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Validation of the Principal's High Stakes Testing Survey

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Validation of the Principal's High Stakes Testing Survey

Abstract

The purpose of this study was to examine the soundness of the psychometric characteristics of the *Principal's High Stakes Testing Survey*. The 48-item instrument is comprised of six hypothesized subscales (i.e., curriculum, teaching, work satisfaction, stress, accountability, and students) measured with a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An expert panel reviewed the instrument plus an exploratory factor analysis and confirmatory factor analyses were conducted. Expert panel members suggested only a few minor modifications to improve the instrument. The confirmatory factor analyses yielded data to support the fit of the model and the factorial invariance of the model by gender and race or ethnicity.

Keywords

Principal's high stakes testing survey, Psychometric characteristics, Curriculum, Teaching, Work satisfaction, Stress, Accountability, Students

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Abstract: The purpose of this study was to examine the soundness of the psychometric characteristics of the *Principal's High Stakes Testing Survey*. The 48-item instrument is comprised of six hypothesized subscales (i.e., curriculum, teaching, work satisfaction, stress, accountability, and students) measured with a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An expert panel reviewed the instrument plus an exploratory factor analysis and confirmatory factor analyses were conducted. Expert panel members suggested only a few minor modifications to improve the instrument. The confirmatory factor analyses yielded data to support the fit of the model and the factorial invariance of the model by gender and race or ethnicity.

Validation of the Principal's High Stakes Testing Survey

The motivation for educational reform was due to the displeasure with the outcomes of education (i.e., student achievement). Haycock (2005) asserted that American students are leaving schools without the skills necessary to fully participate in and be able to contribute to society. In addition, Darling-Hammond (2006) stated that students would need even greater knowledge and skills in the future to survive and succeed in society. As part of the educational reform movement, high stakes testing is being used to measure and report student achievement. Scherer (2005) reported that parents, policy makers, and educators view the results of high stakes testing as proof of student learning.

Afflerbach (2005) identified three reasons for high stakes testing's popularity. First, there are a large number of people that think high stakes testing is fair. Second, high stakes testing is scientific due to the tests undergoing examination for validity and reliability. Third, high stakes testing is commonplace. Baines and Stanley (2004) stated that one of the most obvious benefits

of high stakes testing is the ability to provide a numerical score that can be indexed to an alphabet that represents quality and achievement.

A distinctive feature of high stakes testing is the threat of consequences for poor test performance. Arnold (2006) indicated that educators (i.e., principals and teachers) are under increasing pressure to perform along with their students. Potential consequences for an individual student may include student retention or a student not graduating from school. Potential consequences of poor student performance for teachers and principals may include a transfer to another school or replacement along with an associated decrease in financial compensation. Consequences to schools receiving low test scores include negative labeling that may impact community support and in some instances an outside agency coming in and taking over that school.

Principal's High Stakes Testing Survey Development: A Brief History

Hope, Brockmeier, Lutfi, and Sermon (2007) indicated that for principals the change process brought on by high stakes testing may be reflected in their instructional leadership, philosophical orientation to teaching and learning, and deep seated beliefs about the way instruction unfolds. Principals are facilitators that manage the change process too. In this role principals must engage in behaviors that influence teachers to accept change and to adopt new instructional methods. Hope et al. asked three questions in their study; (a) What influence does high stakes testing have on principals' pedagogical and philosophical beliefs about teaching and learning?, (b) Have principals' beliefs been altered because of high stakes testing?, and (c) Are there emerging trends in principals' behavior as a result of high stakes testing?

Hope et al. (2007) developed the *Principal's High Stakes Testing Survey* to obtain information from principals about the influence of high stakes testing on their beliefs in six domains. The 48-item instrument was comprised of six hypothesized subscales (i.e., curriculum, teaching, work satisfaction, stress, accountability, and students) measured with a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items comprising the survey were developed based upon a review of the literature, which presented positive and negative attributes of high stakes testing (see appendix A). Cronbach's alpha reliability for the 48-item instrument was .92; the subscale Cronbach's alpha coefficients were .70 for curriculum, .85 for teaching, .73 for work satisfaction, .81 for stress, .84 for accountability, and .63 for students.

Purpose of the Study

The purpose of this study was to investigate the soundness of the psychometric characteristics of the *Principal's High Stakes Testing Survey*. While Hope et al. (2007) carefully constructed this instrument, the authors presented little evidence of validity in their original work. A more in-depth analysis of the instrument's validity was warranted due to the intention of utilizing this instrument in a new investigation. First, each item was examined to determine whether the item was technically well-written. Second, the instrument was examined to determine whether any items should be added, modified, or deleted in order to improve the instrument. Hope et al. (2007) indicated that one subscale had a Cronbach's reliability coefficient of .63, which was marginally acceptable for the purposes of their study. Third, the instrument was analyzed to determine whether the items fit the hypothesized six-factor model and measurement invariance of the model.

