



Teachers' Perceptions of the Influence of *No Child Left Behind* On Classroom Practices

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Abstract

Due to the magnitude of *NCLB*, the pressure on teachers has increased to perhaps immeasurable proportions. One could argue that *NCLB* has ramifications for nearly all aspects of the teaching–learning process, including classroom-based assessment. The purpose of this study was to describe the extent to which K–12 teachers perceive that *NCLB* has influenced their instructional and assessment practices. Differences based on several demographic variables were also examined. An original instrument was administered to teachers and 1,534 responses were received. Salient findings revealed that teachers believe *NCLB* is having negative impacts on instructional and curricular practices, including higher levels of stress related to improving student performance. Teachers reported several changes in how they assess students. Significant group differences were found, particularly on the resultant components of *Student Test Preparation* and *Instructional Changes*.

Keywords: Teacher perceptions, No Child Left Behind, classroom practices, assessment practices

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Current Issues in Education

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The *No Child Left Behind Act of 2001 (NCLB)* requires all states in the nation to set standards for grade-level achievement and to develop a system to measure the progress of all students and subgroups of students in meeting those state-determined grade-level standards (U.S. Department of Education, 2004). This act represents a marked departure from the efforts of the Clinton administration to develop a single national test. *NCLB* provides a mandate for national testing, but leaves the format and design of the test up to individual states (Sloane & Kelly, 2003). Furthermore, because of the inconsistencies in the implementation of the mandate, students in some states will not graduate or be promoted unless they are able to pass their respective state's test (Kober, 2002). In this most recent era of high-stakes testing, the amount of pressure and stress imposed upon students—and teachers, as well—has increased immensely. Many leaders believe that this push for increased test scores, with little regard for how those improvements are attained, have created an accountability system that tends to cultivate inappropriate and sometimes unethical behaviors on the part of educators. Additionally, research has cited the fact that large-scale, high-stakes standardized testing movements actually result in decreases in student learning. For example, in their study of high-stakes test data from 18 states, Amrein and Berliner (2002) concluded that student learning is indeterminate, remains at the same level it was before the policy was implemented, or actually *decreases* [emphasis added] when high-stakes testing policies are instituted. They further concluded that a transformation of current high-stakes testing policies is warranted due largely to this lack of improvement to student learning, as well as unintended consequences associated with high-stakes testing policies (e.g., increased drop-out rates, teachers' and schools' cheating on exams, teachers' defection from the profession).

Due to the magnitude of the *NCLB* testing mandates, the extent of this "pressure to perform" and its impact on teachers and their classroom practices has increased to perhaps immeasurable proportions. Nonetheless, it is imperative for the educational community at large to better understand the degree to which teachers have altered their instructional and assessment practices based primarily on their knowledge, understanding, and implementation of *NCLB*. The purpose of this study was to describe the extent to which K–12 teachers perceive that *NCLB* has influenced their instructional and assessment practices. Additionally, the study sought to determine if any differences in these perceptions existed based on gender, school level, education level, teaching experience, and school and district rating.

The Impact of "No Child Left Behind"

The *No Child Left Behind Act* has been the topic of substantial debate since its enactment in early 2002. Arguably, its most crucial component is the heightened requirement for—as well as its greater importance placed on—accountability and high-stakes testing. Few people would disagree with the notion that high-stakes testing can be a driving force behind fundamental change in schools. However, there is little agreement as to whether this change is for better or for worse (Abrams, Pedulla, & Madaus, 2003). Whereas, some have argued that the guarantee of rewards and the threats of sanctions will promote higher quality teaching and, therefore, higher student achievement, others have argued that focusing instruction on the ultimate goal of performance on high-stakes tests only limits the scope of classroom instruction and student learning. Research studies have revealed somewhat mixed findings regarding the impact of *NCLB*, depending on whether one examines its effects on student achievement or its effects on motivation and stress.

In comparing student achievement and growth in achievement prior to the implementation of *NCLB* (school year 2001-2002) and following its implementation (school year 2003-2004), researchers at the Northwest Evaluation Association found mixed results in their analyses of mathematics and reading assessment data from over 320,000 students in more than 200 school districts in over 22 states. The main finding reported by Cronin, Kingsbury, McCall, and Bowe (2005) was that mathematics and reading scores had improved over the initial two-year period of *NCLB*. However, they also found that student growth scores had decreased, that students in grade levels tested by state assessments have higher achievement and growth than students who are in non-tested grades, and that student growth in every ethnic group had decreased slightly since *NCLB* was implemented. The researchers concluded that there is evidence that *NCLB* has improved student achievement, but if the change in achievement continues at roughly the same magnitude, *NCLB* will not bring schools anywhere near the requirement of 100 percent proficiency by 2014.

Research has not been limited to examinations of the effects of *NCLB* and its testing requirements on student achievement, but has also investigated the effects on student and teacher motivation. Abrams et al. (2003) and Stecher (2002) delineate several positive and negative effects on both students and teachers. The positive effects on students include that high-stakes tests motivate them to work harder in school, provide them with better information about their own knowledge and skills, and send clearer signals to students about what to study. Frustration, discouragement from trying, increased competition, and a general devaluation of grades and school assessments are the primary negative student effects.

Positive effects on teachers include improvements in the diagnosis of individual student needs and the identification of strengths and weaknesses in the curriculum, as well as increased

motivation to work harder and smarter, to align instruction with standards, and to identify content not mastered by students, thus allowing for redirected instruction. These positive effects are countered by the facts that high-stakes tests increase stress and decrease morale among teachers, encourage teachers to focus more on specific test content rather than on standards, lead teachers to engage in inappropriate and unethical test preparation practices, and entice teachers to cheat when preparing or administering tests (Abrams et al., 2003; Stecher, 2002). According to teachers, much of this pressure comes from district administrators, building administrators, and the media (Herman & Golan, n.d.).

