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**POLITICS, POLICY, AND PRESIDENTIAL DISASTER
DECLARATIONS:
IS THERE A GOOD TIME (OR PLACE) TO HAVE A
DISASTER?**

by

Dean Findley, M. S.¹ and Kenneth Kickham, Ph. D.²

ABSTRACT

Previous research suggests that a president's decision to grant a "disaster declaration" is influenced by politics; that is, by the electoral importance of a state, by partisanship, and by the timing of the disaster in terms of the election cycle. Using a pooled time-series regression approach, including all 50 states and the District of Columbia from 1981 through 2006, we test the hypothesis that these political factors affect presidential decision making when disasters strike. We find that disaster declarations are somewhat easier for governors to obtain during an incumbent president's reelection campaign. This phenomenon also characterizes second-term presidencies. We also find an increased likelihood of disaster declarations since the enactment of the Stafford Act of 1988, which broadened the President's discretion in granting them. As to their respective influences on the decision, the timing of the disaster relative to the election cycle outweighs both partisanship and the electoral importance of a state.

Introduction

Natural disasters present enormous challenges for state and local governments. Extreme cases, like Hurricane Katrina, require coordination among all levels of government, and are likely to

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involve the cooperative efforts of surrounding states. From the perspective of national leaders, the urgency of a natural disaster arises not only from the devastation felt by its victims, but also from national security implications. Thus the legitimacy of a role for the federal government in dealing with large-scale natural disasters is not controversial. What may be questioned, however, is whether a specific disaster warrants federal intervention. The answer arrives in the form of a decision made by the President. Ultimately, this decision results from a process that empowers the President to singularly determine whether federal financial assistance will be provided to augment state and local efforts. As such, this power holds potential as a political tool (Downton & Pielke Jr. 2001; Garrett and Sobel 2003; Reeves 2011; Sylves and Búzás 2007). With the stroke of a pen, the President can unlock the federal disaster relief coffers by granting state and local governments, along with individuals and businesses, access to millions of tax dollars.

The power to send federal financial assistance to disaster-stricken communities originally rested in the hands of Congress (May 1985). This ad hoc process remained the status quo until the passage of the Disaster Relief Act of 1950. This legislation signaled the dawning of a different approach to disaster relief. With its passage, Congress embraced a comprehensive approach to federal disaster assistance and the ongoing availability of funds (Clary 1985). The original purpose of this legislation was to reduce the economic impact of disasters by assisting in the repair of storm-damaged infrastructure, such as roads and bridges (Platt 1999). This well-intended act, however, began an evolutionary process that Clary (1985) labels a “textbook example of incremental decision making” (24). The bill’s authors, in all likelihood, could not have envisioned how this change in policy would evolve into the controversial and potentially political process that exists today. As Platt (1999) argues, presidential disaster declarations, although originally intended to supplement the efforts of state and local jurisdictions that were overwhelmed by a disaster, are now considered to be more pivotal. According to a U. S. Government Accountability Office report in 1995, “the growth in the size and number of federally declared disasters in recent years is unprecedented, putting a tremendous strain on the federal budget” (14).

Over the years, the public has come to expect federal assistance, viewing disaster relief as an entitlement (Downton & Pielke Jr. 2001). This expectation, which is not always met, adds an element of politics to the process. Previous studies have noted the influence of politics on a president's decision to declare a disaster. Specifically, the decision could be influenced by the timing of the event in terms of the election cycle, or by the electoral importance of the requesting state (see Garrett & Sobel 2003; Reeves 2011). In these studies, more emphasis has been placed on the electoral importance of the requesting state. Other research, however, calls into question the significance of this state-based electoral factor (Salkowe & Chakraborty 2009). This study, therefore, re-examines the relative importance of political and non-political factors that influence presidential decisions when states request federal disaster aid. We begin with an overview of disaster relief policy and politics. We then model presidential disaster declarations as a function of four factors—the magnitude of the disaster, the timing of the disaster, the party affiliations of the chief executives involved (i.e., requesting Governor and President), and the electoral importance associated with the requesting state. We also include a dummy variable proxy for an important legislative event, the Stafford Act of 1988, which broadened the President's discretion in granting disaster declarations.

Disaster Relief Policy

Through the Disaster Relief Act of 1950, Congress vested in the President the sole authority to award a disaster declaration. This unique authority allows the President to bypass the normal legislative approval process prior to committing federal resources to assist disaster affected areas. While the President makes the ultimate decision, such action must be initiated by the Governor of the affected state. Although the President can award a disaster declaration without a Governor's Request, the President typically waits for the Governor to officially ask for help.

The validity of a Governor's Request for disaster assistance is based, in theory, on whether or not the disaster has overwhelmed the capabilities of the state and local governments. An essential element of the Governor's Request is a preliminary damage assessment. This quick assessment is used to justify the

Governor's claim that the disaster's impact has indeed overwhelmed state and local resources. Thus, each request for disaster assistance reflects significant disaster impacts that arguably exceed the ability of the state and local governments to handle effectively. However, there is room for disagreement regarding whether any given request is justified. Instances where requests are denied provide evidence of subjectivity and, of course, presidential power. Although this executive power at times has generated controversy, Congress has yet to pass legislation limiting this part of the process (Platt 1999; Downton & Pielke Jr. 2001). Sylves (2007) suggests that this flexibility is necessary so that the President can immediately reassure citizens that their plight has not gone unnoticed, and that help is on the way.

President Eisenhower was the first to grant a Governor's Request for a disaster declaration, sending aid to the state of Georgia following a tornado. In that same year, Congress passed additional legislation that provided limited assistance to individuals and authorized states to distribute federally owned surplus equipment to disaster victims (Clary 1985). The Disaster Relief Act of 1966 expanded disaster assistance eligibility to include rural communities and institutions of higher education. Temporary allowances were enacted in 1969 to include private property debris removal, food coupons, and unemployment compensation for disaster victims. With the passage of the Disaster Relief Act of 1970, these temporary allowances were made permanent, and individual housing assistance was initiated (May 1985). According to Clary (1985), the federal share of the disaster assistance landscape had swelled to about seventy percent by 1970, compared to only one percent in 1953.

Noting the growth in federal expenditures for disaster assistance, Congress attached mitigation requirements to disaster payouts with passage of the Disaster Relief Act of 1974. This legislation required communities to reduce the impact of future disasters through a number of mitigation techniques. Funding for disaster planning, mental health counseling, and repairs to parks and recreation areas was also included in this legislation. The next two decades added important pieces to the federal disaster policy puzzle. Particularly significant was the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, commonly called the Stafford Act. The Stafford Act, which amended the Disaster

Relief Act of 1974, gave the President additional discretion in awarding disaster declarations. However, the Stafford Act retained the original requirement that the declaration process must be initiated by the Governor of the affected state (Federal Emergency Management Agency 2007). Nearly two decades later, another important piece of disaster legislation was adopted. The Hazard Mitigation and Relocation Assistance Act of 1993 placed a high priority on reducing future losses. This mitigation-focused legislation could potentially influence the granting of disaster declarations for marginal events because it increased the Federal Emergency Management Agency's (FEMA's) influence over local redevelopment and mitigation planning (Sylves 1998).

Disaster Declaration Politics

The implementation of disaster assistance harbors the potential for inconsistency. This unpredictability is due primarily to the absence of explicit decision criteria, and to the subjectivity inherent in judging state and local jurisdictions' ability to handle the situation (Schmidtlein, Finch, & Cutter 2008). May (1985) argues that the President has little, if any, specific guidance to assist him with this decision, which often leads to "charges of favoritism" (111). However, Congress and local governments have long opposed establishing a set of criteria. This is evidenced by the fact that the Stafford Act, which is a relatively recent amendment, prohibits the use of an "arithmetic formula or sliding scale" to deny assistance to any "geographic area" (Downton & Pielke Jr. 2001, 158; Federal Emergency Management Agency 2007, sec. 320). Critics of the process assert that this lack of objective criteria leads to inequities, in that there is no requirement that requests for declarations be considered in the context of previous disasters (U. S. Government Accountability Office 1995; Sylves 1998). Thus, the process is not explicitly directed toward the goal of treating similar situations similarly. Inequities are possible due to variation in the urgency attributed to different catastrophic events, as portrayed in the media, and the temptation presidents might feel to capitalize on them.

Following a disaster, graphic images of the devastation instantaneously fill the airways, demanding immediate intervention. Presidents must be cognizant of the accompanying

political pressure to act quickly (Birkland 1997; Stehr 2006). According to Wamsley and Schroeder (1996), these catastrophic events, filled with death and destruction, provide the perfect opportunity to enhance a president's heroic image and rally political support. During crises, the President may not be subjected to the usual scrutiny or criticism from political enemies. Thus, the President may elect to use these events to serve his own political needs via his disaster declaration power. Research also indicates that timing within the election cycle may play a role in the President's decision to award a disaster declaration (Downton & Pielke Jr. 2001; Garrett & Sobel 2003; May 1985; Sylves & Búzás 2007; Salkowe & Chakraborty 2009; Stehr 2006). Due to the nature of the disaster declaration approval process, granting an increased number of gubernatorial requests during an election year could be viewed as being politically motivated. This cynical perception is more likely when the decision applies to a state of enhanced electoral importance to the sitting President.

May (1985) examines the election year effect on disaster declaration decision making for presidents Nixon, Ford, and Carter. He notes increased disaster declaration percentages when comparing election years to non-election years for both Nixon and Ford, though not for Carter. Downton and Pielke Jr. (2001) suggest that increases under Nixon and Ford could be tied to changes to the declaration process and benefit eligibility, while Carter's reduced award percentages may reflect an emphasis on the "supplemental nature" of federal assistance following the establishment of FEMA (164). However, May's (1985) findings "suggest potential manipulation" with respect to Nixon's increase in approval percentages (112-13). Salkowe and Chakraborty (2009) are even bolder in identifying this same election year effect, which they assert is "indicative of a degree of biased vote-seeking behavior" (14). Stehr (2006) adds that the political pressure to act that often accompanies disasters may push the President to act too quickly, especially during election years.

Garrett and Sobel (2003), along with Reeves (2011) to some extent, also note the rate of disaster declarations is higher in election years. However, in contrast to May, these authors home in on the electoral importance of the state requesting the disaster. In contrast to Garrett and Sobel (2003) and Reeves (2011), other studies suggest this battleground vote-buying phenomenon is not a

significant factor in presidential decision making. Taylor (2007) examines this concept with respect to presidential distribution of procurement contracts between 1984 and 2004 but finds nothing statistically significant with regard to battleground vote buying. Similarly, Salkowe and Chakraborty (2009) find no significant connection between presidential disaster declarations and the battleground vote-buying notion.

Some researchers claim that political party affiliation may play some role in the disaster declaration process (Reeves 2011). One would naturally assume that governors with party affiliation similar to that of the sitting President would achieve higher success rates than those of the other party. However, Sylves and Búzás (2007) note higher success rates with respect to Democratic presidents and Republican governors, but do not find a significant association between similar political parties. Salkowe and Chakraborty (2009) also report no significant relationship between political party affiliation and success in receiving a presidential disaster declaration.

Modeling Presidential Disaster Declarations

Previous research suggests that the timing of a disaster and the electoral importance of the state in which it occurs act as political influences on a president's decision to declare a disaster. With respect to timing, the election cycle and the passage of Stafford Act are important. Electoral importance is modeled as a combination of competitiveness and size of electoral representation (Garrett & Sobel 2003; Reeves 2011). Garrett and Sobel (2003) construct their measure based on party dominance (percent of presidential elections won by the Democrats from 1956 to 1996) and the number of electoral votes in each state. If, for example, the parties have split these elections, electoral importance is equal to the number of electoral votes. Importance decreases as the proportion of wins tilts in favor of either party. Garrett and Sobel (2003) find that "those states politically important to the President have higher rates of disaster declaration" (504). Similarly, Reeves (2011) finds significant positive effects from both size and competitiveness. Disaster declaration approval percentages were significantly higher during years in which these incumbent presidents were running for reelection. Regarding the importance

of presidential terms, whether first or second, results were mixed. Therefore, we hypothesize that the likelihood of the President's awarding a disaster declaration is influenced by the timing of the disaster within the election cycle, and the electoral importance of the requesting state.

The politicization of the disaster declaration process is hardly worth celebrating. If disaster responses are shaped by political considerations as much as by actual need, as these studies suggest (see Garrett & Sobel 2003; Reeves 2011), the implications are profound. According to Garrett and Sobel (2003), these findings “cast doubt on FEMA’s altruistic goal of financial assistance to those most in need” (508). On the other hand, these studies may be overestimating the effect of politics, due to the fact that they leave out an important link in the chain of events leading to a presidential disaster declaration—the Governor’s Request (see p. 3 above). These studies employ an insurance-based indicator of the actual number of disasters that would potentially merit a presidential declaration. An “insurance catastrophe” reflects total disaster damage within a geographic area exceeding \$25 million (Garrett & Sobel 2003). The dollar figures reflect insurance claims made by individuals. The validity of this measure, therefore, is predicated on the presumed reliability of two entities: (1) individuals who are claiming insurance losses, and (2) insurance adjusters who are settling claims.

While we acknowledge the importance of insurance claim information, specifically by including it in our model as a control variable, we select as our dependent variable the number of disasters declared. This measure is based in part on the judgments of governors acting in their official capacity, representing an integral step in the disaster declaration process, as it is a Governor’s Request that triggers the review process. Garrett and Sobel (2003) did not have request data available to them, and Reeves (2011) follows their approach without comment on data availability. Given the current availability of the request data, we include it in our model. We think the request data improve model specification, and are likely to make a significant difference regarding substantive interpretation of the results. One possibility is that the inclusion of the Governor’s Requests measure will reveal an overestimation of political influences in previous studies.