Methodology

The methodology section is divided into two subsections. First, the population, sample, and sampling procedure will be presented. Second, data collection and data analyses will be discussed.

Population, Sample, and Sampling Procedure

Hope et al. (2007) reported that elementary, middle, and high school principals in the state of Florida constituted the population for their investigation. Hope et al. sent a cover letter and survey to all 67 school district superintendents in the five geographical reporting regions of the state asking for permission to administer the survey to a random sample of principals in their district. Superintendents or school district Institutional Review Boards in 22 school districts responded to the request and 20 school districts granted permission to send the *Principal's High Stakes Testing Survey* to their principals.

Hope et al. (2007) reported that a random sample of 375 principals from these 20 school districts was selected and mailed a cover letter and the *Principal's High Stakes Testing Survey*. Survey instruments were coded only to maintain a record of respondents for subsequent follow-up mailings. Of the 375 mailed surveys, 146 of 155 returned surveys were complete and usable for analysis. The response rate for the investigation was 41% after a follow-up survey was mailed to nonrespondents.

Hope et al. (2007) reported the number and percentage of principals responding to the *Principal's High Stakes Testing Survey* by gender, educational level, race or ethnicity, and school type. Approximately 61% of the respondents were female and 39% of the respondents were male. African Americans comprised almost 18% of the respondents, while 74% of the respondents were White and 7% of respondents were Hispanic. Approximately 75% of principals reported having a master's degree, 13% of principals reported having an Educational Specialist degree, and 11% of principals reported having a doctorate. Almost 56% of principals reported working in an elementary school.

Data Collection and Data Analyses

Using data collected in the Hope et al. (2007) study, a number of additional statistical analyses were conducted to further validate the results of the Hope et al. study and to validate the instrument itself. First, to examine the external validity (i.e., population validity), a chi square analysis was used to determine if the participating school districts in the five geographical regions adequately represented the five geographical regions of the state. Other chi square analyses examined the representativeness of the participants by gender and race or ethnicity. Second, additional statistical analyses were conducted to provide information about the structure of the *Principal's High Stakes Testing Survey*. Muthén (2004), in his lecture series on *Statistical Analysis with Latent Variables*, suggested conducting an exploratory factor analysis, confirmatory factor analysis, and an examination of the measurement invariance during instrument development. Measurement invariance of the instrument by gender and race or ethnicity was examined. SAS and Mplus were utilized to conduct these analyses.

Finally, an Expert Panel Review Form was designed to collect information from the five experts on the review panel. The expert panel included four current principals and a college faculty member of the Educational Leadership program. The panel reviewed the *Principal's High Stakes Testing Survey* for clarity of directions, adequacy of items to meet the intended purpose, item clarity, and grammatical correctness. Panel members were asked to identify additional items that might improve the instrument.

Results

This results section consists of four subsections. First, the results of the chi square analyses used to establish external validity will be presented. Second, instrument validation by the expert panel will be reported. Third, the results of the exploratory factor analyses will be presented. Fourth, the results of the confirmatory factor analyses of the instrument will be reported that includes results about the measurement invariance across subpopulations.

External Validity

Concern about the external validity (i.e., population validity) of the Hope et al. (2007) study arose due to the difference between the target population (67 school districts) and the accessible population (20 school districts). In addition, there was concern of gender representativeness and race or ethnic representativeness when compared to the target population (i.e., the entire state). To respond to these concerns, chi-square analyses were conducted. First, a nonsignificant chi-square, $\chi^2(4, N = 67) = .515, p = .972$, indicated that the 20 school districts adequately represented Florida's five geographical reporting regions. Second, a nonsignificant chi-square, $\chi^2(1, N = 7,467) = .0179, p = .672$, revealed that the proportion of female and male respondents did not differ from the overall principal population. Finally, a nonsignificant chi-square, $\chi^2(2, N = 7,425) = 2.029, p = .363$, revealed that the proportion of Caucasian, African American, and Hispanic respondents did not differ from the overall principal population.

Instrument Validation

An Expert Panel Review Form was designed to collect information from the five experts on the review panel. The expert panel included four current principals and a college faculty member of the Educational Leadership program. The panel reviewed the *Principal's High Stakes Testing Survey* for clarity of directions, adequacy of items to meet the intended purpose, item clarity, and grammatical correctness. In addition, panel members were asked to identify additional items that might improve the instrument.