That being said, there is certainly a lack of agreement regarding the effects of testing on student motivation. Some believe that high-stakes accountability testing is unfairly criticized for these effects (Sloane & Kelly, 2002). The authors discuss that it is not clear if the anxiety experienced by students in high-stakes testing situations is due to the tests themselves—as well as the consequences of the resulting test scores—or to generally ineffective preparation for learning, which may be attributable to numerous causes, which could possibly include poor instruction.

Teachers' Perceptions of "No Child Left Behind"

Since the implementation of *NCLB*, research has shown that, generally speaking, teachers do not have favorable perceptions of the law. In 2004, researchers at The Civil Rights Project at Harvard surveyed over 1,400 teachers regarding their knowledge of *NCLB* and how they were responding to its mandates (Sunderman, Tracey, Kim, & Orfield, 2004). Among the key findings from the study, teachers confirmed that the accountability system created by *NCLB* is influencing the instructional and curricular practices of teachers, but is also producing unintended and possibly negative consequences. Specifically, teachers reported that they ignored important

aspects of the curriculum, de-emphasized or completely neglected untested topics, and tended to focus their instruction on tested subjects, sometimes excessively. Additionally, these teachers rejected the idea that *NCLB*'s testing requirements would ultimately focus teachers' instruction and/or improve the curriculum. Finally, teachers who were teaching in schools that had been identified as needing improvement reported that they did not plan to be teaching in those same schools five years in the future. Generally, teachers believed that *NCLB* sanctions would cause teachers to transfer out of schools not making adequate progress (Sunderman et al., 2004).

In a survey conducted by the *NCLB* Task Force of the National Staff Development Council, nearly half of the 2,000 educators responding to the survey believed that the impact of *NCLB* on professional development has had "no discernable effect." These teachers reported that professional development activities were more of an obligation, as opposed to being meaningful, useful professional learning opportunities. Only a small percentage (14%) believed the *NCLB*-funded professional development is "improving the quality of teaching" (National Staff Development Council [NSDC], 2004).

Furthermore, and perhaps more pertinent to this study, the results of the NSDC survey revealed that nearly 60% of teachers believed that the law is having a negative impact on their work settings. Forty percent reported that they experience *NCLB* implementation pressures that negatively impact teacher morale and performance (NSDC, 2004). One-tenth reported that one effect of the law is that teachers are being forced to divert their attention away from more important educational issues that could improve teaching and learning. Approximately the same proportion believed that educators are carrying on their work much as they did prior to the implementation of *NCLB*. In contrast, over one-fourth of responding teachers indicated that the law is having a more positive effect, as evidenced by the fact that many educators were

beginning to think, talk, and act in new ways that could ultimately result in higher levels of student performance (NSDC, 2004).

"No Child Left Behind" and Classroom Assessment

Since *NCLB* places such high-stakes consequences on its mandated standardized testing, teachers must do a more thorough job of teaching to their respective curricular standards. They must also engage in meaningful and valid classroom assessment in order to accurately determine the knowledge and skills that have been mastered by their students, as well as those content areas that may require redirected instruction to entire classes or individualized student reinforcement. One could make the argument that *NCLB* has far-reaching ramifications for nearly all aspects of the teaching–learning process, of which classroom-based student assessment is a part. Unfortunately, at this point in time, very little research exists regarding the relationship between *NCLB* and teachers' classroom assessment practices.

In a statewide survey conducted with teachers in Virginia, McMillan, Myran, and Workman (1999) found that more than three-fourths of elementary teachers and one-third of secondary teachers believed that their statewide testing program had a "somewhat" or "extensive" impact on their teaching and assessment. Specifically, teachers reported that they did not cover untested areas of the curriculum nearly as much as those areas that were tested, and that they tended to emphasize breadth rather than depth of content coverage. Teachers also reported greater use of multiple-choice formats on their self-developed classroom tests. Many teachers identified accountability and increased pressures as the driving forces behind these changes in assessment and instruction (McMillan et al., 1999). These results have been supported by a more recent, nationwide survey of more than 4,000 teachers (Abrams et al., 2003).

With respect to a smaller, yet important, aspect of this relationship, there is research that has examined the arena of test preparation practices. Researchers have identified five types of legitimate test preparation practices that help students demonstrate more completely their knowledge and skills. These strategies include teaching the entire content domain, using a variety of assessment and test item formats, teaching time management skills, fostering student motivation, and reducing test anxiety (Gulek, 2003; Miyasaka, 2000). These practices are considered by the measurement community to be ethical strategies for helping students prepare to take high-stakes tests, largely because they produce student learning that is robust; that is to say, the learning is generalizable to contexts beyond student performance on the test (Gulek, 2003).

However, inappropriate test preparation practices also abound. The basic problem with these practices is that they focus only on raising scores on a given test without also increasing students' knowledge and skills in the broader subject being tested (Kober, 2002; Gulek, 2003). These practices include such teacher behaviors as limiting content instruction to a particular item format, teaching of those objectives from the domain that are sampled on the test, using instructional guides that review actual items from a recent issue of a test, and limiting instruction to actual test items (Gulek, 2003; Mehrens, 1991). Abrams, Pedulla, and Madaus (2003) summarized research in which teachers reported giving greater attention, with regard to instruction and assessment, to content areas they knew would appear on a state test. Some teachers reported de-emphasizing or completely neglecting untested subjects or content. These types of practices are arguably a result of the stress and pressure experienced by teachers to raise test scores (Stecher, 2002; Mehrens, 1991).

Purpose of the Study

The purpose of this study was to describe the extent to which K–12 teachers perceive that *NCLB* has influenced their instructional and assessment practices. Additionally, the study sought to determine if any differences in these perceptions existed based on gender, school level, education level, teaching experience, and school and district rating. The specific research questions addressed in this study were:

1. What are K–12 teachers' perceptions of *NCLB*?
2. In what ways do teachers believe that *NCLB* has influenced their instruction and assessment practices?
3. What differences in the perceptions of *NCLB*'s influence on assessment practices exist between groups as determined by gender, school level, education level, teaching experience, and school rating?