Methods and Data

Using a pooled time-series regression approach, including all 50 states and the District of Columbia from 1981 through 2006, we test the hypothesis that politics affects presidential decision making when natural disasters strike. Specifically, we test whether a president's decision to grant a Governor's Request is influenced by politics; that is, by the electoral importance of a state, including its "competitiveness" in previous elections, or by the party affiliations of the Governor and the President, or by the timing of the disaster relative to the election cycle and the passage of the Stafford Act in 1988.

The scope of this study is somewhat limited in that presidential disaster declarations prior to 1981 are not included in the data. While an expanded study encompassing all years dating back to 1950 would be justifiable in terms of historical perspective, our decision to begin the analysis in 1981 is purposeful. President Carter established FEMA in 1979 by merging multiple departments into one "clearinghouse" for disaster assistance. Those presidents dealing with disasters prior to FEMA's birth did not operate under the same parameters as those in the FEMA era. Therefore, earlier presidential terms are excluded in favor of considering presidencies that operated entirely under the auspices of FEMA.

Presidential disaster declarations serve as the dependent variable.³ Specifically, we measure the number of declarations in a given state in a given year. For each state-year, the number of disaster declarations is a function of the number of Governor's Requests and other factors. Due to the fact that this is a "count" variable, we employ a negative binomial regression model with the logarithm of the number of Governor's Requests introduced as an offset variable (also known as an exposure variable).⁴ We use this approach in order to "deal explicitly with characteristics of count

³ The disaster declaration data used in this model are available at the Public Entity Risk Institute (PERI) website (2007). This site is maintained by Dr. Richard T. Sylves, Professor of Political Science and International Relations at the University of Delaware, and Dr. Gerald J. Hoetmer, Executive Director of the PERI.

⁴ All models are estimated using "xt" commands in Stata, which take into account the cross-sectional time-series structure of the data.

outcomes” (Long 1997, 217). Specifying the offset variable enables us to control for the number of opportunities for granting disaster declarations. An important characteristic of this approach is that the coefficient of the offset variable is constrained to 1.0. The inclusion of the offset ensures that the coefficients of the independent variables will reflect influences on the disaster declarations and not Governor’s Requests (Rutaremwā 2000, 8). A total of 964 declarations were issued during the research period. Texas heads this list with 43, while Rhode Island received the fewest with three. Each state experienced at least one year without a declaration. In response, FEMA has distributed almost \$98 billion (constant 2006 dollars) in disaster relief throughout the country (Public Entity Risk Institute 2007). Yearly listings for disaster declarations and FEMA payouts are provided in the Appendix.

Independent variables include the number of Governor’s Requests from each party (i.e., the President’s party and the opposition party), a monetary measure of actual disaster damage, measures of electoral importance and electoral competition, a dummy variable identifying cases where the President and the requesting Governor differed with respect to party affiliation, and year-based dummy variables indicating mid-term elections, presidential reelection bids, second term presidencies, and the Stafford Act. We use a natural log transformation of our raw measure of monetary damages, which is in millions (constant 2006 dollars). Our measures of competitiveness and electoral importance follow the strategies employed by Garrett and Sobel (2003) and Reeves (2011). The theory is that battleground states, which by definition tend to be more competitive, will be treated more favorably, all else being equal, as the President tries to win votes for the party. In other words, a president might be less likely to turn down a Governor’s Request if the state could go either way in the next election. Similar patterns have been identified with respect to candidate visits and media spending in battleground states during the 2000 presidential election (Hill & McKee 2005, 705).

The electoral competitiveness variable ranges from zero, meaning domination in the state by one party in the previous four presidential elections (non-competitive), to one, meaning an even split between parties over the last four presidential elections (most

competitive).⁵ The electoral importance variable is the product of the competitiveness variable (see note 3) and the average number of electoral votes for a state over the previous four presidential elections.⁶ Table 1 lists these variables and their characteristics.

Table 1: Descriptive Statistics

| | Mean | SD | Min | Max |
|---|------|-------|-----|--------|
| Presidential Disaster Declarations | .73 | .93 | 0 | 6.00 |
| Gubernatorial Disaster Declaration Requests | .97 | 1.11 | 0 | 6.00 |
| --Same Party Requests | .44 | .90 | 0 | 6.00 |
| --Opposition Party Requests | .53 | .94 | 0 | 6.00 |
| Insurance Claims (millions of 2006 dollars) | 192 | 1,329 | 0 | 28,843 |
| --Log Transformation | 2.89 | 2.17 | 0 | 10.27 |
| Post-Stafford | .69 | .46 | 0 | 1.00 |
| Competitiveness | .43 | .42 | 0 | 1.00 |
| Electoral Importance | 5.21 | 7.77 | 0 | 50.50 |
| Mid-Term | .27 | .44 | 0 | 1.00 |
| Re-election | .15 | .36 | 0 | 1.00 |
| Second Term | .38 | .49 | 0 | 1.00 |

N=1,326

The result of a Governor’s Request takes one of two forms—a declaration or a turndown. The requests variable (our offset variable) is calculated by adding turndowns to disaster declarations for each state by year.⁷ As the Appendix reveals, about one in four (322 of 1286) Governor’s Requests were turned down between 1981 and 2006. Texas experienced the most turndowns with 29. Two states, Delaware and Hawaii, did not receive a turndown

⁵ Following Garrett and Sobel (2003, 500) we use the formula $Y = 1 - 4(X - 0.5)^2$, where X is the percent of the previous four presidential elections won by a Democrat. Unlike our measure, however, Garrett and Sobel’s gives equal weight to all presidential elections since 1956.

⁶ Thus, in order for a state to have electoral importance, it must not have been carried by the same party over the last four presidential elections. As Reeves (2011) points out, one could instead use the raw measure of electoral votes, that is, without multiplying by the competitiveness of the state. However, that would be roughly equivalent to a population measure, as electoral votes and population are highly correlated. We prefer our measure on theoretical grounds, but we also tried the “raw” electoral vote indicator without success.

⁷ The PERI website also provided turndown data (2007).

during the period. The “requests” and “declarations” variables correlate at .88, providing evidence that the primary impetus for disaster declarations is non-political. In our models, we distinguish between “same party” and “opposition party” requests in two ways. First, we account for the difference directly with independent variables capturing each situation. Thus we estimate coefficients for “same party requests” and “opposition party requests.” Also, we include a dummy variable coded “1” when the requesting Governor’s party differs from the President’s, and “0” otherwise.

Regarding the severity of disasters in the states, we employ private insurance claims data provided by the Insurance Services Office (ISO) to measure monetary disaster damage. The data provided by ISO include claims information for all “catastrophic” events between 1981 and 2006.⁸ An insurance catastrophe can include damages across multiple states or within a single jurisdiction. This differs from a presidential disaster declaration, which is attached to a specific state’s request. The ISO data identified 774 catastrophic events between 1981 and 2006, resulting in nearly \$260 billion in damages (Appendix). The 774 catastrophic events represent 3556 records of state-specific damage. Some states had multiple damage records during a given year while others may have experienced no damage. To measure actual disaster damage, we allocated claim totals contained in the 3556 individual damage records to the appropriate states and years.

We include a series of variables that summarize the terms of the presidents in office. These variables identified mid-term election years, incumbent reelection campaign years, and the second terms of incumbents who were re-elected. In addition, we constructed a dummy variable indicating whether the case occurred before or after the Stafford Act (coded “1” for the years 1989 through 2006). This indicator measures the impact of the Stafford Act on these presidents’ decisions.

Model I includes only our core measures of need and policy. Need is measured two ways—the number of gubernatorial requests (by party) and the total dollar amount of insurance claims

⁸ ISO is a risk management firm that provides data, analytics, and decision-support services to a variety of professionals. Their web address is www.iso.com. We acknowledge the assistance of Gary Kearney, an Assistant Vice-President in the Property Claims Service division of ISO, for his help in compiling the data.

in millions (logged).⁹ Policy is measured by our Stafford Act indicator, coded zero before 1989 and one otherwise. These four predictors, which are included in all four models, are statistically significant in most cases, and their coefficients show consistency across models. In Model II, for example, the coefficients for *Same Party Requests* and *Opposition Party Requests* are .816 and .895, respectively, indicating that a Governor's Request is likely to be granted about 80 to 90 percent of the time. Equally robust is the *Post-Stafford* indicator, as the effect size does not diminish when other predictors are entered into the model. In Model IV, for example, we see that when other factors are controlled, the likelihood of a presidential disaster declaration increases by 47 percent for the post-Stafford Act years. The *Claims* variable is significant in Models II and IV, with $p < .10$ in Models I and III.

Model II includes our "place" variables, operationalized as each state's competitiveness and electoral importance. Recall that *Competitiveness* reflects the extent to which a state has been "up for grabs" in previous presidential elections. Related to this is the expectation that requests from states with more electoral *Importance* are met with a higher likelihood of success, unless perhaps *Party Differences* get in the way. These political variables, however, are not significant predictors in our models. This finding departs from Garrett and Sobel (2003), as they found a significant positive effect from the electoral importance measure. Similarly, Reeves (2011) found a significant positive effect from his competitiveness measure in the post-Stafford Act era. In our judgment, however, this difference is not as surprising as it may appear at first blush. These authors operationalize need by calculating the number of disasters based on insurance data, while we define need on the basis of a governor's official request. We suspect this is the reason for the divergent results of the political measures. If so, the question that remains is how the variables related to the electoral cycle withstand the presence of the request measures.

⁹ We also ran OLS fixed effects and autoregressive models with panel-corrected standard errors, as suggested by Beck and Katz (1995), which revealed only negligible state-specific and autocorrelation effects. Substantive results were similar, although the negative binomial models generally produced smaller z scores. We also tried the log of per capita income, with the expectation that higher income is associated with reduced need, and therefore negatively associated with the dependent variable. This measure was not significant in our equations, and thus omitted.

Table 2: Regression Results

| | Model I | | Model II | | Model III | | Model IV | |
|--------------------------------------|---------|--------|----------|--------|-----------|--------|----------|--------|
| Variable | IRR | Z | IRR | z | IRR | z | IRR | z |
| Same Party Requests | .844 | -3.52 | .816 | -3.64 | .911 | -1.70 | .881 | -1.99 |
| Opposition Party Requests | .865 | -3.10 | .895 | -2.06 | .912 | -1.71 | .934 | -1.06 |
| Claims (Logged) | 1.043 | 1.56 | 1.047 | 1.69 | 1.044 | 1.58 | 1.047 | 1.69 |
| Post-Stafford | 1.458 | 3.19 | 1.445 | 3.09 | 1.484 | 3.32 | 1.472 | 3.22 |
| Competitiveness | | | .994 | -.03 | | | 1.004 | .02 |
| Importance | | | .993 | -.67 | | | .995 | -.58 |
| Party Difference | | | .868 | -.93 | | | .885 | -.79 |
| Mid-Term | | | | | 1.119 | 1.03 | 1.118 | 1.02 |
| Reelection Year | | | | | 1.888 | 3.22 | 1.865 | 3.15 |
| Same Party Request * Reelection Year | | | | | .734 | -3.20 | .744 | -3.03 |
| Opp. Party Request * Reelection Year | | | | | .787 | -2.48 | .788 | -2.44 |
| Second Term | | | | | 1.228 | 1.96 | 1.229 | 1.96 |
| Constant | -1.97 | -14.29 | -1.87 | -11.15 | -2.22 | -13.57 | -2.13 | -11.16 |
| Wald Chi-Sq. | 25.05 | | 27.63 | | 44.05 | | 45.84 | |
| df | 4 | | 7 | | 9 | | 12 | |

Notes: Dependent variable is the number of presidential disaster declarations. z-scores of magnitude greater than 1.96 are considered statistically significant. *N* for all equations is 1,326.

judgment, however, this difference is not as surprising as it may appear at first blush. These authors operationalize need by calculating the number of disasters based on insurance data, while we define need on the basis of a governor’s official request. We suspect this is the reason for the divergent results of the political measures. If so, the question that remains is how the variables related to the electoral cycle withstand the presence of the request measures.

Model III excludes the “place” variables (competitiveness, electoral importance, and party difference), but includes “time” in the form of election cycle indicators (reelection years and midterm years) and whether a president is serving a second term. If there is

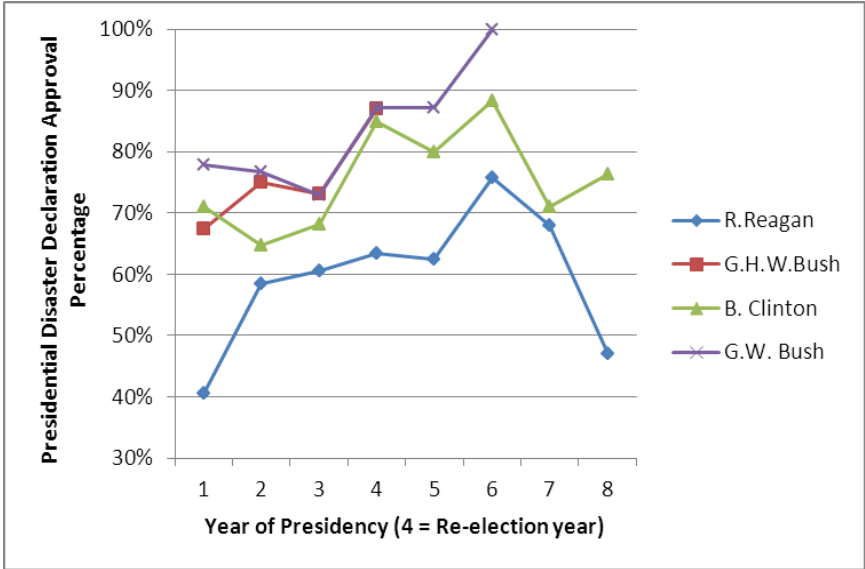
a good time to have a disaster, it would theoretically be during the run-up to an election or in a president's second term. As party leaders, presidents have an interest in avoiding behavior that would antagonize voters at election time, or when they are beginning to think more about their historical legacies. As Table 2 shows, these indicators take the hypothesized direction, and, with the exception of the mid-term years, reach statistical significance. These results support the notion that timing does play an important role.