Feedback from the expert panel was extremely positive. All expert panel members agreed that the survey directions were clear and the items matched the stated purpose. The expert panel identified only three items that potentially required modification. One expert panel member suggested for item 32, "Principals pressure to improve high stakes test scores increase teacher stress," that we add an "s" to increase in the statement. Another panel member questioned the point of item 40, "High stakes testing creates a cooperative environment between the principal and community." After deliberation, it was decided to retain this item in the survey. The final item that received a comment from the expert panel was item 48. One panel member suggested that we add "the nature of" after the word "changed" in the item. The item 48 will now appear as "High stakes testing has changed the nature of student-principal interactions." The expert panel did not have any other comments about items in the *Principal's High Stakes Testing Survey*.

In review, the expert panel provided very positive feedback about the directions and items comprising the *Principal's High Stakes Testing Survey*. Panel members made a few substantive suggestions to improve the instrument. In addition, the expert panel was asked to identify additional items that would improve subscale coverage. However, the panel did not identify any items to include on the instrument.

Exploratory Factor Analyses

Before the exploratory factor analysis was begun, a bootstrap sample of 5,000 surveys was drawn randomly with replacement from the 146 principal's completed surveys. This was done to ensure a sufficient sample size for the exploratory factor analysis and sufficient data for cross validation purposes. SAS and Mplus were used in conducting the exploratory factor analyses. Initially, an exploratory factor analysis was run allowing the *Principal's High Stakes Testing Survey* items to load on an unspecified number of factors. Kaiser's criterion, Cattell's scree test, and residuals were examined for each of the factor models (Stevens, 2002) to select the most appropriate parsimonious factor model. All three criteria indicated that more than five factors were present. Kaiser's criterion of 1 indicated that there were up to 12 factors present, while Cattell's scree test indicated that at least five factors fit the model. An examination of the residuals indicated a decrease in the root mean square residual from .06 to .04 as one went from 5 to 9 factors. After examining the individual item residuals and taking into account the other two criteria, a six-factor model rather than a model with more factors would be selected for the confirmatory factor analysis. However, as the process continued the six-factor structures generated became much too convoluted to interpret and were subsequently dismissed due to interpretation problems. The original six-factor structure due to its simplicity and understanding was employed. Item scores within each factor were totaled for use in the subsequent confirmatory factor analyses.

Confirmatory Factor Analyses

Employing the information gained in the exploratory factor analysis as a guide, a confirmatory factor analysis was generated on the original data set. This was the initial baseline model used in other analyses. None of the fit indices of this baseline model met the suggested minimal values for fit. The chi-square statistic, comparative fit index (CFI), Tucker and Lewis fit index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) did not meet the minimal value fit indices for assessing model fit (see Table 1). However, a final baseline model was generated that allowed correlations among the factors. The chi-square statistic, comparative fit index (CFI), Tucker and Lewis fit index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) all met the minimal value fit indices for assessing model fit.

Table 1

Fit Indices by Confirmatory Factor Analysis for the Principal's High Stakes Testing Survey

	Chi-Square	Degrees of Freedom	p - Value	CFI	TLI	RMSEA	SRMR
Initial Baseline Model – no correlation among factors	100.716	9	.0000	.764	.606	.266	.139
Final Baseline Model - correlation among factors	4.607	5	.4656	1.000	1.003	.000	.019
Factorial Invariance for Gender	22.715	18	.2018	.989	.981	.061	.089
Factorial Invariance for Race or Ethnicity (White & Black)	12.996	10	.2239	.992	.984	.046	.035
Factorial Invariance for Race or Ethnicity (White & Hispanic)	15.426	14	.3497	.996	.991	.042	.101

Once the final baseline model was identified, then separate multiple group analyses were conducted; one multiple group analysis by gender and another multiple group analysis by race or ethnicity. Mplus by default constrains intercepts and factor loadings to be equal across groups, allows residual variances to be free, and factor means are held at zero in one group and free in the other groups. Muthén and Muthén (2006) stated that these default values are sufficient to establish measurement invariance. In these analyses male and White were the reference groups, while female, Black, and Hispanic were the focal groups.

In the multiple group analysis by gender, the fit indices met the minimal value fit indices for assessing model fit. Table 1 presents the results of this analysis and one might conclude from these data that by gender the *Principal's High Stakes Testing Survey* is measurement invariant in respect to gender. In the second multiple group analysis, the measurement invariance of the *Principal's High Stakes Testing Survey* was examined by race or ethnicity. In this first analysis only White and Black were considered. Like the multiple group analysis for gender and the final baseline model, the fit indices all met the minimal criteria for adequate fit. The RMSEA fit

indice was somewhat higher than the baseline model (.046 vs. .000), but still met established acceptable criteria. From these data it was concluded that by race or ethnicity (White and Black) the *Principal's High Stakes Testing Survey* is measurement invariant. In the second analysis only White and Hispanic were considered. The fit indices all met the minimal criteria for adequate fit for the White and Hispanic multiple group analysis. It was concluded from these data that by race or ethnicity (White and Hispanic) the *Principal's High Stakes Testing Survey* is measurement invariant.