Methods

Participants

The population for this study included all K–12 teachers in the state of Ohio during the 2005–2006 school year. Participation was sought through initial contact with superintendents from 156 school districts (roughly 25% of the total 614 school districts in the state). This initial list was randomly selected from the Ohio Department of Education's online database of school districts (http://www.ode.state.oh.us/data/extract_oed_addgrades.asp). Email communications with the superintendents provided them with an explanation of the study and asked for their agreement to allow their teachers to participate. By using this procedure, the researcher was not required to have access to individual teachers' email addresses. Once a superintendent agreed to

allow the district's teachers to participate, he or she was asked to simply forward an email "cover letter" to respective teachers via email. Thirty-eight of the 156 districts (24%) agreed to participate. The researcher sought an additional random sample of 105 districts. From the second random sample, 15 districts agreed to participate. Completed surveys were submitted from 1,534 teachers representing 53 school districts (more than 20% of those districts randomly sampled) across the state.

Instrumentation

An original Web-based survey instrument, titled the *NCLB * CAP (Classroom Assessment Practices) Survey*, consisting of 22 items, was developed for purposes of data collection. Teacher respondents were instructed to respond to each statement on a four-point Likert scale, ranging from "strongly disagree" to "strongly agree." For purposes of addressing Research Question #3, six additional demographic questions were asked of respondents. They were asked to indicate their gender, teaching level, education level, years of teaching experience, and school district and school building rating, as determined by the Ohio Department of Education (ODE).

With respect to these last two questions, some explanation of this rating system is in order. Each year, ODE provides local report cards for each school district and building in the state of Ohio. Both districts and individual buildings are provided with a rating based on multiple measures, including the results from statewide assessments, graduation rates, and attendance as the input variables (Ohio Department of Education [ODE], 2004). Specifically, the three measures are:

- the school's or district's *Adequate Yearly Progress (AYP)* for students in 10 student groups;

- a series of *state indicators*, defined as a minimum percentage of students at or above the proficient level on grade-level achievement tests (at grades 3, 4, 5, 6, 7, and 8) and on the Ohio Graduation Test; and
- a *performance index score*, ranging from 0 to 120, and defined as the average of performance level scores (i.e., below basic, basic, proficient, and advanced) received by students on each of five subjects tested in grades 4 and 6 (ODE, 2004).

School district ratings and their descriptions are as follows:

- *Excellent*—district meets 22 or 23 (of 23) indicators, or has a score of 100 or more on the Performance Index (PI);
- *Effective*—meets 17 to 21 indicators, or has a score of 90 to 99.9 on the PI;
- *Continuous Improvement*—meets 11 to 16 indicators, or has a score of 80 to 89.9 on the PI, or meets AYP (the lowest a district can be rated is they meet AYP is Continuous Improvement);
- *Academic Watch*—meets 8 to 10 indicators, or has a score of 70 to 79.9 on the PI and has missed AYP; and
- *Academic Emergency*—meets 7 or fewer indicators, has a score less than 70 on the PI and missed AYP (ODE, 2004).

The rating for an individual school is based, in part, on the percentage of indicators that apply directly to that school (rather than out of a total of 23 for the entire district). These school-level ratings are as follows:

- *Excellent*—school meets 94% or more of applicable indicators, or has a score of 100 or more on the Performance Index (PI);

- *Effective*—meets 75% to 93.9% of applicable indicators, or has a score of 90 to 99.9 on the PI;
- *Continuous Improvement*—meets 50% to 74.9% of applicable indicators, or has a score of 80 to 89.9 on the PI, or meets AYP (the lowest a district can be rated is they meet AYP is Continuous Improvement);
- *Academic Watch*—meets 31% to 49.9% of applicable indicators, or has a score of 70 to 79.9 on the PI and missed AYP; and
- *Academic Emergency*—meets 30.9% or fewer indicators, has a score less than 70 on the PI and missed AYP (ODE, 2004).

The initial set of content-based items were adapted from a handful of existing instruments (i.e., Abrams et al., 2003; NSDC, 2004; Sunderman et al., 2004). The *NCLB * CAP Survey* underwent pilot-testing (with data collected from a randomly-selected sample from the population previously described) and revision prior to its implementation. Content-evidence of validity was also collected during the pilot-testing phase, based on reviews from survey research experts, as well as from classroom teachers. An alpha coefficient value equal to .76 was obtained for instrument's overall reliability.

Procedures

School district participation was sought through email communications with the superintendents from the randomly selected districts during late summer. Once a superintendent, or an appropriate designee, agreed to permit the survey to be accessed by the district's teachers, the researcher sent the email "cover letter" to the superintendent and asked that the message be forwarded to the entire teaching staff of that district. Teachers were informed that the survey would require only about 10 minutes to complete, that their responses would remain confidential,

and that only aggregate results would be reported. This email message contained an embedded link which provided direct access for respondents to the *NCLB * CAP Survey*. The survey was administered during a three-week period extending from mid-September through early-October. All data were collected and stored electronically.

Data Analyses

All data analyses were conducted using the Statistical Package for the Social Sciences (SPSS, v. 15). Initial data analyses included frequencies, percentages, means, and standard deviations to summarize the overall results. An exploratory factor analysis was conducted as a data reduction technique in order to reduce the number of items for purposes of group comparisons. Analyses of variance were then used to compare group responses based on gender, teaching level, education level, years of teaching experience, district rating, and school rating. All ANOVA results were evaluated at an alpha level equal to .05.

Results

The descriptive, overall results of the analyses are presented first. These results are followed by a discussion of the data reduction procedure and the subsequent group comparisons. Provided in Table 1 is a summary of the demographic characteristics of the sample.

