

# WORKING P A P E R

---

## Instructional Practices Related to Standards and Assessments

LAURA S. HAMILTON AND MARK BERENDS

WR-374-EDU

April 2006

This product is part of the RAND Education working paper series. RAND working papers are intended to share researchers' latest findings and to solicit informal peer review. They have been approved for circulation by RAND Education but have not been formally edited or peer reviewed. Unless otherwise indicated, working papers can be quoted and cited without permission of the author, provided the source is clearly referred to as a working paper. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. **RAND**® is a registered trademark.

## **Preface**

This paper was presented at the 2006 annual meeting of the American Educational Research Association. This material is based on work supported by the National Science Foundation under Grant No. REC-0228295. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. In addition, this paper has not been formally reviewed and does not represent the views of RAND or its sponsors.



## Contents

Preface.....	iii
Introduction.....	1
Background.....	2
Research Questions.....	3
Data and Methods.....	4
Results.....	7
Changes in Time Spent on Each Subject.....	7
California.....	8
Alignment of Instruction with State Standards and Assessments.....	10
Assessment-Related Instructional Practices.....	13
General Changes in Instructional Practice.....	19
Principals' Reports of Test Preparation Activities.....	25
Conclusions and Next Steps.....	27
References.....	31



**Tables**

Table 1. Sample Sizes for Each State ..... 5

Table 2. Grade Levels at which State Accountability Assessments in English Language  
Arts, Mathematics, and Science were Administered in 2004-05 ..... 6

Table 3. Percent of Elementary School Teachers Reporting Changes in Instruction Time  
from 2003-04 to 2004-05 ..... 8

Table 4. Percent of Middle School Teachers Reporting Changes in Instruction Time  
from 2003-04 to 2004-05 ..... 9

Table 5. Percent of Teachers Reporting Aligning Their Instruction with State Content  
Standards ..... 11

Table 6. Percent of Teachers Reporting Aligning Their Instruction with State Assessments  
Using Only Teachers in Tested Grades ..... 12

Table 7. Percent of Elementary School Teachers Reporting Their Instruction is Different  
as a Result of Mathematics and Science Assessments ..... 15

Table 8. Percent of Middle School Mathematics and Science Teachers Reporting Their  
Instruction is Different as a Result of Mathematics and Science Assessments ..... 18

Table 9. Elementary School Mathematics Teachers Reporting Their Instruction Techniques  
and How They Have Changed ..... 21

Table 10. Middle School Mathematics Teachers Reporting Their Instruction Techniques  
and How They Have Changed ..... 22

Table 11. Elementary School Science Teachers Reporting Their Instruction Techniques  
and How They Have Changed ..... 23

Table 12. Middle School Science Teachers Reporting Their Instruction Techniques and How They Have Changed .....	24
Table 13. Percent of Principals Reporting Test Preparation Activities .....	26

## **Introduction**

In response to the No Child Left Behind Act of 2001 (NCLB), states have been implementing standards-based accountability (SBA) systems that are affecting every public school in the United States. States' SBA systems vary in their details, but all involve content and achievement standards, statewide tests, and systems of intervention and other consequences associated with performance on those tests. As part of the Implementing Standards-Based Accountability (ISBA) project, RAND is examining how district staff, principals, and teachers are responding to the SBA provisions under NCLB (see Stecher, Hamilton, & Naftel, 2005). In this paper we present preliminary data from the second year of data collection, with a focus on classroom-level responses to SBA among mathematics and science teachers. Because aspects of SBA directly relate to the core of teaching and learning in classrooms and because changes in student achievement are likely to occur in large part as a result of actions teachers take in their classrooms, it is important to examine how teachers and principals respond to SBA systems.

The results reported in this paper do not constitute an exhaustive description of teacher responses, but they provide some information about teaching practices related to the accountability policies, and they build on a growing body of research examining the effects of SBA on instruction. Other papers in this symposium address other aspects of SBA implementation, including school- and district-level responses and teachers' opinions about the SBA provisions.



## Background

SBA systems are typically intended to improve achievement through several mechanisms—strong *incentives* for school staff to improve their performance, high-quality *information* to guide these improvement efforts, and technical *assistance* to help schools that are unable to reach the goals on their own (see Stecher, Hamilton, & Gonzalez, 2003, and Hamilton & Stecher, 2006, for more detailed discussions of the mechanisms through which SBA works). All three of these mechanisms—incentives, information, and assistance—are likely to affect student achievement primarily by altering what occurs in the classroom: Incentives are intended to motivate teachers to focus on the goals embodied in the standards, information from tests should provide data to guide instructional decision making, and assistance should help them improve their practice. To understand how the SBA model works in practice it is essential to examine teachers' responses. This paper explores some of the ways in which teachers in California, Georgia, and Pennsylvania are responding to the SBA systems adopted by their states.

Most states have had some form of SBA in place for several years, providing opportunities for research examining the effects of these policies on instruction. A recent review of this research (Hamilton, 2003) summarizes evidence that testing leads to a variety of changes in how teachers carry out their jobs. These changes include shifts in emphasis among tested and non-tested subjects (Jones et al., 1999; Koretz, Barron, Mitchell, & Stecher, 1996; Shepard & Dougherty, 1991; Smith, Edelsky, Draper, Rottenberg, & Cherland, 1991; Stecher, Barron, Chun, & Ross, 2000), changes in the timing of topic introduction to match the testing schedule (Corbett & Wilson, 1988; Darling-Hammond & Wise, 1985), shifts in emphasis among tested and non-tested content within a subject (Shepard & Dougherty, 1991; Romberg, Zarinia, &

Williams, 1989; Smith et al., 1991), and use of instructional materials designed to mirror the state test (Pedulla et al., 2003). These changes probably reflect teachers' responses to both the incentives provided by the accountability test and the information they receive about how students perform.

For SBA to lead to desirable outcomes, teachers must work to improve their instruction without unduly sacrificing goals that are not adequately measured by state accountability tests, and they must use information effectively to address individual students' needs. Moreover, some degree of teacher buy-in and support for the reforms is likely to be essential for promoting effective responses. The evidence described above suggests that accountability systems can influence teacher practices, but it raises some concerns about the nature of those responses in that teachers not only respond in ways likely to benefit student learning, but in less beneficial ways as well.

Recent research has focused on SBA systems under NCLB and has begun to provide information about how educators are responding (see, for example, Center for Education Policy, 2005). This paper builds on this existing evidence and presents some new information on what teachers are doing in light of the NCLB SBA provisions that have been adopted in three states that are included in the ISBA study.