Conclusion

Although not originally a purpose of the study, while examining the population and sample of the Hope et al. (2007) study, a concern arose about external validity (i.e., population validity). The results of the chi square analysis indicated that the districts employed were representative of the districts across the five Florida reporting regions. In addition, the number of principals responding to the survey by gender and race or ethnicity was representative of the overall principal population.

The primary purpose of this study was to investigate the soundness of the psychometric characteristics of the *Principal's High Stakes Testing Survey* so that the instrument could be used in future studies. First, the expert review panel reviewed the technical quality of the items. The expert panel indicated that the items were constructed well and only offered a few very minor wording modifications to a couple of items. Second, the expert panel examined the instrument to determine whether any items needed to be deleted or added to improve the instrument. No items were recommended for deletion or for addition to the instrument.

Finally, the instrument was analyzed to determine whether the items fit the hypothesized six-factor model and whether the instrument was measurement invariant across subpopulations. Exploratory factor analyses and confirmatory analyses were conducted. The baseline model (i.e., hypothesized six-factor model) with correlated factors fit the model well. The measurement invariance of the model was supported for gender and race or ethnicity (i.e., White and Black and White and Hispanic) by the confirmatory factor analyses. In other words, principals responded similarly to the six-factor hypothesized model regardless of gender and race or ethnicity.

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Appendix A

Principal's High Stakes Testing Survey

High Stakes Testing Survey (Principals)					
Purpose: High stakes testing affects principals. What are the effects of high stakes testing on principals? This research explores high stakes tests' influence on principals' beliefs about (a) curriculum, (b) teaching, (c) teacher satisfaction, (d) stress, (e) accountability, and (e) students.					
Directions: Please darken the numeral in each column that best represents your degree of agreement with each statement.					
On a scale of 1 to 5:					
5 = Strongly agree 4 = Agree 3 = Neither agree nor disagree 2 = Disagree 1 = Strongly Disagree					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. High stakes testing has led principals to reassess their beliefs about subject matter that is important to teach.	(5)	(4)	(3)	(2)	(1)
2. High stakes testing is consistent with the idea of a balanced curriculum (attention to all subjects).	(5)	(4)	(3)	(2)	(1)
3. Students' scores on a high stakes test accurately portray the quality of a school's curriculum.	(5)	(4)	(3)	(2)	(1)
4. High stakes testing requires teachers to teach to the test.	(5)	(4)	(3)	(2)	(1)
5. High stakes test items accurately reflect the content students learn through a school's curriculum.	(5)	(4)	(3)	(2)	(1)
6. High stakes testing promotes certain subject area content over other subject area content.	(5)	(4)	(3)	(2)	(1)
7. Students' scores on high stakes test provide feedback for schools to improve the curriculum.	(5)	(4)	(3)	(2)	(1)
8. High stakes testing has caused principals to devote more attention to the school's curriculum.	(5)	(4)	(3)	(2)	(1)
9. High stakes testing permits teachers to use the full range of their teaching skills.	(5)	(4)	(3)	(2)	(1)
10. High stakes testing leads to better teaching.	(5)	(4)	(3)	(2)	(1)
11. Students' scores on a high stakes test are a valid measure of teaching ability.	(5)	(4)	(3)	(2)	(1)
12. Students' scores on a high stakes test are a valid way to determine the quality of education.	(5)	(4)	(3)	(2)	(1)
13. The quality of teachers' instruction is directly related to student performance on a high stakes test.	(5)	(4)	(3)	(2)	(1)
14. High stakes testing requires preparation that reduces time to teach other subjects' content.	(5)	(4)	(3)	(2)	(1)
15. Students' scores on a high stakes test provide feedback for teachers to improve their teaching.	(5)	(4)	(3)	(2)	(1)
16. High stakes testing reduces the teaching and learning process to a student's test score.	(5)	(4)	(3)	(2)	(1)
17. High stakes testing motivates teachers to improve the teaching and learning process.	(5)	(4)	(3)	(2)	(1)
18. High stakes testing has increased cooperation among teachers.	(5)	(4)	(3)	(2)	(1)
19. Principal morale has increased because of high stakes testing.	(5)	(4)	(3)	(2)	(1)
20. High stakes testing diminishes the desire to be an educator.	(5)	(4)	(3)	(2)	(1)
21. High stakes testing has increased principal and teacher cooperation.	(5)	(4)	(3)	(2)	(1)
22. The use of high stakes testing as a single measure to determine student achievement leads to principals leaving the profession.	(5)	(4)	(3)	(2)	(1)
23. Principals' work satisfaction declines when the focus is on high stakes test outcomes.	(5)	(4)	(3)	(2)	(1)