Table 1

Demographic Characteristics of Teachers as Represented by Frequencies and Percentages

<i>Demographic Characteristic</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Gender</i>		
<i>Female</i>	<i>1186</i>	<i>78.8</i>
<i>Male</i>	<i>319</i>	<i>21.2</i>
<i>School Level</i>		
<i>Elementary</i>	<i>697</i>	<i>50.4</i>

<i>Secondary</i>	687	49.6
<i>Education Level</i>		
<i>B.A./B.S.</i>	408	26.8
<i>M.A./M.S.</i>	1039	68.2
<i>Doctoral/Specialist</i>	76	5.0
<i>Years of Teaching Experience</i>		
<i>1-5 years</i>	228	15.0
<i>6-10 years</i>	316	20.8
<i>11-15 years</i>	238	15.7
<i>16-20 years</i>	194	12.8
<i>21-25 years</i>	166	10.9
<i>25-30 years</i>	199	13.1
<i>More than 30 years</i>	179	11.8
<i>District Rating</i>		
<i>Excellent</i>	84	5.7
<i>Effective</i>	808	54.5
<i>Continuous Improvement</i>	248	16.7
<i>Academic Watch</i>	298	20.1
<i>Academic Emergency</i>	44	3.0
<i>School Rating</i>		
<i>Excellent</i>	280	19.5
<i>Effective</i>	657	45.8
<i>Continuous Improvement</i>	326	22.7
<i>Academic Watch</i>	122	8.5
<i>Academic Emergency</i>	49	3.4

Overall Results

The descriptive results for the 22 items appearing on the survey, including the percentages of response for each point on the scale, means, and standard deviations, are presented in Table 2. With respect to teachers' knowledge of *NCLB*, nearly three-fourths (72%) of teachers responding to the survey indicated that they believed that they knew a lot about

NCLB and nearly half (43%) specified that they did not care to know anything more about it and its effects on their work as classroom teachers. Nearly three-fourths (73%) of teachers believe that *NCLB* has forced teachers to divert their attention away from the types of issues that can actually improve teaching and learning. Only 31% believed that the overall effect of *NCLB* on their schools has been positive, and only 24% believed that most teachers are carrying on their work much as they did prior to the law.

Table 2

Percentages of Teachers' Responses, Means, and Standard Deviations for Items Appearing on *NCLB* * CAP Survey (n = 1,531)

Item	Frequencies (Percentages) of Response				Mean (SD)
	1 SD	2 D	3 A	4 SA	
I believe that I know a lot about the No Child Left Behind (<i>NCLB</i>) Act.	35 (2%)	392 (26%)	931 (61%)	167 (11%)	2.81 (.65)
<i>NCLB</i> has forced me to change the focus of my classroom instruction.	68 (5%)	441 (29%)	748 (49%)	260 (17%)	2.79 (.77)
<i>NCLB</i> has changed the nature of academic motivation for students and has placed more stress on students.	68 (5%)	338 (22%)	579 (38%)	530 (35%)	3.04 (.87)
<i>NCLB</i> has changed the nature of instructional motivation for teachers and has placed more stress on teachers.	12 (1%)	98 (7%)	599 (40%)	805 (53%)	3.45 (.65)
The importance placed on Ohio's achievement tests and the Ohio Graduation Test (OGT) has lead to instruction that violates the standards of good educational practice.	36(2%)	380 (25%)	613 (40%)	488 (32%)	3.02 (.82)
I feel more pressure and stress as a result of the increased testing mandates in Ohio and	26 (2%)	166 (11%)	629 (42%)	696 (46%)	3.32 (.73)

the related need to improve student performance.					
My students feel more stress as a result of the increased testing mandates in Ohio.	16 (1%)	201 (13%)	642 (42%)	655 (43%)	3.28 (.73)
NCLB has forced me to change the ways in which I assess my students' academic performance.	21 (1%)	356 (24%)	806 (53%)	325 (22%)	2.95 (.71)
As a result of NCLB, I create a greater number of my classroom tests such that they mirror the same format and types of questions on the state's achievements tests and/or the OGT.	37 (3%)	284 (19%)	743 (49%)	439 (29%)	3.05 (.76)
I use multiple-choice classroom tests more frequently than I have in the past.	139 (9%)	837 (56%)	398 (27%)	119 (8%)	2.33 (.75)
I have substantially DECREASED the amount of time spent on instruction of content NOT tested on the state-mandated tests.	49 (3%)	345 (23%)	635 (42%)	476 (32%)	3.02 (.82)
I have NOT let NCLB or the state-mandated testing program in Ohio influence what or how I provide instruction to my students.	424 (28%)	842 (56%)	213 (14%)	33 (2%)	1.90 (.71)
I have substantially INCREASED the amount of time spent on instruction of content that I know is covered on the state-mandated tests.	28 (2%)	240 (16%)	742 (49%)	491 (33%)	3.13 (.74)
I have NOT let NCLB affect how I assess the academic achievement and progress of my students.	283 (19%)	849 (57%)	322 (22%)	42 (3%)	2.08 (.71)
I spend much more time throughout the year preparing my students for the state-mandated tests.	28 (2%)	272 (18%)	721 (48%)	472 (32%)	3.10 (.75)
As a result of NCLB, I now spend more time teaching	28 (2%)	291 (20%)	817 (55%)	358 (24%)	3.01 (.71)

test-taking skills to my students.					
I have used sample test items from the state tests, approved by the Ohio Department of Education, to help prepare my students to take the tests.	49 (3%)	268 (18%)	699 (47%)	477 (32%)	3.07 (.79)
As a result of <i>NCLB</i> , I use standardized test data to help guide and improve my instruction.	46 (3%)	394 (26%)	835 (56%)	219 (15%)	2.82 (.71)
In my school, I believe that most teachers are carrying on their work much as they did before <i>NCLB</i> .	311 (21%)	831 (55%)	315 (21%)	46 (3%)	2.06 (.73)
In my school, I believe that <i>NCLB</i> has forced teachers to divert their attention away from more important issues that can better improve teaching and learning.	38 (3%)	375 (25%)	674 (45%)	418 (28%)	2.98 (.79)
I do not care to know any more about <i>NCLB</i> and its effect on my work as a classroom teacher than I do right now.	148 (10%)	704 (47%)	495 (33%)	153 (10%)	2.44 (.81)
I believe that the overall effect of <i>NCLB</i> on my school has been positive.	331 (22%)	698 (47%)	436 (29%)	34 (2%)	2.12 (.77)

The majority of the survey items dealt with the impact of *NCLB* on classroom practice. Some of the more prominent individual item results were found with statements that addressed increased amounts of pressure and stress that are being caused by *NCLB*. An overwhelming majority ($n = 1,404, 93\%$) of teachers indicated that *NCLB* has changed the nature of instructional motivation for teachers and has placed more stress on teachers, although a slightly smaller number of teachers ($n = 1,325, 88\%$) believed that they *personally* were feeling more pressure and stress. A smaller, but meaningful, number ($n = 1,109, 73\%$) of teachers believed

that *NCLB*, in general, has changed the nature of academic motivation for and has placed more stress on students; however, more teachers ($n = 1,297$, 85%) felt that *their* students were feeling additional stress, as compared to students in general. Two-thirds ($n = 1,008$, 66%) of teachers agreed that *NCLB* has forced them to change the focus of their classroom instruction. An even greater amount ($n = 1,101$, 72%) indicated that the law and its required testing mandates have lead to instruction that violates standards of good educational practice.