### **Research Questions**

This paper addresses several descriptive questions about practices related to SBA. Because it is based on surveys and relies on two years of data, we are not in a position to attribute teachers' responses directly to the effects of SBA. However, the results provide a

useful description of changes in instructional practice in mathematics and science in the context of external accountability requirements. We address five broad research questions:

- To what extent have teachers changed the amount time they spend on different subject areas?
- Do teachers report aligning their instructional activities with standards and assessments?
- What assessment-related practices do teachers report using in their classrooms?
- What other kinds of instructional practices do teachers report using, and how has frequency of use changed from the prior year?
- To what extent do principals engage in test preparation activities designed to influence instruction?

### **Data and Methods**

The introductory paper in this symposium describes the data and methods used in the ISBA study (Stecher et al., 2006). It also provides some information about the state policy contexts in the three states (California, Georgia, and Pennsylvania) where we are working. The results presented in this paper rely primarily on teacher survey data gathered from state-representative samples of elementary and middle school mathematics and science teachers. The sample sizes for the estimates reported in this paper appear in Table 1. Information about response rates is provided in Stecher et al. (2006); principal and teacher response rates were between 80-90 percent. We generated state-specific weights for the responses to reflect each state as whole. The state-specific sample design and patterns of survey non-response are reflected in the weights. Thus, the statistics in the tables that follow are the estimates of the

responses of principals and teachers representative of each state—California, Georgia, and Pennsylvania.

Schools that consisted of both elementary and middle-level grades (e.g., K-8 schools) are included in both the middle and the elementary school samples, but the estimates reported here are based only on teachers in the relevant grades (e.g., the middle school estimates include only teachers in grades 7 and 8). Some of the teacher survey questions focused specifically on mathematics or science; for these questions, only teachers who taught the relevant subject responded.

**Table 1.**  
**Sample Sizes for Each State**

	Number of district super-intendents	Number of principals	Number of elementary school teachers			Number of middle school teachers		
			All	Math	Sci.	All	Math	Sci.
CA	24	78	481	451	448	370	248	247
GA	24	95	705	623	623	317	451	442
PA	19	87	585	569	562	382	260	257

Because much of this paper focuses on the ways in which state testing might affect instruction, we include here a table from Russell & McCombs (2006) that indicates at which grades each state administered accountability tests in the 2004-05 school year (Table 2). Where relevant, we examined responses separately for teachers in tested and non-tested grades, though for the most part we report results for all grades together. Although tests are likely to exert their strongest effects at the tested grade levels, the pressures associated with SBA affect the entire school, and it is likely that even teachers in non-tested grades make changes to their instruction in order to boost the school’s overall performance (and in some cases in anticipation of future testing at that grade).

**Table 2.**  
**Grade Levels at which State Accountability Assessments in English Language Arts, Mathematics, and Science were Administered in 2004-05**

State	English Language Arts	Mathematics	Science
California	3-11	3-11	5, High school end-of-course assessments (9-11)
Georgia	1-8, High school end-of-course assessments	1-8, High school end-of-course assessments	3-8, High school end-of-course assessments
Pennsylvania	3, 5, 8, and 11	3, 5, 8, and 11	

Note:

Pennsylvania administered its state test in grade 3, but scores for grade 3 students did not count toward schools' AYP designations.

Because our surveys were designed to address a broad range of topics related to testing and accountability, we could allocate only limited numbers of items to each of the research questions described in the previous section. Moreover, it is important to note that the study was not designed to explain differences across the three states; instead, the states should be considered three case studies of states that were at different points in their experiences with accountability before NCLB was implemented. We report results separately by state because our sampling approach was designed to provide samples that were representative of each state rather than to support inferences about responses across the combined set of states. Where possible and appropriate, we present information about changes that reportedly occurred over the past year. Some of the conclusions about changes in practice are based on comparisons between two waves of data collection, whereas others use only a single year of data but are based on survey questions that asked teachers about whether their used of practices changed since the prior year. In the sections that follow, we describe the survey questions that inform our efforts to address each of the research questions listed above, and we present the results relevant to each question.

## **Results**

Our first set of results address teachers' reports of increases or decreases in the amount of time spent on various subjects. Second, we present findings from teacher reports about the extent to which they agreed to statements about their alignment of their instruction with the state standards and with the state tests in mathematics and science. Third, we present teachers' survey responses about the ways in which they believe their practices have been affected by the state-mandated accountability tests. We also present results from teacher reports about how their instructional techniques have changed more generally. Finally, we discuss principal reports about test preparation activities in their schools because these actions are likely to affect what teachers do to prepare students for state tests.

### ***Changes in Time Spent on Each Subject***

The first set of responses we report here addresses teachers' reports of broad changes in time allocated across different subjects. Any changes in time allocated to subjects could result from teachers' decisions to reallocate time within their own classrooms, or from district or school policy changes in scheduling. The former source is probably more relevant for elementary schools, where most of our participating teachers taught in self-contained classrooms, than for middle schools. Results are presented separately for elementary and middle school teachers in Tables 3 and 4, respectively. Across the board, teachers were more likely to report increases than decreases for both mathematics and English/language arts (ELA), the core subjects assessed by states' NCLB testing programs. The same pattern did not hold for science, except for in Georgia middle schools, and in fact Pennsylvania elementary school teachers were more likely to report a decrease than an increase in science instructional time despite the fact that

science tests will be added to the state’s accountability system. Approximately 20 percent of Georgia middle school teachers reported an increase in social studies time, but in all other instances the numbers of teachers reporting increases in non-tested subjects were quite small.

What is noteworthy about the changes in math and ELA instruction is that the trends reported here build on similar changes from 2002-03 to 2003-04 (see Hamilton, Berends, & Stecher, 2005), and they most likely represent only a small proportion of changes that have taken place in response to the NCLB legislation passed in 2002. The findings are consistent with recent reports by the Center on Education Policy (2006), which describe nationwide changes in time devoted to tested and non-tested subjects.

**Table 3.**  
**Percent of Elementary School Teachers Reporting Changes in Instruction Time**  
**from 2003-04 to 2004-05**

	California			Georgia			Pennsylvania		
	Decrease	No Change	Increase	Decrease	No Change	Increase	Decrease	No Change	Increase
Mathematics	5 (2)	62 (3)	28 (3)	6 (1)	60 (3)	22 (2)	3 (1)	55 (5)	38 (5)
Science	19 (3)	54 (4)	21 (3)	10 (1)	63 (3)	11 (2)	22 (4)	62 (4)	8 (2)
Reading/ Language Arts/ English	3 (1)	59 (4)	32 (4)	4 (1)	62 (3)	21 (2)	7 (3)	63 (4)	24 (3)
Social Studies	28 (5)	55 (4)	10 (2)	11 (1)	65 (3)	9 (2)	25 (4)	60 (4)	6 (1)
Arts/Music	23 (4)	60 (4)	9 (2)	9 (2)	69 (3)	4 (1)	2 (1)	88 (2)	3 (1)
Physical Education	23 (4)	58 (5)	11 (3)	5 (1)	74 (3)	5 (1)	3 (1)	88 (2)	3 (1)

Notes:

Standard errors shown in parentheses  
Omitted category is “don’t know”

Our case studies provide some examples of reallocation of time away from non-tested subjects and activities. For example, one elementary school we visited eliminated its instrumental music program and another decreased the number of physical education classes

offered each week from five to two. A third had eliminated chorus and assemblies, and its summer school no longer provided enrichment opportunities but instead offered only academic instruction in tested subjects. Some teachers in elementary schools reported that the changes affected all grades, including kindergarten; in one school, for example, nap time was eliminated, reportedly to provide more time for academic instruction.