We also include two interaction terms with this group of variables to test the possibility of the timing effects being conditioned by party differences between the Governor and the President. Assume, for example, that presidents wish to reward same-party governors at a greater rate than opposition-party governors in order to help curry favor with local and state political officials who can provide electoral support to the President. Alternatively, regarding opposition party governors, presidents may hesitate to grant their requests due to the fact that differing party priorities suggest channeling aid to different groups (e.g., Democrats assisting poor and working class families who are victimized, versus Republicans assisting business owners affected by the disaster). While these interaction terms are statistically significant, they function primarily to attenuate the effect of *Re-Election*. In other words, although the effect of a reelection year is interpreted initially as increasing the likelihood of a disaster declaration by 86.5 percent (incidence rate ratio of 1.865), this effect decreases by 25.6 ($100 * .744 - 1$) to 60.9 percent if the requesting Governor is of the same party as the President. Surprisingly, the attenuation is a bit less dramatic for opposition party situations ($100 * .788 - 1 = 21.2$), indicating that the effect of an election year electoral calculus may be to reach out more to states where the President's party is less prominent.

Collectively these results suggest that the approval rate of presidential disaster declarations increases during an election year. However, this result may be driven by the data for an individual president. A recent study by Kapucu, Van Wart, Sylves and Yuldashev (2011), for example, places Ronald Reagan in a qualitatively different category from subsequent presidents in terms of role perceptions and public expectations. This suggests the possibility of data from a single president skewing the results.

We therefore examined trends for each president individually to explore this possibility. The figure below graphs disaster declaration approval trends for each president by year in office, with year four being the reelection year.

Reagan’s eight-year approval average is just under 60 percent, with a low of 41 percent in his first year and a high of 76 percent in the second year following re-election. He approved 63 percent of the disaster declaration requests while running for re-election—a rate higher than any previous year of his first term. Prior to leaving office, Reagan signed the Stafford Act into law increasing the frequency of future presidential disaster declarations. Like Reagan, though, each of the other presidents followed the same pattern of higher rates of disaster declaration approval in their reelection campaign years than had been the case in any earlier year of their terms. George H. W. Bush’s approval average for the first three years of his single term was 71.8 percent, but jumped to 87 percent in his reelection year. Similarly, Bill Clinton’s approval rate average for his first three years was 68.0 percent, increasing to 84.9 percent as he campaigned during his fourth year in office. George W. Bush approved 87 percent of disaster declaration requests during his reelection year, up from an average of 75.8 percent over the three preceding years. It appears



that the actions of a single president are not responsible for the significant effect for presidential reelection year.

Model IV includes all four factors—need, policy, place and time. The largest effect sizes and significance levels are associated

with indicators of the Stafford Act era, reelection years and second-term presidencies. The *Claims* measure, though not as robust, is a reliable control variable. These results suggest that “time” is more important than “place” when modeling presidential disaster declarations. Also important are the effects of two policies—one that made the Governor the initiator of the process, and another, the Stafford Act, that expanded presidential discretion in granting Governor’s Requests. To the extent that those requests are valid reflections of actual disasters—and our model suggests that the level of damage matters—the politicization of the process is mitigated.

Conclusion

This research supports, up to a point, the conclusions drawn by other authors. For example, our finding of a significant relationship between disaster declarations and the year an incumbent is running for reelection underscores the influence of politics. However, the importance of electoral politics has been, in our judgment, overstated. We have tried to sort out the relative importance of timing versus location, in part because of the suggestion after Hurricane Katrina that location matters more. Our results, however, attribute significant importance to the Governor’s Request itself, and to timing, more than to the electoral importance of the state or the partisan affiliations of the chief executives involved in the process. In other words, while we agree that presidents do use their disaster declaration power as a political tool, our results suggest that the timing of the request in terms of election cycles, and the Stafford Act, matter more than the state from which the request originated, or party differences between the Governor and the President. This makes sense in light of the prevalence of twenty-four-hour media coverage of these events, which tends to give them a national scope. The financial effects of a disaster are for the most part limited by area, but as Katrina demonstrated, the political effects are potentially national in scope and salience.

The relationship between a president’s second term and disaster declarations appears to be a new finding. Reeves’ (2011) model includes variables for year of administration, but he does not discuss those results in depth. This may be due to the fact that

his emphasis was on electoral importance instead of a president's year in office. But what does the relationship imply? Taylor (2007) finds a similar second-term effect with respect to the federal procurement contracts. He suggests a lame-duck president may use his influence in such matters to garner congressional support during his final term (Taylor 2007, 106-107). Alternatively, our finding of a post reelection expanse of disaster declarations could reflect legacy-seeking behavior on the part of a reelected incumbent, especially when considering the fact that the power to award a disaster declaration rests solely in the hands of the President. We think this influence merits further investigation. In any case, it is reasonable to conclude that political considerations related to the timing of the election cycle tend to outweigh those related to the electoral importance of the requesting state.

References

- Beck, N., and J. N. Katz. 1995. "What to Do (and not to do) with Time-Series Cross-Section Data." *American Political Science Review* 89 (3): 634-47.
- Birkland, T.A. 1997. *After Disaster: Agenda Setting, Public Policy, and Focusing Events*. Washington, D. C.: Georgetown UP.
- Clary, B. B. 1985. "The Evolution and Structure of Natural Hazard Policies." *Public Administration Review* 45 (January Special Issue): 20-28.
- Downton, M. W., and R. A. Pielke Jr. 2001. "Discretion without Accountability: Politics, Flood Damage, and Climate." *Natural Hazards Review* 2 (4): 157-66.
- Federal Emergency Management Agency. 2007. Robert T. Stafford Disaster Relief and Emergency Act, as amended, and related authorities. Ed. Federal Emergency Management Agency.
- Garrett, T. A., and R. S. Sobel. 2003. "The Political Economy of FEMA Disaster Payments." *Economic Inquiry* 41 (3): 496-509.
- Hill, D., and S. C. McKee. 2005. "The Electoral College, Mobilization, and Turnout in the 2000 Presidential Election." *American Politics Research* 33 (5): 700-25.
- Kapucu, N., M. Van Wart, R. Sylves, and F. Yuldashev. 2011. "U. S. Presidents and Their Roles in Emergency Management

and Disaster Policy, 1950-2009.” *Risk, Hazards & Crisis in Public Policy* 2 (3): Article 4.

- Long, J. S. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, Calif.: Sage.
- May, P. J. 1985. *Recovering from Catastrophies*. Westport, Connecticut: Greenwood P.
- Platt, R. H. 1999. *Disasters and Democracy*. Washington, D.C.: Island Press.
- Public Entity Risk Institute. 2007. *Presidential Disaster Declarations from 1981 to 2006* [Data found under Summary Data tab]. Retrieved September 16, 2007 from www.peripresdecusa.org.
- Public Entity Risk Institute. 2007. *Presidential Turndowns from 1981 to 2006* [Data found under Begin Search tab]. Retrieved October 11, 2007 from www.peripresdecusa.org.
- Public Entity Risk Institute. 2007. *FEMA Payouts from 1981 to 2006* [Data found under Summary Data tab]. 2007. Retrieved November 26, 2007 from www.peripresdecusa.org.
- Reeves, A. 2011. “Political Disaster: Unilateral Powers, Electoral Incentives, and Presidential Disaster Declarations.” *The Journal of Politics* 73 (4): 1142-51.
- Rutaremwa, G. 2000. “Analysis of Regional Differentials in Under-Five Mortality in Kenya Using a Count-Data Regression Model” (ACAP working paper no. 14). Philadelphia, Pa.: University of Pennsylvania Population Studies Center.
- Salkowe, R. S., and J. Chakraborty. 2009. “Federal Disaster Relief in the U. S.: The Role of Political Partisanship and Preference in Presidential Disaster Declarations and Turndowns.” *Journal of Homeland Security and Emergency Management* 6 (1): Article 28.
- Schmidtlein, G. R., C. Finch, and S. Cutter. 2008. “Disaster Declarations and Major Hazard Occurrences in the U. S.” *The Professional Geographer* 60 (1): 1-14.
- Stehr, S. D. 2006. “The Political Economy of Urban Disaster Assistance.” *Urban Affairs Review* 41 (4): 492-500.
- Sylves, R. T. 1998. *Disasters and Coastal States: A Policy Analysis of Presidential Declarations of Disaster, 1953-97*.

Newark, Delaware: University of Delaware Sea Grant College Program.

- Sylves, R. T. 2007. "Federal Emergency Management Comes of Age: 1979-2001." *Emergency Management: The American Experience 1900-2005*. Ed. C. B. Rubin. Fairfax, Va.: Public Entity Risk Institute.
- Sylves, R. T., and Z. I. Búzás. 2007. "Presidential Disaster Declaration Decisions, 1953-2003: What Influences Odds of Approval?" *State and Local Government Review* 39 (1): 3-15.
- Taylor, A. J. 2007. "The Presidential Pork Barrel and the Conditioning Effect of Term." *Presidential Studies Quarterly* 38 (1): 96-109.
- U. S. Government Accountability Office. 1995. *Information on Expenditures and Proposals to Improve Effectiveness and Reduce Future Costs*. Ed. U. S. Government Accountability Office. Washington D.C.: Government Printing Office.
- Wamsley, G. L., and A. D. Schroeder. 1996. "Escalating in a Quagmire: The Changing Dynamics of the Emergency Management Policy Subsystem." *Public Administration Review* 56 (3): 235-44.

Appendix

| Year | Insurance Catastrophes | Requests by Governors | Presidential Disaster Declarations | Presidential Turndowns | Approval Percentage | FEMA Payouts (\$1,000) 2006 Constant \$ |
|--------|------------------------|-----------------------|------------------------------------|------------------------|---------------------|---|
| 1981 | 33 | 32 | 13 | 19 | 41% | \$ 53,787 |
| 1982 | 33 | 41 | 24 | 17 | 59% | \$ 244,404 |
| 1983 | 33 | 33 | 20 | 13 | 61% | \$ 515,089 |
| 1984 | 26 | 52 | 33 | 19 | 63% | \$ 310,203 |
| 1985 | 34 | 40 | 25 | 15 | 63% | \$ 629,436 |
| 1986 | 26 | 33 | 25 | 8 | 76% | \$ 279,866 |
| 1987 | 24 | 25 | 17 | 8 | 68% | \$ 231,174 |
| 1988 | 32 | 17 | 8 | 9 | 47% | \$ 27,287 |
| 1989 | 34 | 43 | 29 | 14 | 67% | \$ 2,378,739 |
| 1990 | 32 | 44 | 33 | 11 | 75% | \$ 532,142 |
| 1991 | 36 | 52 | 38 | 14 | 73% | \$ 626,078 |
| 1992 | 36 | 46 | 40 | 6 | 87% | \$ 3,730,194 |
| 1993 | 36 | 45 | 32 | 13 | 71% | \$ 2,401,283 |
| 1994 | 38 | 54 | 35 | 19 | 65% | \$ 11,226,732 |
| 1995 | 34 | 44 | 30 | 14 | 68% | \$ 1,354,724 |
| 1996 | 41 | 86 | 73 | 13 | 85% | \$ 2,634,995 |
| 1997 | 24 | 50 | 40 | 10 | 80% | \$ 2,200,431 |
| 1998 | 37 | 69 | 61 | 8 | 88% | \$ 2,391,855 |
| 1999 | 26 | 69 | 49 | 20 | 71% | \$ 2,110,855 |
| 2000 | 24 | 59 | 45 | 14 | 76% | \$ 1,931,756 |
| 2001 | 20 | 54 | 42 | 12 | 78% | \$ 12,615,515 |
| 2002 | 25 | 56 | 43 | 13 | 77% | \$ 1,552,174 |
| 2003 | 21 | 70 | 51 | 19 | 73% | \$ 1,931,559 |
| 2004 | 12 | 70 | 61 | 9 | 87% | \$ 8,480,763 |
| 2005 | 24 | 50 | 45 | 5 | 90% | \$ 36,902,249 |
| 2006 | 33 | 52 | 52 | 0 | 100% | \$ 456,280 |
| Totals | 774 | 1286 | 964 | 322 | 75% | \$ 97,749,570 |

Source: Catastrophe data—Insurance Services Office (ISO); Declarations, turndowns, and FEMA payouts—Public Entity Risk Institute (PERI).

**BARRIERS AND FACILITATORS TO HIV CARE
ADHERENCE AMONG AFRICAN AMERICAN WOMEN
LIVING IN MISSISSIPPI**

by

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Ph.D.⁵

ABSTRACT

The current study sought to explore specific factors that influence African American women's decision to engage or remain in HIV care. Two focus groups were conducted with African American women from the Jackson metropolitan area. Barriers to HIV care included lack of rapport with health care providers, lengthy procedures at medical facilities, competing demands, transportation, and substance abuse. Good patient-provider relationships, strong support networks, and a change in social environment were reported as facilitators. The findings from this study can be used to highlight the importance of simplifying the organizational structure of health care services and to encourage physicians to provide comprehensive treatment facilities. Furthermore, sensitivity training may be beneficial to help health care providers become more responsive to the specific needs of women receiving HIV treatment in Mississippi.