According to these teachers, *NCLB* has had a major impact on their instruction of content. The vast majority ($n = 1,266$, 84%) of teachers agreed that *NCLB* had influenced what or how instruction is provided to students. Additionally, 74% ($n = 1,111$) indicated that they have substantially decreased the amount of time spent on content that they knew was *not* tested on the state-mandated tests. Similarly, 82% ($n = 1,233$) responded that they had substantially increased the amount of time spent on content that they knew would appear on the state tests.

Finally, with respect to the assessment of student learning, teachers clearly indicated several prominent impacts of *NCLB*. Three-fourths ($n = 1,131$, 75%) of teachers indicated that *NCLB* had forced them to change the ways in which they assess their students' academic performance. A substantial majority ($n = 1,193$, 80%) indicated that they spent much more time throughout the school year preparing students for the state-mandated tests. Many teachers engaged in this type of preparation by teaching test-taking skills ($n = 1,175$, 79%), by using sample items from previous versions of the state tests to help prepare students to take the tests ($n = 1,176$, 79%), and by creating a greater number of classroom tests so that they mirror the format and item types which appear on the state's tests ($n = 1,182$, 78%). Interestingly, 65% ($n = 976$) disagreed with the statement that they use multiple-choice classroom tests more frequently than in the past.

Factor Analysis Results

In an effort to reduce the number of items into more meaningful clusters of items for purposes of group comparisons, the data were subjected to an exploratory factor analysis. Principal components extraction with varimax rotation was used in order to reduce the number of items to a smaller set of uncorrelated variables for use in analysis of variance procedures. Using the criterion of eigenvalues equal to 1, the analysis returned four components. However, items composing two of the components were so diverse that naming those components proved quite difficult. Therefore, the researcher requested the extraction of three components, which lent themselves nicely to interpretation. This three-component solution explained 52% of the variability across the items. The loadings for this resultant three-component solution are shown in Table 3. Based on the relationships between items within components, it was feasible to attach conceptual labels to each. Following an interpretation of these loadings, Component 1 was labeled *Student Test Preparation*, Component 2 was labeled *Stressful Motivation*, and Component 3 was labeled *Instructional Changes*.

Table 3

Loadings, Eigenvalues, Percent of Variance Accounted For, and Reliability Coefficients for Resulting Components

Item	Component		
	1	2	3
I spend much more time throughout the year preparing my students for the state-mandated tests.	.79	.23	.13
I have used sample test items from the state tests, approved by the Ohio Department of Education, to help prepare my students to take the tests.	.78	.03	.01
I have substantially INCREASED the amount of time spent on instruction of content that I know is covered on the state-mandated tests.	.77	.13	.14
As a result of <i>NCLB</i> , I create a greater number of my classroom tests such that they mirror the same	.71	.08	.17

format and types of questions on the state's achievements tests and/or the OGT.			
As a result of <i>NCLB</i> , I now spend more time teaching test-taking skills to my students.	.70	.24	.12
I have substantially DECREASED the amount of time spent on instruction of content NOT tested on the state-mandated tests.	.69	.32	.15
I have NOT let <i>NCLB</i> or the state-mandated testing program in Ohio influence what or how I provide instruction to my students.	-.68	-.01	-.25
I have NOT let <i>NCLB</i> affect how I assess the academic achievement and progress of my students.	-.66	-.02	-.27
As a result of <i>NCLB</i> , I use standardized test data to help guide and improve my instruction.	.63	-.20	.18
I use multiple-choice classroom tests more frequently than I have in the past.	.40	.24	.01
In my school, I believe that most teachers are carrying on their work much as they did before <i>NCLB</i> .	-.31	-.20	-.29
I believe that the overall effect of <i>NCLB</i> on my school has been positive.	-.11	-.80	.06
In my school, I believe that <i>NCLB</i> has forced teachers to divert their attention away from more important issues that can better improve teaching and learning.	.15	.77	.08
The importance placed on Ohio's achievement tests and the Ohio Graduation Test (OGT) has led to instruction that violates the standards of good educational practice.	.11	.76	.14
My students feel more stress as a result of the increased testing mandates in Ohio.	.32	.57	.29
<i>NCLB</i> has changed the nature of instructional motivation for teachers and has placed more stress on teachers.	.19	.54	.50
I do not care to know any more about <i>NCLB</i> and its effect on my work as a classroom teacher than I do right now.	-.09	.50	-.04
I feel more pressure and stress as a result of the increased testing mandates in Ohio and the related need to improve student performance.	.41	.49	.36
<i>NCLB</i> has forced me to change the focus of my classroom instruction.	.32	.14	.68

NCLB has changed the nature of academic motivation for students and has placed more stress on students.	.17	.45	.60
I believe that I know a lot about the No Child Left Behind (NCLB) Act.	.01	-.19	.58
NCLB has forced me to change the ways in which I assess my students' academic performance.	.46	.21	.52
Eigenvalue	5.57	3.59	2.27
Percent of variance accounted for ^a	25.33	16.31	10.34
Alpha reliability coefficient ^b	.57	.53	.64

^a Total percent of variance accounted for by three components = 51.98

^b Overall alpha reliability = .76

Group Comparisons

The responses (as the three component scores) from teachers were compared across the various demographic data collected (i.e., gender, teaching level, education level, years of teaching experience, district rating, and school rating). These results are summarized in Table 4.