**Table 4.**  
**Percent of Middle School Teachers Reporting Changes in Instruction Time**  
**from 2003-04 to 2004-05**

	California			Georgia			Pennsylvania		
	Decrease	No Change	Increase	Decrease	No Change	Increase	Decrease	No Change	Increase
Mathematics	1 (0)	67 (3)	20 (3)	5 (2)	53 (5)	29 (6)	2 (1)	78 (5)	14 (4)
Science	9 (3)	63 (4)	10 (3)	5 (2)	52 (4)	23 (5)	7 (2)	77 (6)	6 (3)
Reading/ Language Arts/ English	3 (1)	60 (4)	14 (3)	8 (2)	48 (4)	23 (5)	3 (1)	74 (6)	9 (3)
Social Studies	13 (5)	59 (4)	5 (1)	5 (1)	51 (4)	20 (5)	9 (4)	75 (6)	3 (1)
Arts/Music	14 (3)	48 (4)	8 (4)	9 (2)	52 (3)	5 (2)	5 (2)	74 (4)	6 (2)
Physical Education	5 (2)	68 (4)	3 (1)	8 (3)	55 (4)	5 (2)	3 (1)	75 (4)	5 (2)

Notes:

Standard errors shown in parentheses.  
Omitted category is don't know.

Consistent with our survey results, the case studies suggested that even though science testing was going to be added to all states' SBA systems, science generally did not receive as much attention as many teachers thought it should. At one elementary school formal science instruction had been reduced, but teachers were instructed to integrate science into the reading curriculum. Teachers commented on the difficulty of doing this, particularly given the scripted nature of the reading program being used in that school. One of the middle schools was trying a different type of integration—including mathematics and reading concepts in other subjects in



order to bolster the amount of time during which students received math and reading instruction without formally changing the schedule. A number of the teachers with whom we spoke said that this generally did not work well, and that they had not received sufficient training on how to implement this type of integration.

In these instances, the changes affected all students enrolled in the schools, but there were other instances of changes imposed only on low-scoring students. One of the middle schools we visited had instituted a policy of pulling low-performing students out of band, physical education, and keyboarding classes in order to provide additional reading instruction, and we heard similar anecdotes at other schools. Many of the teachers we interviewed expressed concerns that these changes would ultimately cause students to lose motivation and disengage from school. The practice of providing low-scoring students with more instruction in tested subjects, and consequently less exposure to other subjects and activities, is again consistent with the Center on Education Policy's (2006) findings using a national sample of districts.

### *Alignment of Instruction with State Standards and Assessments*

The theory of action underlying SBA, described in Stecher et al. (2006), is centered on the idea that the standards will serve as the primary mechanism for helping teachers determine what should be taught. The assessments are intended to serve primarily as instruments for measuring progress toward those standards (Stecher, Hamilton, & Gonzalez, 2003). But past research suggests that teachers use both the tests and the standards as sources of information about expectations (Hamilton, Berends, & Stecher, 2005; Stecher & Borko, 2002), so an accurate understanding of how SBA systems affect practice requires examining teachers' responses to tests as well as to standards. Table 5 reports the percentages of teachers who reported having

aligned their instruction with state content standards. In California and Georgia, close to 90% or more of teachers in each group reported alignment, with the exception of elementary science teachers. Alignment was less common among Pennsylvania teachers, particularly in science. The fact that the state was not yet administering a science test might be partly responsible for the fact that fewer teachers were attuned to the state standards.

**Table 5.  
Percent of Teachers Reporting Aligning Their Instruction with State Content Standards**

	California		Georgia		Pennsylvania	
	Elementary	Middle	Elementary	Middle	Elementary	Middle
Mathematics content standards	95 (1)	93 (2)	90 (1)	90 (2)	82 (2)	70 (3)
Science content standards	82 (3)	96 (2)	87 (2)	90 (3)	45 (4)	57 (9)

Notes:

Standard errors are in parentheses.

Response options included strongly disagree, disagree, agree, strongly agree, and I don't know; table entries are percent agreeing or strongly agreeing.

In Pennsylvania, this question focused on the Assessment Anchors rather than the Pennsylvania Academic Standards, because our state contacts told us that teachers were being encouraged to use the Anchors as a source of information about what was expected of them.

We also wanted to compare the percentages of teachers who reported aligning their instruction with state standards with the percentage who said they aligned their instruction with state tests. For this comparison we used only teachers who taught in grade levels that were included in the state's testing program in 2004-05. For mathematics, this included all teachers in California and Georgia but only teachers in grades 3, 5, and 8 in Pennsylvania. For science, it included all teachers in Georgia and fifth grade teachers in California. Pennsylvania science teachers were excluded from this comparison due to lack of a statewide science test in 2004-05.

Table 6 shows that California teachers in grades in which state accountability tests were given were more likely to report aligning their instruction with the standards than with the tests. Differences between alignment to tests and standards were smaller in Georgia and essentially nonexistent in Pennsylvania (if anything, Pennsylvania mathematics teachers appeared to be

more attuned to the tests than to the standards). Efforts to align instruction with both standards and tests might not be problematic if the standards and tests sent the same messages to teachers regarding what is important, but as discussed elsewhere (Hamilton & Stecher, 2006; Russell & McCombs, this symposium), in most cases fewer than half of the teachers agreed that the tests were good measures of the standards. To the extent that standards and tests are misaligned, teachers' use of tests as a means of determining what should be taught raises concerns about inappropriate amounts or types of test preparation, which we discuss in the next section.

**Table 6.**  
**Percent of Teachers Reporting Aligning Their Instruction with State Assessments**  
**Using Only Teachers in Tested Grades**

	California		Georgia		Pennsylvania	
	Elementary	Middle	Elementary	Middle	Elementary	Middle
Mathematics standards	95 (1)	93 (1)	90 (1)	90 (2)	82 (3)	71 (4)
Mathematics assessments	52 (4)	51 (4)	82 (3)	77 (2)	87 (3)	86 (3)
Science standards	87 (4)	95 (4)	87 (2)	90 (3)	NA	NA
Science assessments	60 (7)	65 (9)	80 (3)	81 (3)	NA	NA

Notes:

Standard errors are in parentheses.

Response options included strongly disagree, disagree, agree, strongly agree, and I don't know.