Keywords: HIV, HIV treatment, HIV adherence, health care, women

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Introduction

African American women have been disproportionately affected by the human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV/AIDS) epidemic compared to their European American counterparts. According to recent data from the Centers for Disease Control (CDC) (2010), the rate of new HIV infection among African American women is nearly 15 times as high as that of white women, and nearly four times that of Hispanic American women. The latest trends suggest that a high rate of HIV infection is concentrated in the Southern region of the United States (CDC 2011). The South has the highest number of new AIDS diagnoses, the highest number of adults and adolescents living with AIDS, and the highest number of people dying from AIDS in the U. S. (CDC 2011). Furthermore, a distinct increase in HIV-positive African Americans living in the Southern region has been noted (CDC 2010). The most recent data indicate that young black women living in the South account for approximately 70 percent of the reported HIV diagnoses and that they are the fastest growing population to heterosexually acquire HIV (CDC 2011).

Significant medical advances have been made since the beginning of the HIV epidemic, and though it was once viewed as a terminal disease, it can now be treated as a chronic illness. Because of the detrimental effects on the immune system of individuals living with HIV/AIDS, the latest federal guidelines recommend that persons living with HIV/AIDS (PLWHA) have their CD4 T-cell counts examined every three to six months to monitor disease progression (DHHS 2011). Early diagnosis and regular HIV medical treatment can pose great benefits for patients. Timely engagement in HIV medical care is associated with timely initiation of anti-retroviral and prophylactic medications, greater adherence to highly active anti-retroviral therapy (HAART), improved immunologic and virologic outcomes, and extended life expectancy (Moore, Keruly, Gebo, & Lucas, 2005; Giordano et al. 2007; Ulett et al. 2009). Despite the benefits of HIV medical care adherence, many patients find it difficult to visit their providers regularly. As a result, researchers must continue to explore factors that pose barriers that prevent patients from attending regularly scheduled visits to health care professionals.

Due to the enormous health benefits of early engagement in care and the growing number of HIV/AIDS cases in the Southern region of the United States, several studies have been conducted to explore barriers to HIV medical care non-adherence (Krawczyk, Funkhouser, Kilby, & Sten 2006; Amico et al. 2007, Ulett et al. 2009; Kempf et al. 2010; Konkle-Parker 2010). Many of the fore-mentioned studies have found similar predictors of linkage and retention to care, such as patient-related factors, environmental factors, and patient-provider factors.

Literature Review

Patient-Related Factors

Several studies suggest that demographic characteristics, such as age and race, influence adherence to HIV care. Ulett et al. (2009) conducted a systematic evaluation of successive steps of optimizing engagement and retention in HIV medical care. This included a retrospective review of medical records of 567 patients who enrolled in outpatient care at the University of Alabama Birmingham 1917 HIV/AIDS Clinic between January 2000 and December 2005. The researchers assessed the participants for socio-demographic information, medical history, and laboratory and clinic utilization. The results from the study suggest that African American race and younger age were associated with poor rates of early retention to care. Furthermore, the findings indicate that African Americans were also more likely to enter care in the advanced stages of the disease. Giordano, Hartman, Gifford, Backus, and Morgan (2009) also found similar results regarding African Americans. Researchers sought to examine the predictors of poor retention in HIV care among United States veterans. The results indicated that after one year, 36 percent of the patients had poor retention in care. Additional findings revealed that individuals who were at highest risk for poor retention were young black patients with less advanced stages of HIV disease and participants who used illicit drugs.

Substance abuse among persons living with HIV is a common barrier to medical care adherence. In an effort to enhance outreach models, Bradford (2007) conducted a study that implemented and evaluated ten sites across the United States to increase engagement and retention in HIV care for underserved,

HIV-infected individuals. The findings from the study suggest that patients who do not engage in regular care are more likely to use illicit drugs, report less ambulatory care and medication adherence, and are more likely to use emergency room services. The illicit drug users were also less likely than the non-drug users to show improvement in care adherence over a twelve-month period. Moreover, Ulett (2009) found that substance abuse history was associated with lower levels of retention and higher CD4 counts; however, patients with co-morbid substance use and mood disorders were more likely to have better retention in care. Pence, Thielman, Whetten, Ostermann, Kumar, and Mugavero (2008) also conducted a study to explore psychosocial predictors of alcohol and drug use among patients seeking HIV clinical care to identify and reduce substance use in HIV patients. A total of 611 participants were selected from eight infectious diseases clinics from North Carolina, South Carolina, Georgia, Alabama, and Louisiana. Traumatic experiences were linked with getting drunk more frequently, while greater maladaptive coping strategies were associated with getting drunk. Additionally, greater self-efficacy was associated with crack use, recent stressful life events were associated with non-marijuana drug use, and psychosocial stressors were associated with polysubstance use.

Substance abuse and mental health concerns such as depression are frequently co-morbid disorders among PLWHA. Leserman, Ironson, O’Cleirigh, Fordiani, and Balbin (2008) conducted a study to examine if non-adherence would be related to more alcohol and illicit drug use, more depressive symptoms, and more stressful life events. The researchers collected data from 105 HIV positive men and women taking HAART. Results from the study indicated that stressful life events were consistently associated with missing HIV medication. Although depressive symptoms were related to non-adherence, depression decreased to non-significance when the stressful event measure was included. They argued that having many stressful events may be a more robust correlate of non-adherence than depression for PLWHA. Similarly, Hinkin, Hardy, Mason, et al. (2004) conducted a study to examine whether cognitive impairment and substance use influenced medication adherence levels among HIV-positive individuals. Data were collected from 148 HIV-positive participants gathered from medical centers in Los Angeles using a

battery of standardized neuropsychological tests and medication event monitoring system (MEMS) caps over a four-week period. The findings indicated that current drug abuse and neurological dysfunction are associated with decreased levels of medication adherence among sample participants.

Environment-Related Factors

Individuals living in specific geographic locations may face additional barriers to obtaining optimal HIV medical care. Kempf et al. (2010) found that clinic distance and transportation, especially in regards to increasing gas prices, posed barriers to adherence for women with low income living in rural areas. According to Heckman (1998), barriers among urban respondents included the level of knowledge about HIV among individuals in the community, financial responsibilities, limited support systems and lack of understanding working environments for PLWHA, stigma, and limited employment opportunities, respectively. Rural respondents indicated that common barriers include long travel distances to care facilities, limited access to transportation, limited number of HIV-trained health care providers, lack of mental health care providers to help with mental health needs, and stigma from community members (Heckman 1998).

The stigma of HIV/AIDS is especially profound within the African American community, and often hinders medical care adherence. Many patients fear discrimination after revealing their diagnosis (Aspeling & van Wyk 2007). Beer et al. (2009) conducted a study to examine the barriers to HIV medical care treatment among HIV-positive persons who are not currently engaged in care. The study consisted of 37 participants, 29 of which were African Americans males between the age ranges of mid-20s and mid-50s. Analysis of focus group transcripts revealed that all focus groups noted stigma, concerns about confidentiality, and negative experiences with health care providers as barriers to engaging in care. Konkle-Parker, Erlen, and Dubbert (2008) collected data from twenty HIV-infected patients to examine barriers to medical adherence among patients living in the Deep South. Patients were recruited from an AIDS Drug Assistance Program site in Mississippi. One finding from the study indicated that social stigma and shame had a negative impact on the health care of HIV-positive patients. Patients revealed that fear, shame,

and embarrassment of taking HIV medications often hindered medical care.

A lack of social support network from friends, family members, and significant others can pose as a barrier to medical care adherence. Patients often report that the support of others is an important facilitator to adherence (Curioso et al. 2010). Dahab et al. (2008) conducted a study among 12 HIV-infected patients in South Africa to examine barriers to anti-retroviral therapy (ART) adherence. A key finding of the study indicates that having a connection with family and friends was beneficial for treatment adherence. Patients often indicate that significant others, friends, and family members were often helpful in reminding patients to take pills on time (Dahab et al. 2008; Konkle-Parker, Erlen, & Dubbert 2008). Similarly, Wood, Tobias, and McCree (2004) conducted a study among HIV-positive women caring for children under the age of 18 to determine patterns and decisions to medication adherence. In-depth interviews were used to collect data from 30 patients prescribed HAART. The results of the study revealed that patterns of adherence were associated with interpersonal relationships and levels of distress. Patients with good support systems began taking HAART as soon as it was prescribed; however, upsetting events related to interpersonal relationships often resulted in treatment delays and interruptions.

Patient-Provider Factors

Negative experiences with health care providers can adversely impact medical care adherence. Schuster et al. (2005) noted that several individuals reported feelings of discrimination by health care providers while seeking HIV medical care. Of the people receiving HIV care in the United States, 26 percent reported at least one of four types of perceived discrimination after learning their HIV diagnosis. Twenty percent indicated that health care providers had been uncomfortable with them, 17 percent believed they were treated as inferior, 18 percent felt as though health care providers preferred to avoid them, and eight percent reported they were denied services because of their HIV positive diagnosis. Of those who reported discrimination, 54 percent attributed it to physicians, 32 percent to dentists, 39 percent to nurses or other clinical staff members, 31 percent to hospital staff, eight percent to case managers and social workers, and two percent to someone else. Unfair treatment by HIV health care providers is often the

cause of treatment interruption for some patients (Aspeling & van Wyk 2007).

Several studies have shown that a supportive relationship between a provider and a patient can facilitate adherence. Beach, Keruly, and Moore (2006) used data from 1743 patients to examine the relationship between patients' perception of their relationship with their health care providers and whether this perception influenced patients' receipt of HAART, adherence to HAART, and HIV viral load levels. The results of the study indicated that patients were more likely to receive and adhere to HAART and have an undetectable viral count. Patients who reported their provider knows them "as a person" were older, reported higher quality of life, had been followed in a clinic longer, and missed fewer appointments. Kempf (2010) quantitatively investigated the factors impacting HIV care adherence among women living in Alabama and found that women are more likely to remain in care if they believe health care providers show genuine care and concern for them. Women in the study reported that their perceptions of how they were treated by the clinic staff, seeing friendly faces, and receiving encouragement and support from their providers were incentives for attending regularly scheduled appointments.

A qualitative study by Rajabiun et al. (2007) examined the process of engagement in HIV medical care among 76 patients. The study consisted of patients who (1) had been in care since the time of their HIV diagnosis despite multiple risk factors and external challenges; (2) described significant periods with no HIV medical care but were currently engaged and stable in care, (3) were tenuously connected to care, reporting an HIV medical visit in the past six months, but described risk factors and a history of inconsistent HIV; and (4) people who had no HIV medical visits in the past year. Patients revealed that positive patient-provider relationships were important aspects of engagement and retention in HIV medical care. Individuals who described negative experiences with their health care providers were less likely to be adherent to medical care recommendations because they felt their providers were controlling their health decisions without considering life issues or their desires. Contrastingly, participants with good adherence rates described positive relationships

characterized by autonomy and acceptance with their HIV health care providers. Aspeling and van Wyk (2008) conducted a study that investigated ART adherence among black women. Data were collected from in-depth interviews among eleven participants. The findings from the study indicated that the patient-provider relationship has a significant impact on adherence. Patients reported that discourteous treatment by health care providers leads to treatment interruption. Furthermore, they indicated that good patient-provider relationships are based on trust and noted that they prefer health care providers who are accessible, confidential, competent, and supportive.

More research should be conducted focusing on HIV care adherence among African American women living in the state of Mississippi given the variety of unique factors that might impact this underserved population. To address the aforementioned issues, two focus group sessions were conducted with African American women living with HIV in an effort to gather qualitative information. The purpose of this study was to determine the barriers and facilitators associated with HIV medical care adherence among African American women living in Mississippi. HIV medical care adherence in the present study will refer to attending appointments to monitor CD4 levels and viral loads and adhering to prescribed anti-retroviral medications.

Method

Sample

Two focus groups were conducted with a total of 13 HIV-infected African American women from a local support group for HIV-positive women in the Jackson metropolitan area. The inclusion criteria included the following: (1) African American female; (2) HIV-positive serostatus; (3) at least 18 years of age; (4) resident of Mississippi; and (5) English as a primary language. The focus groups, which last about 60 minutes, were facilitated by the principle investigator, under the guidance of a researcher with experience moderating focus groups, particularly those comprising persons living with HIV. All group sessions were recorded via digital recorder and newsprint. Participants were given a \$25.00 incentive.

Instruments

Instruments used to conduct the focus group sessions included the following:

Sociodemographic Questionnaire (SQ): The SQ assessed demographic information such as participants' age, marital status, education level, income, housing status, and number of children. HIV-related information such as length of diagnosis, and anti-retroviral history were also assessed.

Center for Epidemiological Studies-Depression Scale (CES-D): The CES-D is a 20-question multiple-choice self-report inventory developed by the National Institute of Mental Health to measure the severity of depression. Answers are rated on a 4-point scale where "0" is "rarely or none of the time (less than 1 day)," and "4" is "almost or all of the time (5-7 days)." Scores range from 0 to 60. Higher scores suggest greater levels of depressive symptoms, while lower scores suggest lower levels of depressive symptomology. The CES-D has four separate factors: depressive affect, somatic symptoms, positive affect, and interpersonal relations. The instrument has internal consistency with alphas of .85 for the general population and .90 for a psychiatric population.

Multidimensional Scale of Perceived Social Support (MSPSS): The MSPSS scale was developed by Zimet et al. in 1988. It is a twelve-item self-report measure developed to assess perceived social support from family, friends, and a significant other. Responses are rated on a seven-point Likert scale with answer choices ranging from "Very Strongly Agree" to "Very Strongly Disagree." High scores indicate high levels of perceived support.