Table 4

Summary of Significant Group Comparison Results

<i>Demographic Factor</i>	<i>Dependent Variable (Component)</i>	<i>F-ratio</i>	<i>p-value</i>	<i>Eta Squared</i>
<i>Gender</i>	<i>Student Test Preparation</i>	5.58	.02	.004
	<i>Instructional Changes</i>	32.14	< .01	.024
<i>School Level</i>	<i>Student Test Preparation</i>	34.40	< .01	.031
	<i>Instructional Changes</i>	53.10	< .01	.042
<i>Years of Teaching Experience</i>	<i>Student Test Preparation</i>	2.80	.01	.013
<i>District Rating</i>	<i>Student Test Preparation</i>	7.03	< .01	.022
<i>School Rating</i>	<i>Student Test Preparation</i>	6.61	< .01	.021

Females scored higher (i.e., they had a higher level of agreement) on each of the three component scores than their male counterparts. However, the differences between females and males were significant only for *Student Test Preparation*, $F(1, 1298) = 5.58, p = .02, \eta^2 = .004$, and for *Instructional Changes*, $F(1, 1298) = 32.14, p < .01, \eta^2 = .024$. The difference for *Stressful Motivation* was not significant, $F(1, 1298) = 1.54, p = .216, \eta^2 = .001$. These results indicate that female teachers are doing more to prepare students to take the state-mandated tests and that they are making more NCLB-induced instructional changes than are male teachers. However, it is important to note that the discrepancy in sample sizes between females ($n = 1,186$) and males ($n = 319$) certainly could have impacted these statistical results.

A similar pattern of differences was apparent for the comparisons between elementary and secondary teachers in the sample. Elementary teachers scored higher on all three components than did secondary teachers. However, only two of these differences were significant. The difference for *Student Test Preparation* was significant, $F(1, 1198) = 34.40, p < .01, \eta^2 = .031$, as was the difference for *Instructional Changes*, $F(1, 1198) = 53.10, p < .01, \eta^2 = .042$. The difference for *Stressful Motivation* was not significant, $F(1, 1198) = .57, p = .45, \eta^2 = .000$. These results indicate that elementary teachers are doing more to prepare students to take the state tests and that they are making more instructional changes than are secondary teachers. Although none of the education level comparisons were significant, teachers with masters degrees scored higher than both those with bachelors or doctoral/specialist degrees on *Student Test Preparation*, $F(2, 1313) = 1.11, p = .33, \eta^2 = .002$. Those teachers with bachelors degrees scored higher than the other two groups on *Stressful Motivation*, $F(2, 1313) = 3.03, p = .05, \eta^2 =$

.005. Finally, those with doctoral/specialist degrees scored highest on *Instructional Changes*, $F(2, 1313) = .458, p = .63, \eta^2 = .001$.

Those with 6-10 years of teaching experience scored highest on *Student Test Preparation*, where there was a significant difference, $F(6, 1309) = 2.80, p = .01, \eta^2 = .013$. Scheffé *post hoc* tests revealed the only significant difference to be between those with 6-10 years of experience and those with more than 30 years of experience. There were no significant differences based on years of teaching experience for *Stressful Motivation*, $F(6, 1309) = .77, p = .59, \eta^2 = .004$, or for *Instructional Changes*, $F(6, 1309) = .74, p = .62, \eta^2 = .003$.

With respect to the current school district rating, a significant difference was found for the *Student Test Preparation* component, $F(4, 1279) = 7.03, p < .01, \eta^2 = .022$. Teachers from districts rated as "Academic Emergency" scored significantly higher (indicating that they were engaged in more of these practices) than those rated "Excellent" or "Effective." Additionally, "Academic Emergency" and "Academic Watch" were both significantly different from those rated "Continuous Improvement." Although there were no significant differences for *Stressful Motivation*, $F(4, 1279) = .70, p = .59, \eta^2 = .002$, those from "Academic Watch" districts scored highest. Similarly, there were no significant differences for *Instructional Changes*, $F(4, 1279) = 1.18, p = .32, \eta^2 = .004$, those from "Effective" and from "Academic Watch" districts scored highest.

Finally, with regard to the current school building rating, a similar pattern of results was found. There was again a significant difference for *Student Test Preparation*, $F(4, 1241) = 6.61, p < .01, \eta^2 = .021$, with teachers from "Academic Emergency" and "Academic Watch" schools scoring significantly higher than those from "Excellent" and "Effective" schools. Again, although there were no significant differences for *Stressful Motivation*, $F(4, 1241) = 1.55, p = .19, \eta^2 =$

.005, those from "Academic Emergency" schools scored highest. Similarly, there were no significant differences for *Instructional Changes*, $F(4, 1241) = 1.96, p = .10, \eta^2 = .006$, those from "Academic Emergency" schools scored highest.

Discussion

The results of this study support those of the limited studies previously conducted on the topic of the impact of *NCLB* on teachers' classroom practices. Consistent with recent studies (Abrams et al., 2003; McMillan et al., 1999; NSDC, 2004; Sunderman et al., 2004), this study found that teachers do not have favorable perceptions of *NCLB*. Specifically, teachers believe that *NCLB* is having negative impacts on both instructional and curricular practices of teachers. The vast majority of teachers in the large sample employed in this study also reported that they have substantially reduced the amount of time spent teaching content that they know is *not* tested on the state-mandated tests and substantially increased time spent on tested content. Previously, 60% of teachers surveyed indicated that *NCLB* was having a negative impact on their work settings (NSDC, 2004); in the present study, 69% of teachers believed that its impact on their work, as well as on their school setting, was negative. Teachers in this study also reported experiencing much greater levels of pressure and stress related to the need to improve student performance as a result of *NCLB* and its associated testing mandates. This stress has also "trickled down" to the students of these teachers. This study has provided empirical evidence of assertions made by Abrams et al. (2003) and Stecher (2002).