Pennsylvania science teachers are not included because the state did not administer a science test.

Teachers in our case study schools described a variety of school- and district-level initiatives designed to support their efforts to align instruction with standards and state tests. These included the identification of “highly assessed standards” in several districts; the adoption of Assessment Anchors in Pennsylvania, and the use of pacing guides or calendars to help teachers ensure coverage of the key standards. These types of actions are discussed in greater detail in another paper in this symposium, but it is worth pointing out that teachers' concerns about the need to cover standards are likely to lead to increased focus on the test as a mechanism for understanding what needs to be taught. Teachers were especially concerned that the need to

cover large amounts of material was leading to failure of students to master the material. While discussing the pacing guide, one said, “More and more of them (students) are behind because we’re spending so little time on mastering and understanding. We’re just trying to expose them to the skill, and just move on.” In one case even parents commented about the need to cover tested material. One focus group participant said, “It’s being pushed on them. ‘Do this paper, hurry up, because it’s down on the test.’ And then you move on to the next. They don’t get time to practice it. They don’t get time to read over it and do it over and over, like it used to be when we went to school.” On the other hand, some teachers and principals praised the focus on standards as a means of ensuring all students were exposed to the same material and helping teachers understand what should be taught. Whether alignment with state standards and tests will ultimately lead to the desirable or undesirable outcomes about which our interview participants were concerned remains to be seen.

### *Assessment-Related Instructional Practices*

The next set of results examines teachers’ perceptions of how their instruction has been affected by state accountability tests. We asked a set of questions similar to one developed by Koretz and Hamilton (2003) to understand teachers’ responses to high-stakes testing in Massachusetts. Although we were primarily interested in the kinds of changes teachers made in response to tests, we decided not to ask directly about change because this type of question would only be appropriate for teachers who had been teaching prior to the implementation of the state testing program. Instead, we developed a question focused on attribution of practices to the testing program, which allowed all teachers to be included. Teachers were asked to describe the degree to which their teaching was *different* because of the state test. Specifically, we asked

teachers to “Think about ways in which your teaching is different because of the [state test]<sup>1</sup> than it would be without the [state test]. How much do the following statements describe differences in your teaching due to the [state test]? Teachers could select “no difference,” “differs by a small amount,” “differs by a moderate amount,” or “differs by a great deal.”

Table 7 reports the percentages of elementary teachers who said their instruction differed by a moderate amount or a great deal. Table 8 presents the same information for middle school teachers. The categories of instructional practices were designed to capture a range of responses, from the kinds of general improvement in the quality of teaching that many accountability advocates envision, to narrowly focused test preparation activities that might detract from the validity of scores (see Koretz & Hamilton, forthcoming, for a discussion of various instructional responses to test preparation and their implications for the validity of high-stakes test scores).

Among elementary teachers, roughly three-quarters of math teachers said they focused more on state standards than they would in the absence of the state test, and nearly as many said they focused more on tested topics. Majorities of math teachers also reported engaging in narrower forms of test preparation, such as emphasizing problem styles or formats and teaching test-taking strategies. In almost all cases, the effects of testing in science appear to be less significant than in math, though substantial numbers of teachers report making changes in science, particularly with respect to focusing on standards and on tested topics.

---

<sup>1</sup> Because our surveys were customized to each state, we were able to include the actual name of the state testing program; e.g., the Pennsylvania System of School Assessment or PSSA.

**Table 7.**  
**Percent of Elementary School Teachers Reporting Their Instruction is Different**  
**as a Result of Mathematics and Science Assessments**

	California		Georgia		Pennsylvania	
	Mathematics	Science	Mathematics	Science	Mathematics	Science
Assign More Homework	43 (4)	8 (2)	29 (4)	21 (3)	30 (4)	NA
Search for More Effective Teaching Methods	67 (3)	33 (4)	74 (4)	64 (6)	62 (4)	NA
Focus more on Standards	73 (4)	45 (4)	77 (3)	68 (4)	76 (3)	NA
Focus more on Topics Emphasized in Assessment	63 (5)	35 (4)	72 (3)	57 (4)	73 (4)	NA
Emphasize Assessment Styles and Formats of Problems	55 (4)	20 (4)	78 (4)	60 (4)	74 (3)	NA
Spend More Time Teaching Test-Taking Strategies	53 (4)	25 (4)	56 (4)	42 (4)	51 (3)	NA
Spend More Time Teaching Content	52 (4)	29 (4)	58 (4)	43 (4)	53 (4)	NA
Focus More on Students Who Are Close to Proficient	37 (5)	9 (2)	36 (2)	23 (3)	29 (3)	NA
Offer More Assistance Outside of School for Students Who are Not Proficient	29 (3)	8 (2)	34 (4)	16 (3)	21 (3)	NA
Rely More Heavily on Multiple-Choice Tests	24 (5)	19 (4)	37 (4)	42 (4)	18 (3)	NA
Rely More Heavily on Open-Ended Tests	21 (4)	18 (3)	23 (4)	28 (3)	50 (2)	NA

Notes:

Standard errors are provided in parentheses.

Response options were: not at all, a small amount, a moderate amount, and a great deal.

Cell entries are percentages reporting they engage in each practice “a moderate amount” or a “great deal” as a result of the state tests.

These questions were not presented to PA science teachers because of the lack of a statewide science test.

One effect of NCLB’s requirement that accountability indices be based on a percent-proficient metric is that it creates incentives for teachers to focus their efforts on moving students from below to above the cut score associated with the “proficient” performance level (sometimes called “bubble kids”). Research is beginning to shed light on ways in which schools and teachers reallocate resources toward students who are most likely to make that move (Booher-Jennings, 2005). In California and Georgia, more than a third of math teachers said they focused

more on students who were close to proficient than they would have in the absence of the state testing program. The numbers were smaller for Pennsylvania math teachers and for science teachers, but still substantial in most cases. This type of response raises concerns about whether students who are not performing near the proficient cut score are getting shortchanged.

Although we cannot examine this specifically, there is some evidence that teachers recognize the risk; e.g., roughly half of the teachers across states and levels agreed that “as a result of the state’s accountability system, high-achieving students are not receiving appropriately challenging curriculum or instruction” (see Hamilton & Stecher, 2006, and Russell & McCombs paper in this symposium).

Teachers in our case study schools described several examples of “bubble kid” strategies.

According to one elementary school teacher,

[T]he high-basic child that’s almost proficient ... that’s what we call our target group ... Every teacher got a printout of their target group. Every teacher has about four to five kids in their class. We went over strategies on how to make sure you involve them and you get them involved. We talked about seating. These children should be closer up to you. Whenever another child answers a question, refer back to that student and make sure can you tell me what the answer was or what did Johnny say, and always keep those four to five kids questioning and making sure they’re their target. They’re the kids that we need to push up to proficient. So, that’s our AYP strategy.