Focus Group Questionnaire (FGQ): The FGQ is composed of nine open-ended questions. The questions were developed based on a review of relevant literature and discussion with research advisor with expertise in conducting focus groups with this target population. The FGQ comprises two sections: Barriers and Facilitators. The former section focused on questions related to obstacles that prevent participants from adhering to HIV medical care, while the latter focused on questions that facilitate participants' adherence to HIV medical care.

Procedures

The Jackson State University Institutional Review Board approved this study protocol. Participants from a support group in

Jackson, Mississippi were asked if they were interested in participating in the study following a brief overview of the research study. To insure confidentiality and privacy, focus groups were conducted in a conference room in a secluded area at the Jackson Medical Mall.

Before completing the questionnaires, participants were provided an overview of the focus group process. Consent forms that provided detailed descriptions about participation, confidentiality, and the procedures were thoroughly read. The participants were assured that their responses were confidential and no one, with the exception of the researchers, would be allowed to see any personal information on the forms. Participant names did not appear on any of the instruments. Instead, they were assigned numbers from a master list, which was maintained by the researcher and destroyed after all data were analyzed.

Focus Group Process

The steps necessary for conducting the focus group are listed below: (1) outlining the purpose of the focus group; (2) explaining the expectations of the focus group members (e. g., confidentiality, respect for others' opinions); (3) administering focus group questions; and (4) distributing the \$25 incentive.

Data Analyses

Digital audio files of the focus groups were transcribed verbatim then reviewed for accuracy by the researchers. The research team individually determined recurrent themes and conducted a meeting to synthesize their findings into a final list of barriers and facilitators. For each barrier and each facilitator, selected quotes from the transcripts were matched with each barrier and each facilitator. A descriptive analysis was conducted on the information from the socio-demographic questionnaire.

Results

A qualitative analysis of focus group transcripts was conducted in order to identify recurrent themes. For each question, summaries of the participants' responses have been highlighted to distinguish differences and similarities within the group. A descriptive analysis was conducted on the demographic information.

The sample consisted of African American women between the ages of 26 and 54, with a mean age of 42.15 years. A majority

of the participants lived below the poverty line, and approximately 70 percent reported an annual income of less than \$9,999. Approximately 23 percent of the participants had completed high school, 23.1 percent had attended technical school, and 38.5 percent had some college education. Most participants (61.6%) reported they were single, and 76.9 percent self-identified as heterosexual. Approximately 93 percent of the sample received ART, and 61.6 percent of the women indicated they were prescribed between 12 and 20 years ago. CES-D scores $M = 23.38$ ($SD = 16.48$) indicate that the group has severe depressive symptoms. Participants received MSPSS scores of $M = 15.5$, ($SD = 10.98$) for family support, $M = 17.54$, ($SD = 8.15$) for support from friends, and support from significant others $M = 20.08$, ($SD = 10.16$).

Barriers

Several factors appeared to influence HIV care adherence for the sample. Barriers included: (1) rapport with health care provider and staff members; (2) procedures and policies at medical care facilities (e.g., clinic waiting time, privacy); (3) competing demands (employment vs. health care); (4) transportation; and (5) substance abuse.

Rapport with health care providers and staff members. Poor consumer relations with health care providers and support staff emerged as a common negative experience for women in the sample. Staff members and physicians negatively influenced patients' willingness to attend HIV care appointments by exhibiting a lack of respect and rapport with the patients. One participant stated, "I had one that talked to you like you're illiterate...It was her attitude and the way she treated me like— You got to do this, you better do this, —like you're a child and she's the momma trying to discipline you."

Several participants indicated that negative treatment from health care providers discouraged them from engaging in care. They reported a "lack of knowledge" among providers promoted stigma associated with HIV and caused them to feel degraded. Specifically, they appeared to exhibit ignorance about the modalities that HIV disease is contracted. One participant stated, "They stand back and they look at you like they don't want to touch you, they don't want anything to do with you, they don't

even want to set an appointment with you. You might have sores or mishaps going on with you...You don't want to go back to a person that treats you like crap, so that has a lot to do with you going back to that doctor and say, "Hey, they don't care about me, why should I?"

Patients also reported experiencing frustration when they perceived that their providers minimized the concerns they voiced about their own care. They felt less motivated to attend appointments with physicians who failed to listen to their HIV-related queries about issues such as side effects, medication interactions, and co-morbid conditions. One participant stated, "You can go in there and tell that woman, 'Oh doc, I got this on my leg and I think it's from my medication.' She'll tell you she's going to check it out but before you know it, she to the front to sign you up out of there."

Procedures and policies at medical care facilities. Clinic procedures and policies at medical care facilities also appeared to hinder HIV care treatment. Patients reported experiencing difficulty with the structural barriers at the local clinics. Those barriers are associated with a series of procedures conducted before seeing the health care provider (e.g., waiting in long line, placing name on list, waiting for receptionist to obtain the payment method). This series also includes enduring, on average, a wait of approximately 30 to 40 minutes before being seen by their medical providers.

One participant indicated, "So it used to be like two years you would go straight to the infectious disease doctor and that's the only person that you had to see, is the lady at the front desk. But now it's just discouraging because you may sit down there about thirty or forty minutes before you even get to your doctor. And if you're on a lunch break or have to get back to work or you have to pick up your child or somethin' that is a major barrier."

Schedule conflicts. Several participants reported experiencing scheduling conflicts between their jobs and HIV medical care appointments. One reported, "My appointment is probably on the same day that they done scheduled me to work and they weren't able to schedule me off that particular day...I do reschedule, but I just might miss that particular time." Another patient agreed and noted the frustration of having to choose between health and employment. She stated, "It's important that

you go to your doctor, but it's also important for me to make a livin', and if I don't go to my job they gonna, you know, fire me. So you gotta kinda weigh it out."

Transportation. Another barrier to receiving HIV care is related to a lack of transportation (e.g., non-working vehicle, depending on others). Participants who relied on others (e.g. family members) to bring them to appointments reported feeling obligated to disclose the type of appointment they were attending, and were less likely to ask others to bring them to their appointment. For example, one participant stated, "You have to have transportation to get to the doctor and if you don't have any, you can't go. And most people not gonna wait on you, the average is gonna take two hours, uh to see the doctor. And then, say you don't have transportation, you might not want anybody to know where you're going."

Substance abuse. Another barrier to HIV care adherence for several participants was substance use. Individuals who had used substances in the past recalled having to choose between illegal substances and attending their medical appointment. For participants who had a history of substance abuse, the preference was typically the illegal substance. One of the participants stated, "I would miss my appointments because of addiction...It would be that I would get in the mood of don't care, don't really wanna be bothered with it. I was so caught up in my addiction that I would miss my appointments."

As noted earlier, the 30-to-40 minute wait time is a barrier to attending regularly scheduled care. As it regards to substance abuse, the long wait to see health care providers often conflicts with getting high or intoxicated. One participant stated, "Back when I was on crack, I was either worn out from being up all night or too high and paranoid to go. I didn't have patience to sit up there and wait with other patients to be seen by the doctor 'cause I wanted to get home and get high." Some participants also reported feeling guilt and embarrassment when asked to provide blood and urine samples at HIV care visits, which decreased their motivation to attend clinic visits.

Facilitators

Participants reported several facilitators that influenced their ability to adhere to regular HIV care which included (1) good

patient provider relationships; (2) strong support networks; and (3) change in social environment.

Positive patient-provider relationship. The participants reported that good rapport with their health care providers encourages them to adhere to HIV medical care recommendations. Health care providers with whom positive rapport was easily established were friendly, accessible, and displayed unconditional positive regard towards them. One participant stated, “Even though I let them [the doctors] down over and over and over again, they didn’t give up on me. They continually supported me and told me they would always be there whenever you’re ready. That’s what got me to that point where I said it’s time for me to either live or die.”

The participants described positive medical care experiences with their providers based on the quality of the relationship with their health care provider. Positive patient-provider relationships were significant indicators of a patient’s willingness to seek treatment. One of the participants stated, “See, when I come in after I have my tests done, she calls me and lets me know the results of them. And she tells me how proud she is of me that I continue to take my medicine and come to my doctor’s appointments like I’m supposed to. That means a lot to an AIDS patient when their doctor is just as proud [of the patient] as their family is.”

Strong support network. Most participants reported that a strong social support system was helpful in encouraging them to attend regularly scheduled appointments. Friends and family members (e.g. partners, children, and grandchildren) often influenced patients to attend regularly scheduled appointments. They were instrumental in providing reminders, transportation, and even empathy for individuals in care.

Attending support group meetings was also described as a facilitator to help participants remain in HIV care. Participants acknowledged the importance of being able to speak with someone who shared similar experiences with them. One patient stated, “It’s very important to see a face, a person that’s like you. That’s the connection, because you don’t want to feel like you’re the only one out here living this and people will make you think that you’re the only one in Mississippi with HIV and we have one of the highest numbers.”

The participants emphasized the significant impact children had on motivating them to adhere to ART and attend medical appointments regularly. Unconditional acceptance and support from their children encourages participants to take better care of themselves. One participant stated, “When I was diagnosed my daughter was five years old. When I told her she didn’t understand but she knew that she had saw a change in me ’cause I would always be unhappy. And she, um, she told me no matter what you have, Mom, you are not a monster.”

Some participants had poor relationships with their children. Particularly, one participant reported that her children are “haters.” It appears that the term “hater” is described as an individual who dislikes you or does not wish you well. Haters served as motivators for some participants to take better care of themselves. For example, one participant stated, “Their [children’s] roles are roles of haters so I have to prove to them that mommy’s still got it. I don’t care if you hate me or not, I’m still gonna live.”

Change in social milieu. A change in social milieu was also a critical facilitator to HIV medical care adherence. Several participants reported that changing their environment (e.g., homelessness, addition, negative influences) helped them to become more consistent with their HIV care. One participant stated: “Just changing my environment completely. Since it changed I have become more adherent with medications, making sure I make my doctor appointments, um, getting more support help. So that did a lot for me.”

Discussion

Standard guidelines for all HIV-infected patients include monitoring CD4 count and viral load results approximately every three to four months and taking HAART medication, if necessary (DHHS 2011). Despite the well-known benefits of HIV care adherence, a large percentage of patients find it difficult to adhere to treatment recommendations. Examining barriers and facilitators to HIV care adherence is an important research endeavor due to the detrimental consequences of treatment non-adherence. However, little research has been conducted to explore how cultural and

environmentally related factors may influence HIV medical care adherence.

This mixed-methods study focuses on determining the barriers and facilitators to HIV care adherence among African American women residing in Mississippi. Existing research suggests that HIV-positive patients living in the Deep South may experience some unique barriers that hinder their ability to engage and remain in care (Konkle-Parker, Erlen, & Dubbert 2008; Krawczyk et al. 2006). The results of this study show that the quality of rapport with health care providers and staff members, procedures and policies at medical care facilities, competing demands, transportation, and substance abuse are barriers to HIV care adherence. Positive patient-provider relationships, strong support networks, and changes in the social environment were the most frequently cited facilitators.

The findings of this study are somewhat consistent with findings from other studies (Kempf et al. 2010; Konkle-Parker, Erlen, & Dubbert 2008; Rajabuiun et al. 2007) of HIV-positive patients in the United States. For example, the primary barrier to treatment adherence for these participants is the quality of relationship with their health care providers and other health care staff members. This finding is consistent with that of Beach, Keruly, and Moore (2005), which examined the association between patients' perceived relationship quality with their physician and their health outcomes and medical care adherence. The results indicate that the quality of the patient-provider relationship is a significant predictor of better health outcomes and treatment adherence for patients.

Structural barriers, such as lack of privacy in local health care facilities and lengthy clinic waits, were also reported among participants in this sample. Long waiting times at health care facilities frequently interfered with the work schedules of the employed participants, and forced them to choose between their source of income and the quality of their health. This finding was similar to the results from Kempf's (2010) qualitative study. The study found that poor organizational structure of health care facilities deters patients' ability to conveniently access care. The results also indicated that women preferred brief, yet comprehensive, visits to health care providers to reduce the length and number of appointments. Another barrier for this sample

directly related to the health care system included negative treatment by the health care staff. Kempf (2010) also reported that respectful treatment from health care personnel was preferred and often encouraged patients to return for treatment.

Consistent with other research findings resulting from the use of participants from the Deep South, transportation appeared to be a major barrier to care for the participants in this sample. Moneyham et al. (2010) conducted a qualitative study among 40 participants to examine HIV-related experiences among patients living in the Deep South. Researchers report that patients in the Deep South frequently reported transportation-related barriers to accessing care. The results of the aforementioned study indicate that lack of personal transportation, limited financial resources (e.g., gas money, bus or taxi fare), and stigma (e.g., asking others to bring them to appointments) discouraged patients from engaging in care.

Several participants in this sample reported a variety of social influences that impacted their willingness to remain in HIV care. Many individuals reported close family members, partners, and friends were instrumental in keeping track of appointment times, medication reminders, and providing transportation to visits. The hope of living a longer life to watch children and grandchildren grow up appears to motivate some participants to adhere to HAART regimens and devote more attention to maintaining good health. Participants also reported that support groups were beneficial since they gave patients the opportunity to interact with others who could relate to their experiences and empathize with their peers. The results from the present study are consistent with the findings from a study conducted by Edwards (2006) to explore the relationship between social support and medication adherence among African American women. The women in the sample indicated that perceived social support from family and friends encouraged them to adhere to their medication regimens. The lack of support from others appears to greatly interfere with HIV care adherence. In contrast, some of the women reported that a lack of support from family members is a motivating factor that encourages them to engage in better health care. This finding has not been examined in any of the previous samples. One possible explanation that could account for the

difference is that the participants in the present study used their lack of support from family member and friends to motivate them to care more about their health.