Specifically, with respect to classroom assessment practices, the results of this study have strongly supported previous research (Abrams et al., 2003; McMillan et al., 1999). A substantial majority of teachers in this study reported that they had changed the ways in which they assess students, spent more time teaching test-taking skills, used sample items from previous tests, and

created a greater number of classroom tests that paralleled the format of state tests. The lone finding from this study that seems to contradict previous research (e.g., McMillan et al., 1999) is that well over half of the teachers reported that they did not use multiple-choice classroom tests more frequently than in the past.

This study found that teachers have experienced a substantial increase in stress and pressure as a result of its testing mandates, as well as the push to improve student performance on those tests. Teachers in this study have reported altering numerous aspects of their instruction, including content coverage and methods of assessing student performance. Teachers believe that these types of changes have forced them to take time away from more important aspects of the teaching–learning process. These results seem to support an assertion made by Abrams et al. (2003) that these state tests are the more powerful influence on teaching practices, as opposed to the content standards themselves.

While it is important to remember that the ultimate purpose of any test is to improve teaching and learning (Kober, 2002), this study strongly supports previous research (e.g., Abrams et al., 2003) that *NCLB*, with its emphasis on and pressure to improve student performance as measured by standardized assessments, has quite possibly led to an increased level of teacher-led student test preparation in our schools. While this appears to be an ethical and admirable effort on the part of teachers, Abrams et al. (2003) are quick to point out that these "highly consequential tests encourage teachers to employ test preparation strategies that may result in improved test scores...but may not represent an actual improvement in achievement" (p. 25).

The group comparisons from this study revealed some interesting findings. The fact that there were no significant differences between any subgroups on the *Stressful Motivation*

component suggests that all teachers—regardless of gender, school setting, education level, years of teaching experience, or effectiveness ratings—are feeling the stress of this increased accountability and the need to improve student performance. Although the effect sizes were not large, the two largest group differences were obtained for comparisons between elementary and secondary teachers on the *Student Test Preparation* and *Instructional Changes* components. Elementary teachers indicated significantly more time spent on test preparation and that they had made more instructional changes than secondary teachers. This is not surprising when one takes into consideration the nature of state-mandated testing in Ohio. There is substantially more testing that occurs during the elementary years of school. In addition to diagnostic testing in grades 1 and 2, students in elementary grades are required to take achievement tests in the following grade levels and subjects:

- Grade 3—mathematics and reading
- Grade 4—mathematics, reading, and writing
- Grade 5—mathematics and reading (science and social studies will be added in 2006-2007)
- Grade 6—mathematics and reading (ODE, 2005).

At the secondary level, students are tested in mathematics and reading in grades 7 and 8. Additionally, students begin taking the Ohio Graduation Test (OGT) in grade 10. Arguably, there is more pressure at the elementary level for students to demonstrate academic achievement on these tests since they are being tested every year in grades 1 through 6. However, at the secondary level, students are tested only three times between grades 7 and 12. Elementary teachers in Ohio may feel it necessary to spend more time

preparing students to take the state tests and may engage more frequently in making changes to their instruction.

Similarly, more pressure to demonstrate improvements in student achievement may be felt by those districts or individual schools that are currently rated low (i.e., "Academic Watch" and "Academic Emergency") on the state's effectiveness scale. These districts and schools are on a much shorter timeline, so to speak, to show improvements and to demonstrate adequate yearly progress than those that are rated as being more effective. Teachers, as well as administrators, in these districts and buildings undoubtedly feel that they must do more, and do it sooner rather than later, to improve student performance. However, this fact raises an interesting set of questions. In light of greater pressure to perform, are these teachers preparing students for these tests by using only those practices that are generally agreed-upon as being acceptable by the greater measurement community? If not, they may be engaging in practices that are truly, and only, artificially inflating test scores (Urduan & Paris, 1994). Examples of these unacceptable test preparation practices include:

- acquiring actual test questions from a current test form and teaching students the answers;
- giving students actual test questions for drill, review, or homework; and
- copying, distributing, or keeping past versions of a test that have not been officially released as practice exams (Kober, 2002).

A second question relates to teachers' knowledge of these practices. If teachers are using any of these practices, are they aware of their ethical "violations?" We might assume and take for granted that teachers would know what is and is not appropriate practice in this arena. For example, however, it is possible that a given teacher may not be aware that the state may reuse some of the same test questions, or the same entire test version, from year to year (Kober, 2002).

A final question of interest is that if these teachers are engaged in unethical test preparation practices, have they taken this initiative on their own, or are they feeling increased pressure to do so from district or school-level administrators? Again, it is possible that this is happening without realizing that certain practices are considered unacceptable.

It is important to note a couple of limitations of the results of this study. Although the findings are limited by geographic location (all teachers currently work in school districts in Ohio, a state which includes a series of state-mandated achievement tests), external validity of the findings of this study is suggested through the large and broad nature of the sample. The study sought to describe teachers' beliefs with respect to specific classroom-based instructional and assessment practices. Of course, the findings are based purely on self-reported data, and no efforts were made within the scope of this study to validate the extent to which these beliefs are consistent with actual classroom practice. Worthy of reiteration is the fact that this was a study of teachers' *perceptions* of the impact of *NCLB*, and not one of scientifically studying the extent to which *actual* classroom practices have changed as a direct result of *NCLB*.

In light of the findings from this study of teacher perceptions, it is imperative for various groups to be aware of any unintended effects of *NCLB*. For example, policymakers need to be aware of how the law is affecting teachers. The increased pressure that has been placed on teachers to raise levels of student academic achievement has made their daily work much more stressful. Furthermore, teachers have been forced to change the ways that they provide instruction to students and assess their resultant academic performance. They have substantially altered the amount of time spent on specific content, which sometimes conflicts with their respective academic content standards and violates sound educational practice. Additionally, teachers have resorted to spending much more time teaching students how to take standardized

achievement tests, perhaps turning to unethical practices in order to achieve higher test scores. Similarly, administrators need to be mindful of these issues as well. They should be aware of these unintended consequences of *NCLB* and should look for ways to address increased stress levels, perhaps through professional development activities. They should definitely be cognizant of the potential for their teachers to utilize unethical test preparation practices. Closely examining how teachers are instructing students in the skills of test-taking may be a critical first step.