Other teachers, as well as a few parents, expressed concerns about both high-performing and low-performing students being left behind in the effort to maximize movement from below proficient to above proficient.

There is also some evidence that teachers have changed their own assessment practices in response to state tests; percentages saying they rely more heavily on certain test formats in their classroom assessments range from approximately 20 to approximately 40. The highest response was in Pennsylvania, where half of elementary math teachers said they relied more heavily on open-ended assessments. This is probably due to the fact that the state math test includes open-

ended items; our case study visits suggested that many teachers increased their use of open-ended classroom assessments in part to prepare students for the open-ended section of the state test.

We reported results for this item from the 2003-04 school year in an earlier paper (Hamilton, Berends, & Stecher, 2005). A comparison of results for spring 2004 and spring 2005 indicates that most of the responses have held relatively steady, though there have been slight decreases in reports of searching for more effective teaching methods and focusing on standards, and slight increases in some cases in teachers' reported focus on tested topics, assessment styles and formats, and students performing close to proficient<sup>2</sup>. It is not clear whether these changes represent meaningful trends, but if they do, they suggest that elementary teachers are increasingly attuned to specific features of their state testing and reporting systems.

Table 8 presents the results for middle school teachers. Many of the responses are less frequently reported among middle school teachers than among elementary teachers, but the overall patterns of responses are similar. In particular, focus on standards and on tested content were generally the most frequently endorsed items, though narrower forms of test preparation were also common. The largest change in assessment practices was among Georgia science teachers, roughly half of whom said they relied more heavily on multiple-choice tests than they would have in the absence of the state testing program. Focus on students close to proficient was reported by some middle school teachers but was slightly less common than among elementary teachers.

---

<sup>2</sup> Note that the samples of teachers responding to surveys in 2004 and 2005 do not necessarily include all of the same teachers.



**Table 8.**  
**Percent of Middle School Mathematics and Science Teachers Reporting**  
**Their Instruction is Different as a Result of Mathematics and Science Assessments**

	California		Georgia		Pennsylvania	
	Mathematics	Science	Mathematics	Science	Mathematics	Science
Assign More Homework	29 (4)	8 (3)	29 (3)	26 (3)	13 (4)	NA
Search for More Effective Teaching Methods	58 (3)	35 (6)	69 (3)	67 (3)	59 (7)	NA
Focus more on Standards	66 (4)	47 (6)	72 (3)	77 (3)	69 (3)	NA
Focus more on Topics Emphasized in Assessment	57 (5)	27 (7)	73 (3)	64 (4)	71 (7)	NA
Emphasize Assessment Styles and Formats of Problems	49 (5)	23 (4)	71 (3)	65 (3)	62 (4)	NA
Spend More Time Teaching Test-Taking Strategies	45 (7)	26 (6)	44 (3)	48 (3)	39 (4)	NA
Spend More Time Teaching Content	45 (6)	24 (4)	53 (3)	59 (4)	46 (3)	NA
Focus More on Students Who Are Close to Proficient	19 (3)	8 (2)	38 (4)	30 (3)	22 (5)	NA
Offer More Assistance Outside of School for Students Who are Not Proficient	26 (3)	9 (2)	41 (3)	33 (3)	19 (5)	NA
Rely More Heavily on Multiple-Choice Tests	23 (3)	20 (3)	38 (4)	54 (3)	9 (2)	NA
Rely More Heavily on Open-Ended Tests	13 (2)	11 (2)	23 (2)	26 (3)	33 (5)	NA

Notes:

Standard errors are provided in parentheses.

Response options were not at all, a small amount, a moderate amount, and a great deal.

Cell entries are percentages reporting they engage in each practice “a moderate amount” or a “great deal” as a result of the state tests.

A comparison with spring 2004 results indicates some changes in reported effects of state testing on classroom assessment methods, but they varied by state: California and Georgia teachers were less likely to say they relied more on open-ended assessments than they had in the past, whereas Pennsylvania teachers were less likely to report relying on multiple-choice tests. Georgia math teachers and California teachers in both subjects were less likely to report a greater focus on standards than they did in 2004. It is important to note that these results provide no information on actual change in practices, but only address changes that teachers attribute to the

state test. The fact that fewer teachers in California and Georgia say they focus more on standards because of the state tests might indicate a reduced emphasis on standards, or it could be a result of a growing acceptance of standards as the primary source of information about instructional objectives. In other words, teachers who no longer say they focus on standards more than they would in the absence of the state test may have decided that the standards are worth teaching to, regardless of whether a test is associated with them. More detailed information from interviews or observations would be needed to understand how the responses reported in Tables 7 and 8 relate to actual changes in practice.

### ***General Changes in Instructional Practice***

The previous section described teachers' attributions of instructional practices to the state testing program. We also asked teachers about the frequency with which they used a variety of instructional approaches in their math and science instruction, and whether this frequency changed since the previous school year. These questions did not ask teachers to attribute the changes to any aspect of the state SBA system. The results for mathematics and science teachers in elementary and middle schools appear in Tables 9-12, which provide the percentages of teachers who reported using particular instructional approaches and whether frequency of use increased or decreased during the 2004-05 school year compared with the previous school year.

In both mathematics and science, elementary and middle school teachers reported using all of the instructional activities we asked about, but some strategies had much higher percentages of teachers reporting their use. For example, 95 percent or more of all teachers reported practices that have been common in classrooms for decades, such as introducing content

through formal presentations or direct instruction. Assigning homework is a common strategy, too, especially as reported by mathematics teachers.

Among all mathematics teachers, 80 percent or more reported re-teaching mathematics topics because student performance on assessments or assignments did not meet expectations, reviewing math assessment results to identify topics requiring more or less emphasis in instruction and to identify those students who needed supplemental instruction, and having students help other students learn mathematics content. Lower percentages of elementary and middle school mathematics teachers reported using extended mathematics investigations or projects, conducting a pre-assessment to find out how much a student knew, and referring students for extra help outside of the classroom.

In science, although the introduction of content through direct instruction or formal presentations was commonly used (90 percent or more), the percentages of teachers who reported using the other instructional practices tended to be lower in science than mathematics. For example, although 70 percent or more of elementary mathematics teachers reported providing extra help to students outside of the classroom; about 25-41 percent of elementary school science teachers across the three states reported providing such help in science.

When focusing on the percentages of teachers using specific approaches more or less during the 2004-05 school compared with the previous school year, we find that all teachers reported using the various strategies more than in the past with a couple exceptions. For example, middle school mathematics teachers did not report increased use of extended mathematics investigations, and elementary school science teachers did not report changing the frequency of referring students for extra help outside of class.