Another predictor of poor retention in medical care is substance use. Participants reported experiencing difficulty adhering to treatment recommendations while using illegal substances or alcohol. Reports of lengthy clinic waits and appointments also hindered substance abusers from attending regularly scheduled appointments because it interfered with the ability to get intoxicated or high. This finding was also exhibited in another qualitative study composed of a sample of participants living in Mississippi (Konkle-Parker 2010). Through the use of semi-structured interviews to collect data, it was found that patients in the sample identified stopping substance use as a facilitator to engaging in and remaining in care.

There were several noteworthy limitations of the present study. The sample size was relatively small in comparison to samples of other qualitative studies. Thus saturation for the two focus groups was not attainable. Another limitation is the use of the convenience sampling method to recruit participants living in a metropolitan area of Mississippi. Therefore, the responses are not representative of people living with HIV/AIDS throughout Mississippi. Moreover, the participants in the sample were successful at adhering to the recommended treatment guidelines, so results of the study cannot be generalized to patients who are not engaged in HIV medical care.

Future Implications

The barriers and facilitators identified in the present study are similar to findings from other settings and suggest that interventions for HIV care adherence can be applied to African American women living in Mississippi. The findings can be used to implement public health program initiatives for local support groups to assist patients in building support networks while coping with HIV-related concerns such as stigma, health care, and treatment adherence. Due to the prevalence in psychological distress and alcohol or drug use associated with HIV, it is necessary for mental health and substance abuse treatment programs to be implemented into HIV care to help facilitate entry and retention into care. The findings from this study can also be

used to encourage policymakers to advocate for simplification of the organizational structure of health care services and for physicians to provide comprehensive treatment facilities for patients. Furthermore, the implementation of sensitivity training can help medical care staff members become more sensitive to the specific needs of women receiving HIV treatment in Mississippi.

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References

- Amico, K. R., D. J. Konkle-Parker, D. H. Cornman, W. D. Barta, R. Ferrer, W. E. Norton, C. Trayling, P. Shuper, J. D. Fisher, and W. A. Fisher. 2007. "Reasons for ART Non-Adherence in the Deep South: Adherence Needs of a Sample of HIV-Positive Patients in Mississippi." *AIDS Care* 19 (10): 1210-18.
- Aspeling, H. E., and N. C. van Wyk. 2007. "Factors Associated with Adherence to Anti-Retroviral Therapy for Treatment of HIV-Infected Women Attending an Urban Care Facility." *International Journal of Nursing Practice* 14: 3-10.
- Beach, M. C., J. Keruly, and R. D. Moore. 2006. "Is the Quality of the Patient-Provider Relationship Associated with Better Adherence and Health Outcomes for Patients with HIV?" *Journal of General Internal Medicine* 6: 661-65.

- Beer, L., J. L. Fagan, E. Valverde, and J. Bertolli. 2009. "Health-Related Beliefs and Decisions about Accessing HIV Medical Care among HIV-Infected Persons Who Are Not Receiving Care." *AIDS Patient Care and Stds* 23 (9): 785-92.
- Bradford, J. B. 2007. "The Promise of Outreach for Engaging and Retaining Out-Of-Care Persons in HIV Medical Care." *AIDS Patient Care and STD*, 2: 85-91.
- Centers for Disease Control and Prevention. 2010. *CDC HIV/AIDS Fact Sheet: HIV among African Americans (2010)*. Retrieved on September 2, 2010 from www.cdc.gov/hiv.
- Centers for Disease Control and Prevention. 2011. *HIV/AIDS Surveillance Report*. Retrieved on July 16, 2011 from www.cdc.gov/hiv.
- Center for Disease Control and Prevention. 2011. "Disparities in Diagnoses of HIV Infection Between Blacks/African Americans and Other Racial/Ethnic Populations—37 States, 2005-2008." *Morbidity and Mortality Weekly Report (MMWR)*. Retrieved on July 16, 2011 from www.cdc.gov/hiv.
- Curioso, W. H., D. Kepka, R. Cabello, P. Segura, and A. E. Kurth. 2010. "Understanding the Facilitators and Barriers of Anti-Retroviral Adherence in Peru: A Qualitative Study." *BioMedical Central Public Health* 10: 1-8.
- Dahab, M., S. Charalambous, R. Hamilton, K. Fielding, K. Kielmann, G. J. Churchyard, and A. D. Grant. 2008. "'That is why I stopped the ART': Patients' & Providers' Perspectives on Barriers to and Enablers of HIV Treatment Adherence in a South African Workplace Programme." *BioMedical Central* 8, 63. doi: 10.1186/1471-2458-8-63.
- Department of Health and Human Services. 2011. *Guidelines for the Use of Anti-retroviral Agents in HIV-1-Infected Adults and Adolescents*. Retrieved on July 11, 2011.
- Edwards, L. V. 2006. "Perceived Social Support and HIV/AIDS Medication Adherence among African American Women." *Qualitative Health Research* 16: 679-91.
- Giordano, T. P., A. L. Gifford, A. White, M. E. Suarez-Almazor, L. C., Hartman, L. I. Backus, L. A. Mole, and R. O. Morgan. 2007. "Retention in Care: A Challenge to Survival

with HIV Infection.” *Clinical Infectious Diseases* 44: 1493-99.

- Giordano, T. P., Hartman, C., Gifford, A. L., Backus, L. I., and Morgan, R. O. 2009. “Predictors of Retention in HIV care among a National Cohort of U. S. Veterans.” *HIV Clinical Trial*, 10 (5): 299-305.
- Heckman, T. G., A. M. Somlai, J. Peters, J. Walker, L. Otto-Salaj, C. A. Galdabini, J. A. Kelly. 1998. “Barriers to Care among Persons Living with HIV/AIDS in Urban and Rural Areas.” *AIDS Care* 10: 365-75.
- Hinkin, C.H., D. J. Hardy, K. I. Mason, S. A. Castellon, R. S. Durvasula, M. N. Lam, and M. Stefaniak. 2004. “Medication Adherence in HIV-Infected Adults: Effect of Patient Age, Cognitive Status, and Substance Abuse.” *AIDS* 18: 19-25.
- Kempf, M.C., J. McLeod, A. K. Boehme, M. W. Walcott, L. Wright, P. Seal, W. E. Norton, J. E. Schumacher, M. Mugavero, and L. Moneyham. 2008. “A Qualitative Study of the Barriers and Facilitators to Retention-in-Care among HIV-Positive Women in the Rural Southeastern United States: Implications for Targeted Interventions.” *AIDS Patient Care and STDs* 24 (8): 515-20.
- Konkle-Parker, D. J. 2010. “How Can We Facilitate Entry into and Retention in HIV Care?” *HIV Clinical Care* 22: 10-11.
- Konkle-Parker, D. J., J. A. Erlen, and P. M. Dubbert. 2008. “Barriers and Facilitators to Medication Adherence in a Southern Minority Population with HIV Disease.” *Journal of the Association of Nurses in AIDS Care* 19: 98-104.
- Krawczyk, C. S., E. Funkhouser, J. M. Kilby, and S. H. Vermund. 2006. “Delayed Access to HIV Diagnosis and Care: Special Concerns for the Southern United States.” *AIDS Care* 18: 35-44.
- Leserman, J., G. Ironson, C. O’Cleirigh, J. M. Fordiani, and E. Balbin. 2008. “Stressful Life Events and Adherence in HIV.” *AIDS Patient Care STDs* : 403-11.
- Moneyham, L., J. McLeod, A. Boehme, L. Wright, M. Mugavero, P. Seal, et al. 2010. “Perceived Barriers to HIV Care among HIV-Infected Women in the Deep South.” *Journal of the Association of Nurses in AIDS Care* 21: 467-77.

- Moore, R. D., J. C. Keruly, K. A. Gebo, and G. M. Lucas. 2005. "An Improvement in Virologic Response to Highly Active Anti-Retroviral Therapy in Clinical Practice from 1996 through 2002." *Journal of Acquired Immune Deficiency Syndrome* 39: 195-98.
- Pence, B. W., N. M. Thielman, K. Whetten, J. Ostermann, V. Kumar, and M. J. Mugavero. 2008. "Coping Strategies and Patterns of Alcohol and Drug Use among HIV-Infected Patients in the United States Southeast." *AIDS Patient Care* 11: 896-77.
- Rajabiun, S., R. K. Mallinson, K. McCoy, S. Coleman, M. L. Drainoni, C. Rebholz, and T. Holbert. 2007. "'Getting me back on track': The Role of Outreach Interventions in Engaging and Retaining People Living with HIV/AIDS in Medical Care." *AIDS Patient Care and STDs* 21: 20-29.
- Schuster, M. A., R. Collins. W. E. Cunningham, S. C. Morton, S. Zierler, M. Wong, W. Tu, and D. E. Kanouse. 2005. "Perceived Discrimination in Clinical Care in a Nationally Representative Sample of HIV-Infected Adults Receiving Health Care." *Journal of General Internal Medicine* 9: 807-13.
- Ulett, K. B., J. H. Willig, H. Y. Lin, J. S. Routman, S. Abrams, J. Allison, A. Chatham, J. L. Raper, M. S. Saag, and M. J. Mugavero. 2009. "The Therapeutic Implications of Timely Linkage and Early Retention in HIV Care." *AIDS Patient Care STD* 23: 41-49.
- Wood, S. A., C. Tobias, and J. McCree. 2004. "Medication Adherence for HIV Positive Women Caring for Children: In Their Own Words." *AIDS Care* 16 (7): 909-13.

ATTITUDES TOWARD MATH: AN INDICATOR OF SUCCESS?

by

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ABSTRACT

A positive attitude toward math work is an essential element in the success of a student. Without it, achievement scores are likely to be lower. Eighth grade students from every demographic representing schools across the United States were surveyed on a graduated scale regarding their attitudes toward math work. The data were used to measure student attitudes toward math work in relation to average achievement scores. Attitudes were measured in the following categories: “math work is engaging and interesting,” “math work is challenging,” and “math work is too easy.” Each topic was broken down into four subtopics representing various frequency levels of positive and negative attitudes. Additionally, correlation was measured between scores for students who were eligible for free or reduced-price lunch and those who were not. Correlation analysis revealed that achievement scores and attitudes toward math work are positively correlated—the higher the score, the more positive the attitude. Scores for students eligible for free or reduced-price lunch and for those not eligible also revealed positive correlation. There was a significant difference in average scores for students eligible for free or reduced-price lunch and those not eligible for free lunch, with those eligible scoring much lower under every category surveyed. Analysis of the coefficient of determination showed that the majority of the variance can be explained by the variables measured. The results show that achievement scores and attitudes toward math work are positively correlated. Based on this, more research should be conducted to determine methods to

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increase and maintain positive attitudes toward math work. Also more research should be conducted to determine the reasons for the discrepancy in math scores between students eligible for free or reduced-price lunch and those not eligible for it.

Introduction

What can we do to help students become successful? What are the barriers holding them back? These questions are on the minds of concerned teachers everywhere. Many are searching for means to improve learning experiences and engagement of students. Educators have looked at every angle of the question of improving success. Pajares (2002) believes it comes down to one main idea, students' belief in themselves. He maintains that a positive belief in oneself is essential to achieving academic success.

This study investigated the possible relationship between math achievement scores and student attitudes toward mathematics work. Whether or not that relationship differs between students eligible for free or reduced-price lunch and those not eligible for it was also investigated. Research demonstrates that a student's attitude toward math predicts his or her future. Thus, attitudes toward math have been shown to be positively correlated with many aspects of students' future, from their likelihood to pursue advanced math in high school or college to their college majors and even career paths. All of these predictors have been based on one factor—attitude (Farooq & Shah 2008; Hemmings & Kay 2010; Kitsantas, Ware, & Cheema 2010; Pajares 2002). Attitude is so tightly interwoven between the student and his or her success that it is impossible to tell which one causes the change in the other. Does positive academic achievement lead to a positive attitude, or does a positive attitude lead to academic achievement? Pajares (2002) likened this relationship between attitude and achievement to that of “the chick and the egg question.” He stated that the question cannot be answered definitively (Pajares 2002).

Kitsantas, Ware, and Cheema (2010) used a multiple regression model to find that a positive attitude toward mathematics is closely associated with higher achievement. In the study, Kitsantas et al. also used the model to show that high achievement scores were positively correlated with higher socioeconomic status. Areas of poverty had lower attitudes toward math and lower achievement scores. This is in line with the

hypothesis in the current study, stating that the scores of students eligible for free or reduced-price lunch and those not eligible will be positively correlated with attitudes toward math and achievement scores and that the scores for those eligible for free lunch will be lower than scores for those not eligible. Through their research, Kitsantas et al. ran a number of nested tests and found that no matter how data were analyzed, self efficacy was an important predictor of academic achievement (Kitsantas et al. 2010).

Lebens, Graff, and Mayer (2011) focused on the differences between students who had trouble in math and those who were average performers. According to the findings of their research, students who had difficulty with math also had a negative attitude toward math. This negative attitude increased as the students progressed through middle school. More students had a negative attitude toward math at the end of middle school than at the end of elementary school. Students realize the importance of academics during middle school, and struggling students give up on learning after many personal failures. These students come to believe their teacher is at fault for their failure to understand the subject matter. Interestingly, this attitude was only found in the lowest performers. Average performers in math did not share in the belief that the teacher was to blame. Instead, they felt more positive believing they were able to achieve some success on their own. This information suggests that forming positive attitudes about math needs to be a focus in the early grades so that students may become confident in their abilities to execute basic math skills (Lebens et al. 2011).