In light of the earlier discussion of unacceptable test preparation practices, it is recommended that teachers gain a better understanding of not only these *unacceptable* practices, but also activities whose practice would be more acceptable. Some students do not perform to the best of their abilities because they lack skills in test taking (Hogan, 2007; Linn & Miller, 2005). Specifically, students can be taught “testwiseness” skills (i.e., test-taking strategies) in order to prevent this type of inadequacy from lowering their test scores. These skills can be mastered by most students, but they need practice in order to develop them (Linn & Miller, 2005).

Testwiseness skills that students should be taught, and given the opportunity to practice, include:

- listening to and/or reading test directions carefully (including following proper procedures for marking responses on the answer sheet);
- listening to and/or reading test items carefully;
- establishing a pace that will permit completion of the test or subtest;
- skipping difficult items (instead of wasting valuable testing time) and returning to them later;
- making informed guesses, as opposed to just omitting items that appear too difficult;

- eliminating possible options (in the case of multiple-choice items), by identifying options that are clearly incorrect based on knowledge of content, prior to making informed guesses;
- checking to be sure that an answer number matches the item number when marking an answer; and
- checking answers, as well as the accuracy of marking those answers, if time permits (Linn & Miller, 2005).

The importance of engaging in these types of practices with students in advance of the administration of standardized tests is not only that they are seen as acceptable and ethical, but that they likely will result in test scores that demonstrate real student learning (Mertler, 2007).

Since there were so many group differences on the *Student Test Preparation* component, it is imperative that we shed light on the phenomenon. In order to understand this potential "problem" more completely, it is recommended that researchers look more closely at how teachers engage in student test preparation, focusing perhaps on particular test preparation strategies used by teachers. We need to better understand what specific techniques are used, why those techniques are used (i.e., what teachers are hoping to accomplish by using them), and the nature of their overall effectiveness. If they fail to improve actual student learning, their use should be strongly discouraged.

References

- Abrams, L. M., Pedulla, J. J., & Madaus, G. F. (2003). Views from the classroom: Teachers' opinions of statewide testing programs. *Theory Into Practice, 42*(1), 18-29
- American Psychological Association. (2001). *Publication Manual of the American Psychological Association* (5th ed.). Washington, DC: Author
- Amrein, A. L. & Berliner, D. C. (2002, March 28). High-stakes testing, uncertainty, and student learning *Education Policy Analysis Archives, 10*(18). Retrieved February 19, 2010 from <http://epaa.asu.edu/epaa/v10n18/>.
- Cronin, J., Kingsbury, G. G., McCall, M. S., & Bowe, B. (2005, April). *The impact of the No Child Left Behind Act on student achievement and growth: 2005 edition*. Retrieved February 14, 2006, from the Northwest Evaluation Association Web site: <http://www.nwea.org/research/NCLBstudy.asp>
- Gulek, C. (2003). Preparing for high-stakes testing. *Theory Into Practice, 42*(1), 42-50.
- Herman, J. L., & Golan, S. (n.d.). *Effects of standardized testing on teachers and learning: Another look*. (CSE Technical Report 334). Los Angeles, CA: University of California, National Center for Research on Evaluation, Standards, and Student Testing.
- Hogan, T. P. (2007). *Educational assessment: A practical approach*. Hoboken, NJ: John Wiley & Sons.
- Kober, N. (2002). *Teaching to the test: The good, the bad, and who's responsible* (TestTalk for Leaders, Issue No. 1). Washington, D.C.: Center on Education Policy.
- Linn, R. L., & Miller, M. D. (2005). *Measurement and assessment in teaching* (9th ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.
- McMillan, J. H., Myran, S., & Workman, D. (1999). *The impact of mandated statewide testing on teachers' classroom assessment and instructional practices*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.
- Mehrens, W. A. (1991, April). *Defensible/indefensible instructional preparation for high stakes achievement tests: An exploratory dialogue*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
- Mertler, C. A. (2007). *Interpreting standardized test scores: Strategies for data-driven instructional decision making*. Thousand Oaks, CA: Sage.

- Miyasaka, J. R. (2000, April). *A framework for evaluating the validity of test preparation practices*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- National Staff Development Council. (2004). *NCLB: Survey finds many educators experience little positive NCLB impact on professional development*. Retrieved May 20, 2005, from http://www.nsd.org/library/policy/NCLBSurvey2_04.cfm
- Ohio Department of Education. (2004). *2004-05 Ohio school district rating definitions*. Retrieved July 15, 2005, from <http://www.ode.state.oh.us/reportcard/definitions/rating.asp>
- Ohio Department of Education. (2005). *Implementation schedule of Ohio statewide assessments*. Retrieved March 2, 2006, from http://www.ode.state.oh.us/proficiency/PDF/IMPLEMENTATION_SCHEDULE_OHIO_STATEWIDE_ASSESSMENTS083005.pdf
- Sloane, F. C., & Kelly, A. E. (2003). Issues in high-stakes testing programs. *Theory Into Practice*, 42(1), 12-17.
- Stecher, B. (2002). Consequences of large-scale, high-stakes testing on school and classroom practice. In L. S. Hamilton, B. M. Stecher, & S. P. Klein (Eds.), *Making sense of test-based accountability in education*. (pp. 79-100). Santa Monica, CA: RAND.
- Sunderman, G. L., Tracey, C. A., Kim, J., & Orfield, G. (2004). *Listening to teachers: Classroom realities and No Child Left Behind*. Cambridge, MA: The Civil Rights Project at Harvard University.
- Urduan, T. C., & Paris, S. G. (1994). Teachers' perceptions of standardized achievement tests. *Educational Policy*, 8(2), 137-156.
- U.S. Department of Education. (2004). *A guide to education and "No Child Left Behind."* Retrieved September 10, 2005, from <http://www.ed.gov/NCLB/overview/intro/guide/guide.pdf>



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