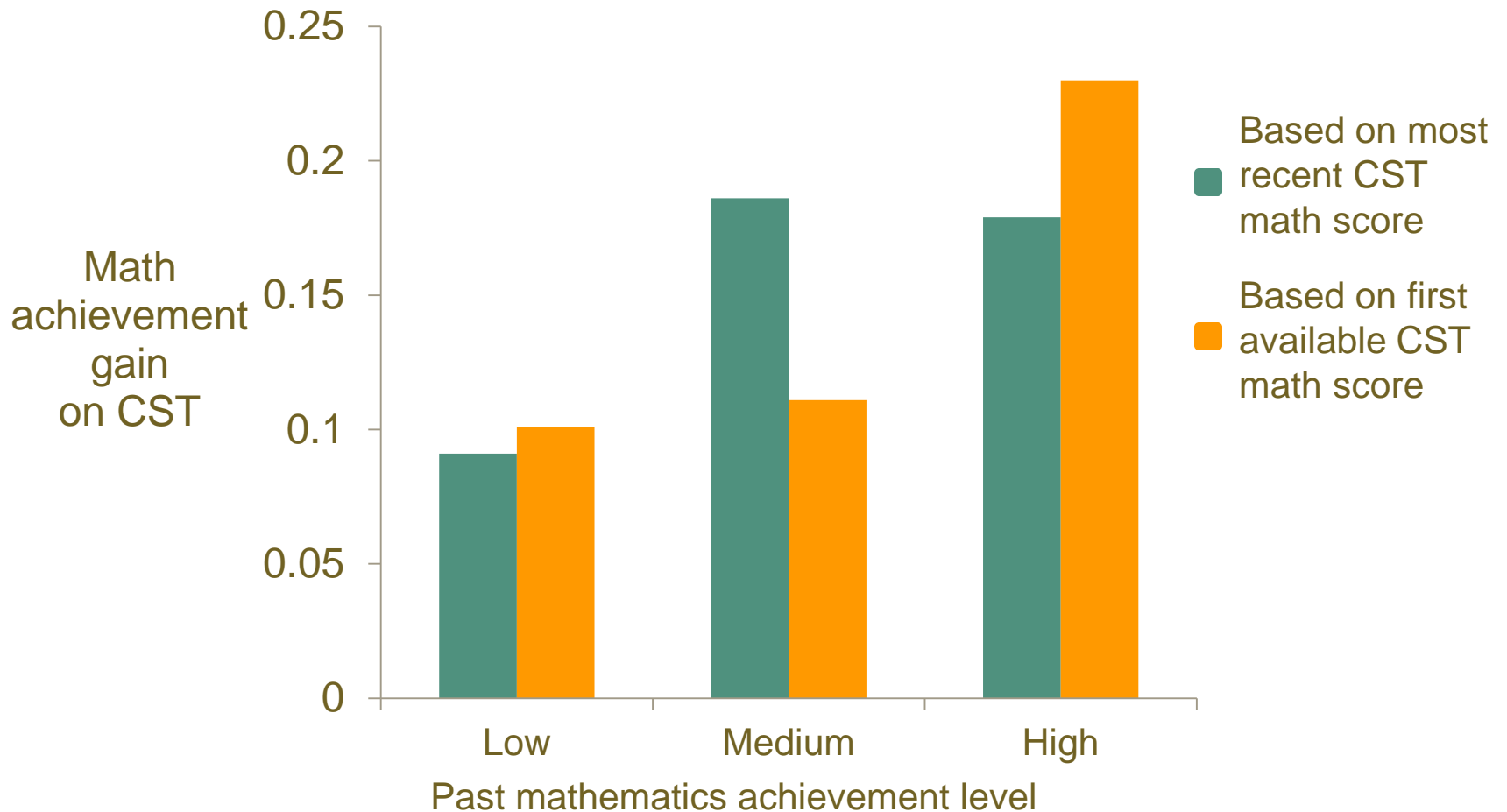
Outline

- Math Diagnostic Testing Project
- Examining San Diego Unified
- **Results from San Diego Unified**
- Summary and Conclusions

Mandated MDTP Clearly Boosted Math Skills for All Participants



Smallest Positive Effects for Those With Lowest Initial Achievement



Voluntary Testing Had Little Effect

- Voluntary testing from September to March associated with lower March CST score
 - Correlational, not causal
 - No relationship when class average of prior math achievement scores factored in
 - Teachers appear to be selectively testing classes with weaker achievement
- Voluntary testing late in prior year not linked to current year CST score

How Did Mandated MDTP Have Such a Large Effect?

- Students more accurately tracked into appropriate classes
 - Explains 5–11 percent of positive effect
- Better identification of students needing summer school
 - Explains 1 percent of effect
- Could be that mandated testing worked better than voluntary testing because it engaged entire math departments in working together to spot and improve areas of student weakness

Outline

- Math Diagnostic Testing Project
- Examining San Diego Unified
- Results from San Diego Unified
- **Summary and Conclusions**

Summary: Mandated Testing

- District-mandated MDTP testing associated with positive gains in subsequent year
- Gains increase if students tested two years in a row
- Just under a third of effect dissipates within a year if students tested only once

Summary: Voluntary Testing

- Voluntary MDTP testing fails to deliver similar benefits
- In some cases, negative effects seen due to testing on already low-achieving classes
 - Reflects only decision by some teachers to test a struggling class
- Unclear whether these effects apply more generally in other school districts

Lessons for California's Accountability System

- CST not designed to fill diagnostic test role, but...
- Could be made more useful if results, feedback made more timely, detailed
- Conversion to computerized state test could help
- Room for both diagnostic and accountability testing exists in current education landscape

The Future of State Testing

- California one of 18 governing states in the SMARTER Balanced Assessment Consortium
 - Developing tests for the national Common Core standards in math and English
- SMARTER planning computer adaptive testing
 - Could improve ability of teachers to more timely use test results

Does Diagnostic Math Testing Improve Student Learning?

Julian Betts

This project was supported with funding from the Donald Bren Foundation.
The California Academic Partnership Program also
provided support to the authors for related research.



Note on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

Julian Betts: 858-534-3369; jbetts @ucsd.edu

Thank you for your interest in this work.

October, 2011