Bramlett and Herron (2009) surveyed college algebra students using the Fennema-Sherman Math Attitudinal Survey. Their research showed that there was a “significant relationship between attitudes toward mathematics and achievement for African American students” (Bramlett & Herron 2009). The research showed that too much confidence can cause students to overestimate their abilities in the area of mathematics and lead to poor results. More than half of the students surveyed either withdrew from the course or scored a *D* or below in the course, even though the surveys did not indicate an overwhelming negative attitude toward math from the participants. Research

indicated that the students lacked the motivation to put forth the effort required to do the work associated with the math problems (Bramlett & Herron 2009).

Further, Hemmings and Kay (2010) conducted a study to find out if achievement level was based on ability and effort, attitude toward the subject, previous achievement scores, or any combination of these. This study focused on whether or not the examination of scores derived from achievement tests given in seventh and tenth grades could predict future achievement scores. Hemmings and Kay also wanted to find out if effort and attitude had any bearing on achievement scores. They concluded that students' achievement test scores in their seventh year were a good device to predict their achievement in their tenth year of school. The researchers also found that a positive attitude toward mathematics indicated a higher achievement score. However, effort did not turn out to be a significant indicator of achievement scores (Hemmings & Kay 2010). This is in contrast to what Bandura (1982) concluded. In his study, Bandura used the graduated self efficacy scale, in which various levels are assigned to each item in question. He stated that the way a student feels about his ability in a particular area directly affects the way he will perform and even the amount of effort he will put forth when faced with a challenge of any magnitude (Bandura 1982).

In order to boost students' confidence in math, their attitude toward this subject must be improved. The key to improving student attitudes toward mathematics may lie in showing them that math is useful in real life situations. Dossey, Mullis, Gorman, and Latham (1994) present data that seem to indicate that students feel there is a disconnect between the classroom and the real world in regard to mathematics. Students who did not believe math was useful and did not think math would be used in their jobs had lower achievement scores. Conversely, students who believed math was useful and it would benefit them in future jobs scored higher (Dossey et al. 1994).

In this study, the researchers sought to answer the following research questions: (1) Is there a positive correlation between achievement scores and student attitudes toward mathematics work? and (2) Of the students who responded negatively toward mathematics work, is there a positive relationship between achievement scores of students who receive

free or reduced-price lunch and those who do not receive free or reduced-price lunch?

Method

Participants

The sample of this study consisted of 161,000 male and female eighth grade students of public and private schools. The sample included white, black, Hispanic, Asian/Pacific Islander, and American Indian/Alaskan native students. The data were separated by eligibility and ineligibility for free or reduced-price lunch. Eighth grade was chosen for this study because it is a very important point in the academic life of each student. Students for whom test accommodations were permitted are included in the data (National Center for Education Statistics, November 19, 2009).

Materials

The test and survey data in this study were collected from the National Center for Education Statistics (May 2010) and the National Assessment of Educational Progress (NAEP). This information was collected from the 2009 Mathematics Assessment. The Common Core of Data collected the student data from all fifty states, the District of Columbia, the Department of Defense schools, and outlying areas. The information was collected from the state education agencies. The NAEP “is the largest nationally representative and continuing assessment of what America's students know and can do in various subject areas” (National Center for Education Statistics, April 27, 2012). The NAEP does not change the test booklet based on the demographic of the area, and they rarely make changes to the test booklets so as to provide a good indicator of progress through the years. A scatter plot is used to show correlation between two variables, achievement in mathematics and varying attitudes toward mathematics (National Center for Education Statistics, April 27, 2012).

Design

This correlation research is a quantitative study of the correlation between mathematics achievement and negative attitudes toward mathematics. Attitudes in mathematics are defined as follows: “math is engaging and interesting,” “math is challenging,” and “math is too easy.” Each of these levels is broken down into four subcategories as follows: *never or hardly*

ever, sometimes, often, and always/almost always. To define the negative attitudes toward math, the researchers used the data collected from students who had indicated that math was often or always challenging. Those who indicated math was never too easy or never engaging or interesting were also included in this group. For the purpose of this study, the students who felt that math was sometimes too easy or that math was sometimes engaging or interesting were not included as having negative attitudes toward math work.

The attitudes were assigned frequency levels. Under the topics “math work is engaging and interesting” and “math work is too easy,” level one was assigned to *never or hardly ever*. Level two was assigned to *sometimes*. Level three was assigned to *often*. Level four was assigned to *always/almost always*. Under the topic “math work is challenging,” level one was assigned to *always/almost always*. Level two was assigned to *often*. Level three was assigned to *sometimes*. Level four was assigned to *never or hardly ever*. Level one describes the most extreme negative attitude. Level four explains the highest positive attitude.

A scatter plot will show the correlation between the attitudes to discover if there is a relationship between the variables. If there is a relationship, the nature of that relationship will be investigated—positive or negative correlation. There will be no attempt to prove causation as there are many possible factors that could impact the variables.

Procedure

The study used a scatter plot to show correlation, positive or negative. The data from the tables were input, and this correlation was used to find the relationship between the variables. The correlation was between -1 and +1. The variables showed higher correlation as the number reaches closer to +1. Data analysis showed whether there was a correlation between the variables: scores for students eligible for free or reduced-price lunch and scores for those not eligible. A correlation exists when one variable increases and the other variable either increases or decreases. This is shown on a scatter plot; if correlated, the points will hover around an imaginary line. R^2 explains the amount of variance. A bar graph is used to show the differences in scores for students eligible for free or reduced-price lunch and those not eligible. Graphs have been plotted to show the change in scores in

regard to the frequency in attitudes—both positive and negative—toward math work.

Results

The intent of this study was to determine the correlation between achievement scores and attitudes toward math work. This correlation was measured at each level for each topic. There were three topics surveyed: “math work is challenging,” “math work is too easy,” and “math work is engaging and interesting.” Under each topic, there were four choices: *never or hardly ever*, *sometimes*, *often*, and *always/almost always*. The secondary intent was to review the scores of the negative responders and determine if there was a positive relationship between those who are eligible to receive free or reduced-price lunch and those who are not. The hypothesis for this study stated that the scores of students eligible for free or reduced-price lunch and students not eligible for free or reduced-price lunch would be positively correlated with their attitudes toward math work and that the scores for students eligible for free lunch would be lower than those received by students not eligible for free or reduced-price lunch.

There was positive correlation between achievement scores and attitudes toward math work under the “math work is challenging” topic (see Figure 1). Students who felt math was *often* or *always* challenging scored the lowest, with those choosing *always* scoring significantly lower than those choosing *often*. The scores for students who chose *often* and *sometimes* were close but still positively correlated. Those who felt that math was never challenging scored much higher than all other subsets in this topic. The range for these scores was 19 points. Those choosing *often* or *sometimes* represent 77 percent of the population surveyed. Therefore, $R^2=.9446$, which means that 94.46 percent of the variation can be explained by the variables measured.

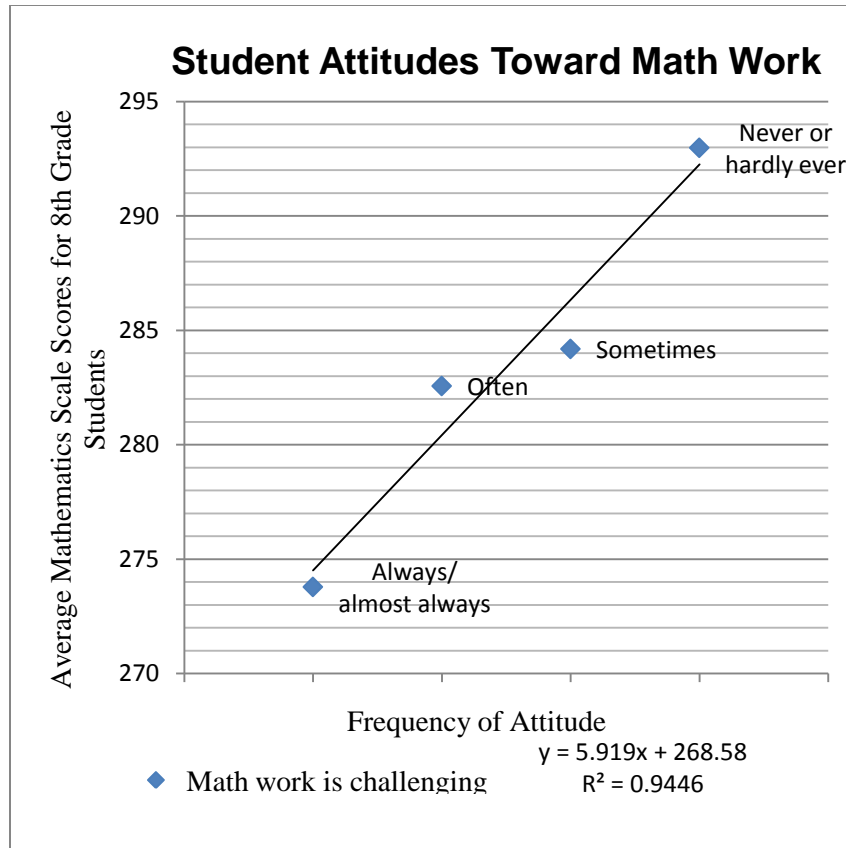


Figure 1

There was positive correlation between achievement scores and attitudes under the “math work is too easy” topic (see Figure 2). The two subheadings with the lowest scores were within one point of each other. Students who felt that math was too easy *sometimes* scored the lowest. They represented 54 percent of the population surveyed. Students who felt that math work was *never* too easy, scored second lowest. They represented 17 percent of the population surveyed. Those who believed math work was easy *often* or *always/almost always* scored the highest, and these scores were within two points of each other. The range for these scores was only six points. Thus, $R^2 = .7919$, which means 79.19 percent of the variation can be explained by the variables measured.

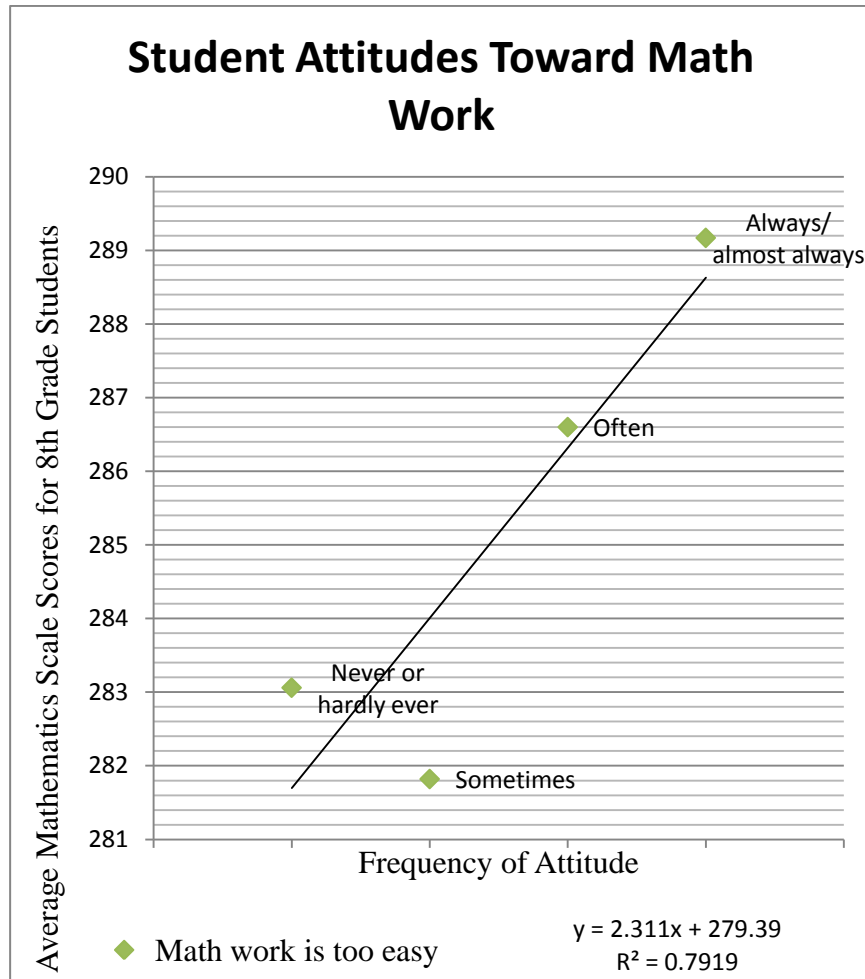


Figure 2

There was positive correlation under the “math work is engaging and interesting” topic (see Figure 3). Representing 24 percent of the population surveyed, those who felt math work was *never* engaging and interesting scored the lowest. Those who chose *sometimes* and *always/almost always* scored the same and represented a total of 49 percent of the population surveyed. The highest scores belonged to the students who believed math was *often* engaging and interesting. The range of these scores was only eight points. Consequently, $R^2 = .4889$, which means 48.89 percent of the variation can be explained by the variables measured. This indicates there are other significant factors that contribute to the variance under this topic.