Continued on next page

High Stakes Testing Survey (Continued)		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
24.	High stakes testing leads to competition among principals.	(5)	(4)	(3)	(2)	(1)
25.	Principal's stress increases when the school receives a failing grade.	(5)	(4)	(3)	(2)	(1)
26.	Principal's stress increases when the school's accountability grade declines.	(5)	(4)	(3)	(2)	(1)
27.	Punitive measures associated with high stakes testing induces stress in principal stress.	(5)	(4)	(3)	(2)	(1)
28.	Principals experience stress in the effort to maintain their school's accountability grade.	(5)	(4)	(3)	(2)	(1)
29.	Principal's stress increases with public advertisement of a school's high stakes test results.	(5)	(4)	(3)	(2)	(1)
30.	The pressure of high stakes testing may result in principals cheating to improve scores.	(5)	(4)	(3)	(2)	(1)
31.	District supervisors' pressure to improve high stakes test scores increases stress in principals.	(5)	(4)	(3)	(2)	(1)
32.	Principals pressure to improve high stakes test scores increases teacher stress.	(5)	(4)	(3)	(2)	(1)
33.	Principals leave the profession because of stress related to high stakes testing.	(5)	(4)	(3)	(2)	(1)
34.	High stakes testing has increased principals' accountability for students' academic performance.	(5)	(4)	(3)	(2)	(1)
35.	High stakes testing has increased principals' awareness of the accountability issue in education.	(5)	(4)	(3)	(2)	(1)
36.	High stakes testing is an effective means of determining the quality of public education.	(5)	(4)	(3)	(2)	(1)
37.	Students' scores on a high stakes test are an indicator of principal effectiveness.	(5)	(4)	(3)	(2)	(1)
38.	High stakes testing is a reform measure that improves the quality of education.	(5)	(4)	(3)	(2)	(1)
39.	Principals are more accountable because of high stakes testing.	(5)	(4)	(3)	(2)	(1)
40.	High stakes testing creates a cooperative environment between the principal and community.	(5)	(4)	(3)	(2)	(1)
41.	Student performance on a high stakes test is directly related to the quality of a principal's instructional leadership.	(5)	(4)	(3)	(2)	(1)
42.	High stakes testing contributes to the number of students that drop out of school.	(5)	(4)	(3)	(2)	(1)
43.	Students' learning styles are accounted for in high stakes testing.	(5)	(4)	(3)	(2)	(1)
44.	High stakes testing induces anxiety in students.	(5)	(4)	(3)	(2)	(1)
45.	High stakes testing motivates students to achieve.	(5)	(4)	(3)	(2)	(1)
46.	The pressure of high stakes testing may result in students cheating to improve scores.	(5)	(4)	(3)	(2)	(1)
47.	Principals are concerned about the impact of high stakes testing on minority students.	(5)	(4)	(3)	(2)	(1)
48.	High stakes testing has changed the nature of student-principal interactions.	(5)	(4)	(3)	(2)	(1)
Demographic Information						
Directions: Please check or darken the appropriate space for the demographic items.						
1. Gender		4. Educational Level				
<input type="checkbox"/> Female <input type="checkbox"/> Male		<input type="checkbox"/> Bachelor's Degree				
		<input type="checkbox"/> Master's Degree				
2. School Location		<input type="checkbox"/> Education Specialist's Degree				
<input type="checkbox"/> Rural <input type="checkbox"/> Suburban <input type="checkbox"/> Urban		<input type="checkbox"/> Doctorate				
3. Type of School		5. Race or Ethnicity				
<input type="checkbox"/> Elementary		<input type="checkbox"/> African American				
<input type="checkbox"/> Middle		<input type="checkbox"/> American Indian/Alaskan Native				
<input type="checkbox"/> High		<input type="checkbox"/> Asian/Pacific Islander				
<input type="checkbox"/> Other		<input type="checkbox"/> Caucasian				
		<input type="checkbox"/> Hispanic				
		<input type="checkbox"/> Other (identify) _____				
		6. Years of Experience as a Principal				
		_____ (Please write the number in the space.)				
Thank you very much for your assistance!						