**Table 9.**  
**Elementary School Mathematics Teachers Reporting Their Instruction Techniques**  
**and How They Have Changed**

	California			Georgia			Pennsylvania		
	Use technique	Used less	Used more	Use technique	Used less	Used more	Use technique	Used less	Used more
Plan different assignments based on performance	82 (2)	4 (1)	27 (3)	90 (2)	4 (1)	29 (2)	81 (2)	5 (2)	18 (2)
Assign mathematics homework	97 (1)	1 (1)	19 (2)	96 (1)	3 (1)	16 (2)	98 (1)	1 (0)	11 (2)
Re-teach topics because performance on assignments or assessments did not meet expectations	93 (2)	3 (2)	24 (3)	96 (1)	2 (1)	29 (2)	89 (3)	7 (3)	18 (3)
Have students work on extended mathematics investigations or projects	45 (4)	8 (2)	13 (3)	46 (3)	9 (1)	16 (2)	43 (3)	5 (1)	12 (2)
Introduce content through formal presentations or direct instruction	98 (1)	2 (1)	13 (3)	98 (1)	3 (1)	14 (2)	98 (1)	1 (1)	8 (2)
Review assessment results to identify individual students who need supplemental instruction	91 (2)	2 (1)	21 (3)	95 (1)	1 (1)	27 (3)	89 (2)	2 (1)	21 (3)
Review assessment results to identify topics requiring more or less emphasis in instruction	90 (2)	1 (1)	20 (2)	94 (1)	0 (0)	26 (3)	87 (1)	2 (1)	20 (2)
Provide help to individual students outside of class time	68 (4)	5 (1)	19 (2)	70 (3)	5 (1)	25 (2)	72 (4)	5 (1)	17 (3)
Confer with another teacher about alternative ways to present specific topics or lessons	81 (3)	4 (1)	20 (3)	90 (1)	2 (1)	23 (3)	89 (2)	2 (1)	19 (3)
Conduct a pre-assessment to find out what students know about a topic	65 (4)	3 (1)	13 (2)	67 (3)	4 (1)	17 (2)	60 (5)	9 (4)	11 (2)
Have students help other students learn mathematics content	91 (2)	2 (1)	18 (3)	93 (1)	2 (1)	27 (3)	92 (2)	2 (1)	23 (3)
Refer students for extra help outside the classroom	57 (4)	4 (1)	14 (3)	65 (4)	3 (1)	21 (3)	54 (4)	2 (1)	16 (3)

Notes:

Standard errors are provided in parentheses.

Response options were never, rarely, sometimes, and often.

Cell entries are percentages reporting they engage in each practice “sometimes” or “often.”

**Table 10.**  
**Middle School Mathematics Teachers Reporting Their Instruction Techniques**  
**and How They Have Changed**

	California			Georgia			Pennsylvania		
	Use technique	Used less	Used more	Use technique	Used less	Used more	Use technique	Used less	Used more
Plan different assignments or lessons based on performance	68 (2)	3 (2)	17 (3)	81 (2)	5 (1)	29 (3)	69 (5)	0	18 (4)
Assign mathematics homework	94 (2)	2 (1)	12 (2)	92 (2)	4 (1)	19 (3)	95 (2)	1 (0)	13 (4)
Re-teach topics because performance on assignments or assessments did not meet expectations	95 (2)	4 (1)	24 (3)	93 (1)	4 (1)	30 (4)	87 (3)	0 (0)	16 (4)
Have students work on extended mathematics investigations or projects	28 (4)	9 (2)	7 (2)	39 (3)	12 (2)	13 (2)	26 (3)	11 (3)	10 (3)
Introduce content through formal presentations or direct instruction	95 (2)	4 (2)	10 (2)	97 (1)	1 (1)	14 (2)	99 (1)	2 (1)	5 (2)
Review assessment results to identify individual students who need supplemental instruction	84 (3)	3 (1)	17 (4)	89 (2)	2 (1)	26 (4)	75 (6)	1 (0)	15 (5)
Review assessment results to identify topics requiring more or less emphasis in instruction	86 (2)	1 (1)	19 (3)	90 (2)	1 (1)	28 (3)	83 (4)	2 (1)	19 (3)
Provide help to individual students outside of class time	85 (4)	2 (1)	20 (4)	85 (2)	4 (1)	32 (3)	80 (11)	3 (1)	24 (8)
Confer with another teacher about alternative ways to present specific topics or lessons	81 (3)	7 (2)	20 (5)	84 (2)	4 (1)	33 (3)	72 (11)	1 (1)	17 (4)
Conduct a pre-assessment to find out what students know about a topic	49 (4)	5 (2)	9 (2)	65 (3)	4 (1)	21 (3)	41 (9)	4 (2)	20 (6)
Have students help other students learn mathematics content	86 (2)	3 (2)	17 (3)	95 (1)	3 (1)	30 (2)	84 (4)	2 (1)	27 (5)
Refer students for extra help outside the classroom	70 (3)	2 (1)	17 (4)	64 (4)	4 (1)	23 (4)	66 (4)	2 (1)	18 (3)

Notes:

Standard errors are provided in parentheses.

Response options were never, rarely, sometimes, and often.

Cell entries are percentages reporting they engage in each practice “sometimes” or “often.”

**Table 11.**  
**Elementary School Science Teachers Reporting Their Instruction Techniques**  
**and How They Have Changed**

	California			Georgia			Pennsylvania		
	Use technique	Used less	Used more	Use technique	Used less	Used more	Use technique	Used less	Used more
Plan different assignments or lessons based on performance	38 (4)	5 (2)	8 (2)	64 (4)	5 (1)	18 (3)	37 (3)	3 (1)	7 (2)
Assign science homework	51 (4)	8 (2)	11 (2)	75 (3)	4 (1)	17 (2)	57 (4)	5 (1)	6 (2)
Re-teach topics because performance on assignments or assessments did not meet expectations	57 (4)	7 (2)	12 (3)	81 (3)	3 (1)	15 (2)	54 (4)	2 (1)	8 (2)
Have students do hands-on laboratory science activities or investigations	72 (3)	12 (3)	15 (4)	82 (2)	10 (2)	21 (3)	84 (3)	8 (2)	12 (3)
Introduce content through formal presentations or direct instruction	93 (2)	5 (2)	15 (3)	99 (1)	2 (1)	12 (2)	97 (1)	2 (1)	4 (1)
Review assessment results to identify individual students who need supplemental instruction	61 (4)	7 (2)	8 (2)	81 (2)	2 (1)	13 (2)	62 (3)	2 (1)	4 (1)
Review assessment results to identify topics requiring more or less emphasis in instruction	61 (4)	6 (2)	10 (3)	82 (2)	3 (1)	15 (2)	60 (3)	2 (1)	4 (1)
Provide help to individual students outside of class time	25 (3)	7 (2)	5 (1)	41 (3)	6 (1)	10 (2)	30 (3)	2 (1)	4 (1)
Confer with another teacher about alternative ways to present specific topics or lessons	62 (5)	7 (2)	17 (4)	83 (2)	6 (1)	19 (2)	68 (4)	2 (1)	11 (2)
Conduct a pre-assessment to find out what students know about a topic	42 (4)	5 (2)	7 (2)	53 (3)	3 (1)	12 (2)	43 (4)	2 (1)	5 (1)
Have students help other students learn science content	67 (3)	4 (2)	10 (2)	87 (2)	2 (1)	23 (3)	75 (3)	1 (1)	8 (2)
Refer students for extra help outside the classroom	20 (3)	8 (2)	6 (4)	35 (3)	3 (1)	10 (2)	16 (3)	3 (1)	4 (1)

Notes:

Standard errors are provided in parentheses.

Response options were: never, rarely, sometimes, or often.

Cell entries are percentages reporting they engage in each practice “sometimes” or “often”.

**Table 12.**  
**Middle School Science Teachers Reporting Their Instruction Techniques**  
**and How They Have Changed**

	California			Georgia			Pennsylvania		
	Use technique	Used less	Used more	Use technique	Used less	Used more	Use technique	Used less	Used more
Plan different assignments or lessons based on performance	46 (7)	3 (1)	12 (3)	74 (3)	3 (1)	27 (3)	65 (6)	7 (5)	20 (2)
Assign science homework	75 (7)	3 (1)	16 (4)	87 (3)	4 (1)	13 (3)	79 (6)	3 (2)	5 (3)
Re-teach topics because performance on assignments or assessments did not meet expectations	59 (5)	3 (1)	11 (3)	80 (2)	5 (2)	24 (3)	62 (4)	3 (2)	16 (5)
Have students do hands-on laboratory science activities or investigations	82 (5)	8 (2)	16 (4)	85 (2)	12 (2)	19 (2)	76 (6)	11 (4)	20 (8)
Introduce content through formal presentations or direct instruction	98 (1)	3 (1)	7 (2)	98 (1)	2 (1)	11 (2)	94 (4)	2 (1)	5 (2)
Review assessment results to identify individual students who need supplemental instruction	66 (7)	3 (1)	13 (3)	80 (3)	6 (2)	21 (4)	79 (6)	1 (0)	11 (5)
Review assessment results to identify topics requiring more or less emphasis in instruction	70 (6)	3 (1)	13 (3)	85 (2)	2 (1)	20 (4)	76 (3)	1 (1)	10 (3)
Provide help to individual students outside of class time	65 (7)	2 (1)	14 (4)	76 (3)	6 (1)	19 (3)	56 (10)	6 (5)	15 (4)
Confer with another teacher about alternative ways to present specific topics or lessons	69 (5)	5 (2)	16 (4)	84 (2)	4 (2)	27 (3)	69 (6)	7 (5)	9 (3)
Conduct a pre-assessment to find out what students know about a topic	53 (5)	4 (1)	13 (3)	63 (3)	8 (2)	24 (4)	65 (3)	1 (1)	9 (4)
Have students help other students learn science content	80 (4)	1 (1)	14 (3)	90 (2)	3 (1)	27 (4)	74 (6)	2 (1)	12 (4)
Refer students for extra help outside the classroom	43 (6)	2 (1)	12 (4)	57 (3)	5 (1)	17 (3)	39 (7)	2 (1)	9 (4)

Notes:

Standard errors are provided in parentheses.

Response options were never, rarely, sometimes, and often.

Cell entries are percentages reporting they engage in each practice “sometimes” or “often.”

Although there is a general pattern of teachers reporting that they are using most instructional approaches more in the current school year than in the past, there are some instructional approaches that are noteworthy because of the percentages of teachers reporting increased use. For example, roughly 20 percent or more of mathematics teachers reported increases in the use of planning different assignments or lessons based on student performance, re-teaching mathematics topics because student performance on assessments or assignments did not meet expectations, reviewing assessment results to identify individual students who need supplemental instruction, providing individual help to students outside of class time, conferring with another teacher about ways to present specific topics or lessons, and having students help other students learn the content. Although the increased use of many of these activities was also reported in science, the increases were not as great, particularly among elementary school science teachers. Future analyses will be designed to try to link changes in individual teachers' practices with SBA-related practices and supports.

### ***Principals' Reports of Test Preparation Activities***

The final set of results we present examines principals' reports of whether or not they engaged in a set of actions related to test preparation. Principals are likely to exert a strong influence on teachers' test-related practices through the actions that they take and the messages they convey regarding how, and how much, to prepare students for state tests. We asked principals whether they had engaged in several practices that are fairly widely reported. Some of these practices are closely associated with the coaching activities discussed earlier; others are more strongly related to alignment or reallocation. The percentages of principals who responded that they had engaged in each practice in the last year are reported in Table 13.



**Table 13.**  
**Percent of Principals Reporting Test Preparation Activities**

	California		Georgia		Pennsylvania	
	Elementary	Middle	Elementary	Middle	Elementary	Middle
Distributed commercial test preparation materials (e.g., practice tests)	59 (10)	61 (11)	90 (5)	88 (5)	93 (4)	88 (8)
Distributed released copies of the state test or test items	61 (10)	61 (11)	88 (4)	98 (2)	96 (3)	96 (2)
Discussed methods for preparing students for the state test at staff meetings	94 (4)	95 (4)	100	100 (1)	99 (1)	100
Encourage or require teachers to spend more time on tested subjects and less on other subjects	53 (11)	63 (9)	47 (7)	66 (8)	61 (11)	45 (13)
Helped teachers identify content that is likely to appear on the state test so they can cover it adequately in their instruction	94 (3)	99 (1)	100	100	100	99 (1)
Encourage teachers focus their efforts on students close to meeting the standards	85 (6)	94 (3)	90 (4)	93 (4)	77 (7)	57 (15)
Discussed Assessment Anchors with teachers (PA only)					100	100

Note:

Standard errors shown in parentheses

Almost all principals discussed test preparation at staff meetings and helped teachers identify tested content, but there was variability across states and levels in the percentages of principals reporting other preparation-related activities. California principals were less likely than principals in the other states to use commercial test preparation materials or released items. According to our state contacts in California, one likely reason is that those materials are not made available by the state in the same way that they are in Pennsylvania and Georgia, and principals often receive a message that narrow test preparation is discouraged. Pennsylvania principals were the least likely to report encouraging teachers to focus on students near the proficient cut score, particularly at the middle school level. One possible reason is that the PSSA test was only given in grades 3, 5, and 8, so the advice to focus on the proficient score would

only be applicable to a subset of teachers. It will be worth revisiting this to see whether the focus on near-proficiency changes as PSSA is expanded to additional grades.

A few of the items from Table 13 also appeared on our spring 2004 survey. There was only significant decrease—Georgia principals were less likely to report using released tests in 2005 (88 percent) than in 2004 (96 percent). All of the other notable changes represented increases. The largest of these include an increase in distribution of test preparation materials in California middle schools (36 percent to 61 percent), Georgia middle schools (73 percent to 88 percent), and Pennsylvania elementary schools (75 percent to 93 percent), as well as an increase in California elementary school principals' discussion of methods for preparing students for the test at staff meetings (76 percent to 94 percent). It appears from these numbers that test preparation is on the minds of most principals and in some cases has increased in frequency over the last year.

### **Conclusions and Next Steps**

The descriptive information presented here provides a snapshot of some of the practices in which teachers are engaging within the broader context of state SBA systems. Although the research design does not support strong causal claims, it is fairly clear that SBA policies are influencing what teachers are doing in the classroom, and that this influence is leading to an increased focus on state standards and tests. In some respects, teachers' reports about their practices provide support for SBA advocates' claims that these policies will promote a stronger focus on outcomes among teachers and principals. Taken together with the findings reported in the other papers from this symposium, we can paint a picture of instruction that involves heavy use of test-score data, reflects state standards in both broad and narrow ways, and pays special

attention to students who are most likely to show changes on the NCLB-required percent-proficient metric. Although it is too early to tell, it would not be surprising to see these results pay dividends in terms of increased scores on state accountability tests in the near future.

While much of the news seems positive, teachers' and principals' responses to our survey and interview questions raise some concerns about possible negative consequences of SBA policies. There is evidence of reallocation, toward instruction focusing on tested topics and formats, toward classroom assessment methods that reflect the state test, and toward students near the proficient cut point. Although we cannot directly measure what, if anything, is getting sacrificed as a result of these actions, it is likely that certain topics, activities, and even students are receiving less attention than they would in the absence of the state test—a conjecture that is consistent with past research on SBA and that receives some support from our case study interviews. While some kinds of reallocation are clearly problematic, others—such as the decision to emphasize tested topics and de-emphasize material not on the test—may or may not be considered beneficial outcomes, and different stakeholder groups are likely to have different views on the desirability of these actions. Nonetheless it is important to document them so that policymakers, educators, parents, and other members of the public have a clear understanding of how SBA is influencing the instruction children receive.

It will also be important to examine relationships between some of the instructional practices discussed in this paper and other aspects of district and school responses to SBA. We have planned a number of analyses to follow up on these results. We will conduct exploratory analyses to inform the development of a set of scales that represent important constructs and will conduct multilevel analyses of relationships among these constructs. For example, we will examine how teacher reports of aligning their instruction with standards and assessments are

related to survey measures of clarity of the accountability system, accountability pressure, familiarity with standards, and satisfaction with curricular materials, controlling for differences across schools, districts, and states. We also plan to examine relationships between district and school actions and student achievement, which will provide valuable information on the actions and conditions that support achievement growth. We hope this study, along with other research on NCLB that is currently being conducted, will contribute to improvements in the development and implementation of SBA policies in the future.



## References

- Center on Education Policy (2006). *From the capital to the classroom: Year 4 of the No Child Left Behind Act*. Washington, DC: Author. Available <http://www.cep-dc.org/nclb/Year4/Press/> (retrieved 3/28/06).
- Corbett, H. D., & Wilson, B. L. (1991). Two state minimum competency testing programs and their effects on curriculum and instruction. In R. E. Stake (Ed.), *Advances in program evaluation: Vol. I. Effects of mandated assessment on teaching* (pp. 7–40). Greenwich, CT: JAI Press.
- Darling-Hammond, L., & Wise, A. E. (1985). Beyond standardization: State standards and school improvement. *Elementary School Journal*, 85, 315–336.
- Hamilton, L. S. (2003). Assessment as a policy tool. *Review of Research in Education*, 27, 25–68.
- Hamilton, L. S., Berends, M., & Stecher, B. M. (2005). *Teachers' responses to standards-based accountability*. Santa Monica, CA: RAND.
- Hamilton, L. S., & Stecher, B. M. (2006). *Measuring educators' responses to high-stakes testing*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco (April).
- Jones, G., Jones, B. D., Hardin, B., Chapman, L., Yarbrough, T., & Davis, M. (1999). The impact of high-stakes testing on teachers and students in North Carolina. *Phi Delta Kappan*, 81, 199–203.

- Koretz, D., Barron, S., Mitchell, K., & Stecher, B. (1996). *The perceived effects of the Kentucky Instructional Results Information System (KIRIS)* (MR-792-PCT/FF). Santa Monica, CA: RAND.
- Koretz, D., & Hamilton, L. S. (forthcoming). Testing for accountability in K-12. In R. L. Brennan (Ed.), *Educational Measurement* (4<sup>th</sup> ed.). Westport, CT: American Council on Education/Praeger.
- Koretz, D. M., & Hamilton, L. S. (2003). *Teachers' responses to high-stakes testing and the validity of gains: A pilot study* (CSE Technical Report 610). Los Angeles, CA: Center for Research on Evaluation, Standards, and Student Testing.
- Pedulla, J. J., Abrams, L. M., Madaus, G. F., Russell, M. K., Ramos, M. A., & Miao, J. (2003). *Perceived effects of state-mandated testing programs on teaching and learning: Findings from a national survey of teachers*. Boston: National Board on Educational Testing and Public Policy.
- Romberg, T. A., Zarinia, E. A., & Williams, S. R. (1989). *The influence of mandated testing on mathematics instruction: Grade 8 teachers' perceptions*. Madison, WI: National Center for Research in Mathematical Science Education, University of Wisconsin–Madison.
- Shepard, L. A., & Dougherty, K. C. (1991, April). *Effects of high-stakes testing on instruction*. Paper presented at the annual meeting of the American Educational Research Association and National Council on Measurement in Education, Chicago.
- Smith, M. L., Edelsky, C., Draper, K., Rottenberg, C., & Cherland, M. (1991). *The role of testing in elementary schools* (CSE Technical Report 321). Los Angeles, CA: Center for Research on Evaluation, Standards, and Student Testing.

- Stecher, B. M., Barron, S. I., Chun, T., & Ross, K. (2000). *The effects of the Washington state education reform on schools and classrooms* (CSE Technical Report 525). Los Angeles, CA: Center for Research on Evaluation, Standards, and Student Testing.
- Stecher, B. M., & Borko, H. (2002). Integrating findings from surveys and case studies: Examples from a study of standards-based educational reform. *Journal of Education Policy*, 17(5), 547-570.
- Stecher, B. M., Hamilton, L. S., & Gonzalez, G. (2003). *Working smarter to leave no child behind*. Santa Monica, CA: RAND.
- Stecher, B. M., Hamilton, L. S., & Naftel, S. (2005). *Introduction to first-year findings from the Implementing Standards-Based Accountability (ISBA) Project*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal.
- Stecher, B. M., & Naftel, S. (2006). *Implementing standards based accountability (ISBA): Introduction to second year findings*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.