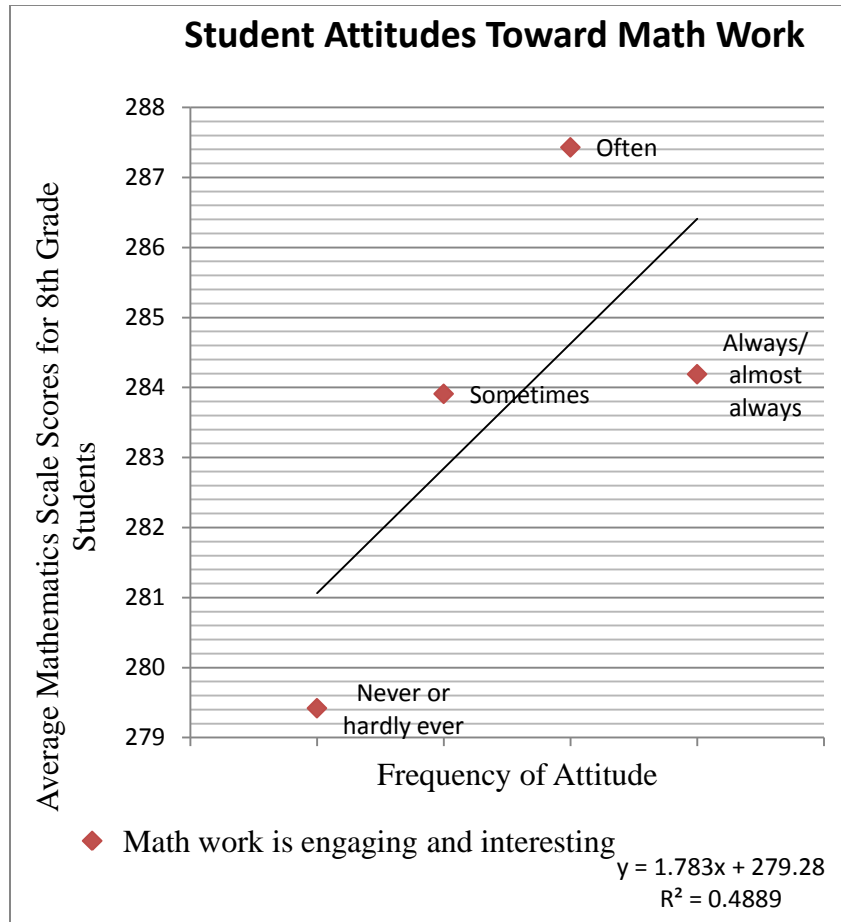


Figure 3

Of the negative responders, there was a consistent relationship between the attitudes of students eligible for free or reduced lunch and those not eligible (see Figure 4). For the purpose of this study, a negative attitude toward math is defined by the following responses: math work is *often* or *always/almost always* challenging, math work is *never* or *hardly ever* too easy, and math work is *never* or *hardly ever* engaging and interesting. The percentage of students who chose these subheadings was consistent between the two groups.

Under the topic “math work is challenging,” 30 percent of the students eligible and 30 percent of those not eligible chose *often*. Under the topic “math work is challenging,” 12 percent of those eligible and 10 percent of those not eligible chose *always/almost always*. The range of the scores under the subheading *often* was 27 points. The range under the subheading *always/almost always* was 31 points. Students eligible for free or reduced-price lunch received the lower scores.

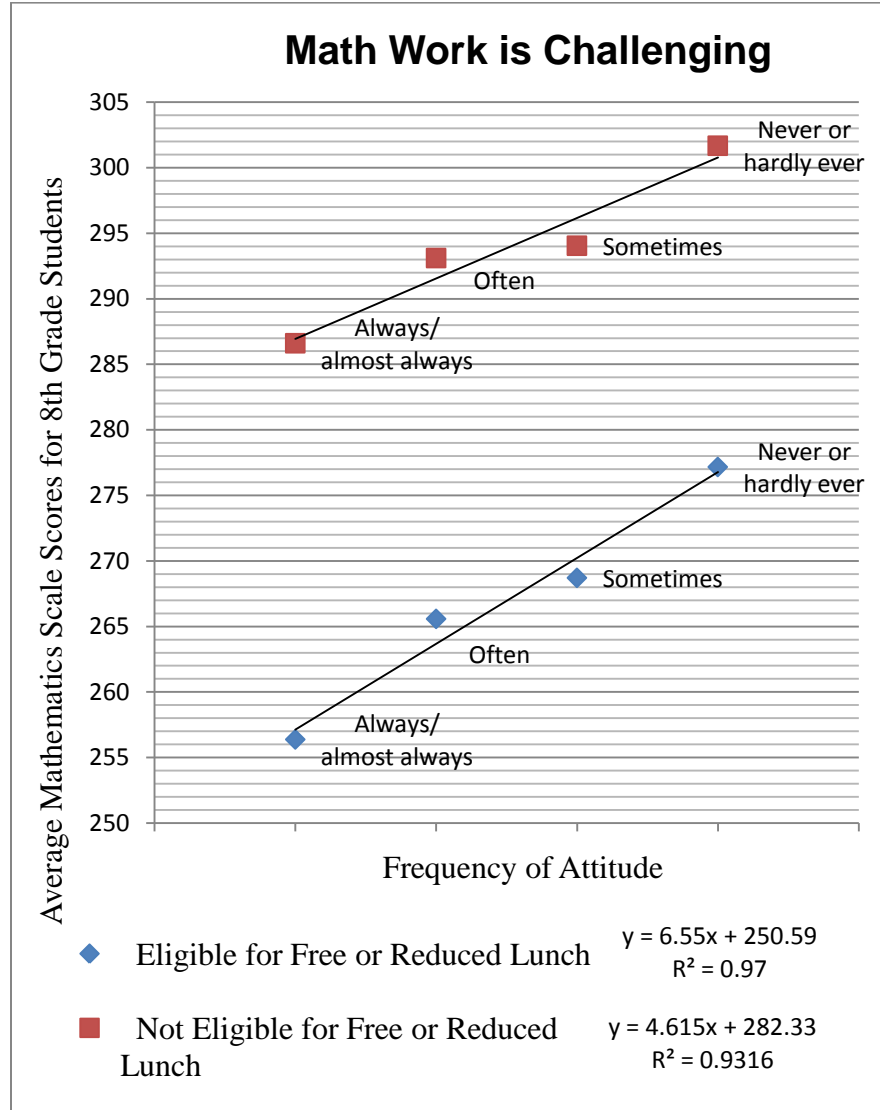


Figure 4

Under the topic “math work is too easy,” 14 percent of students eligible and 19 percent of those not eligible chose *never* (see Figure 5). The range of the scores was 28 points, with those eligible for free or reduced-price lunch receiving the lower scores.

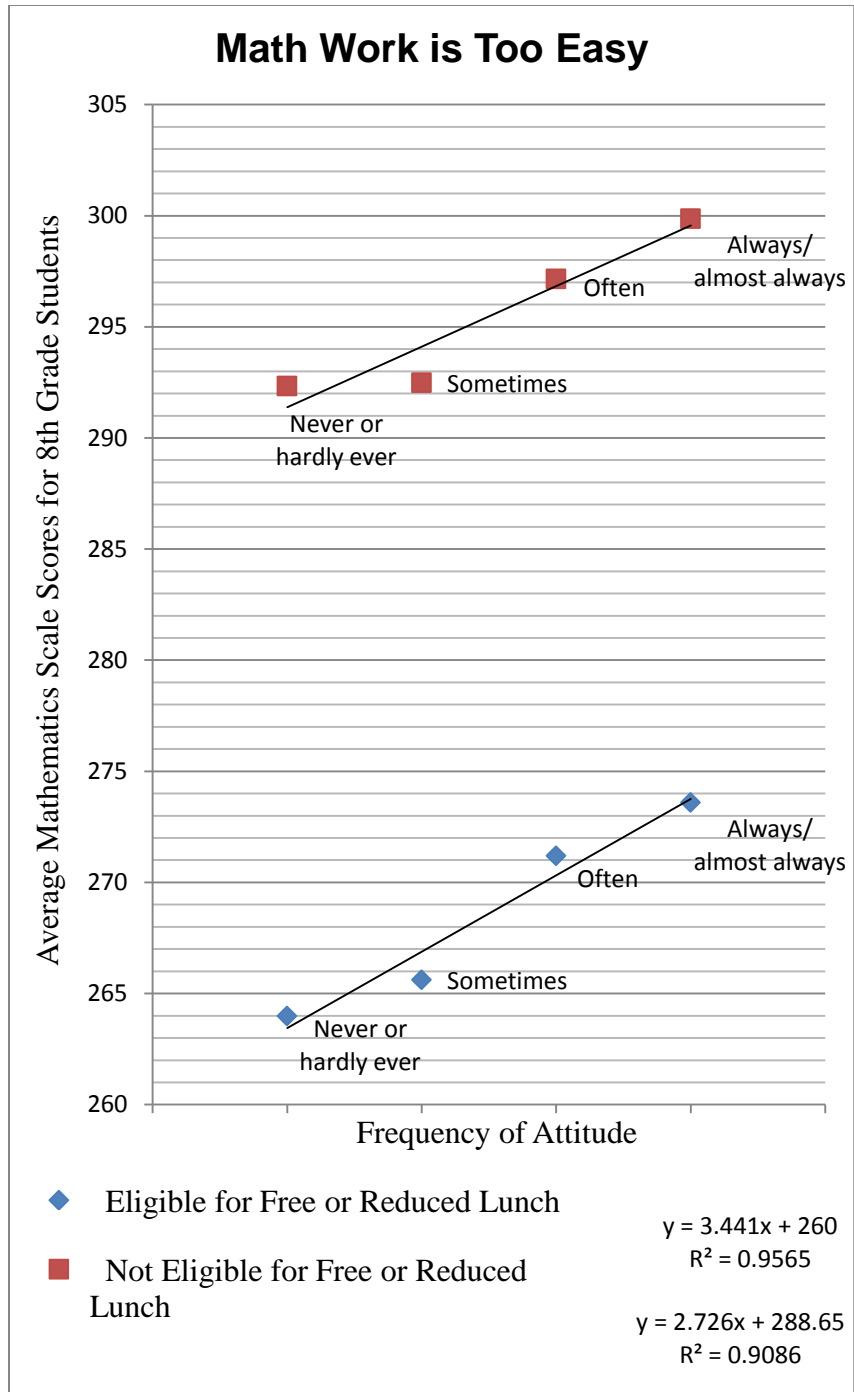


Figure 5

Under the topic “math work is engaging and interesting,” 22 percent of students eligible and 26 percent of those not eligible chose *never* (see Figure 6). The range of the scores was 22 points, with eligible students receiving the lower scores.

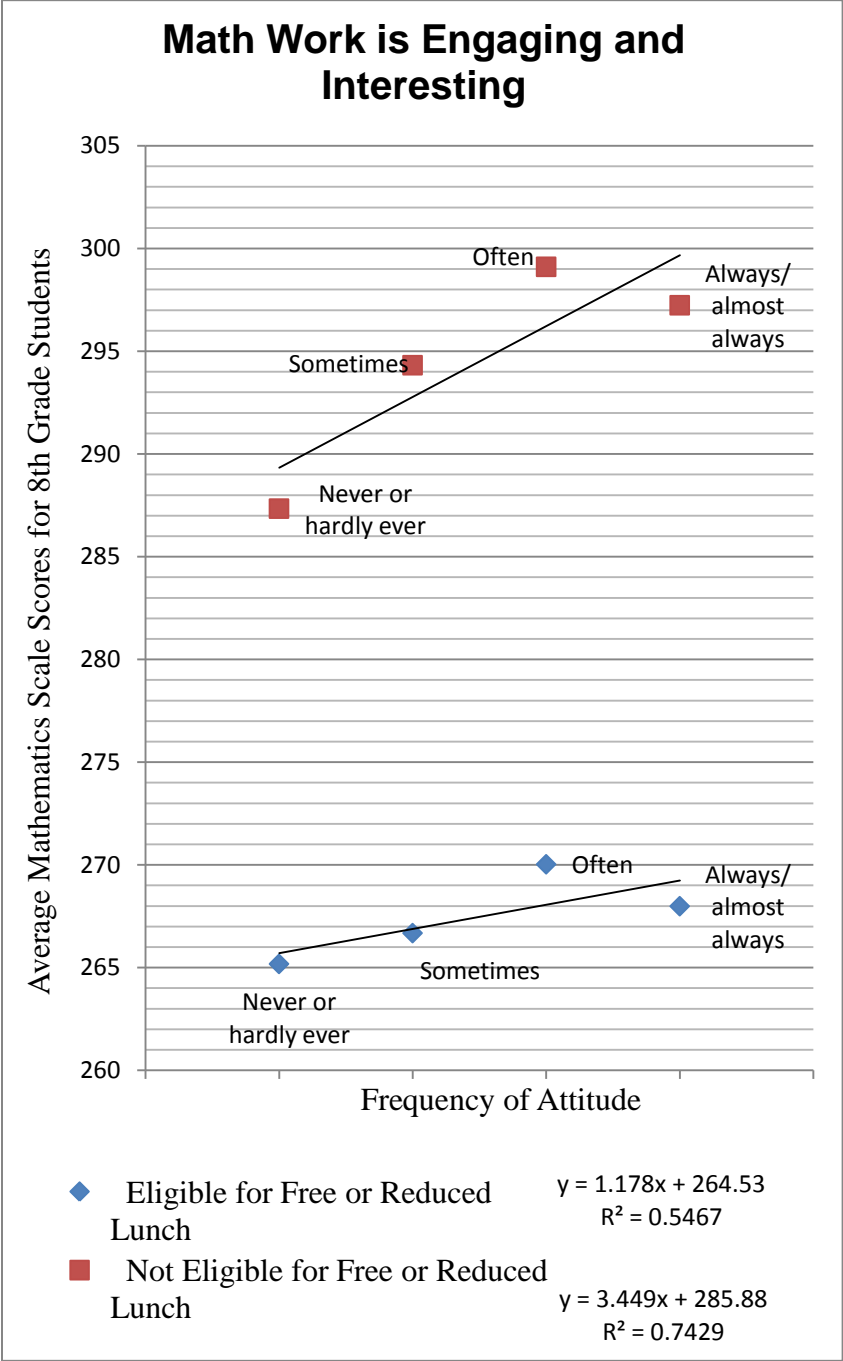


Figure 6

Figure 7 shows a score comparison of those students eligible for free or reduced-price lunch and those not eligible. The scores are only compared in the context of negative attitudes toward math work. The stark differences in average scores could be an indicator that environmental factors are playing a significant role in the score discrepancy.

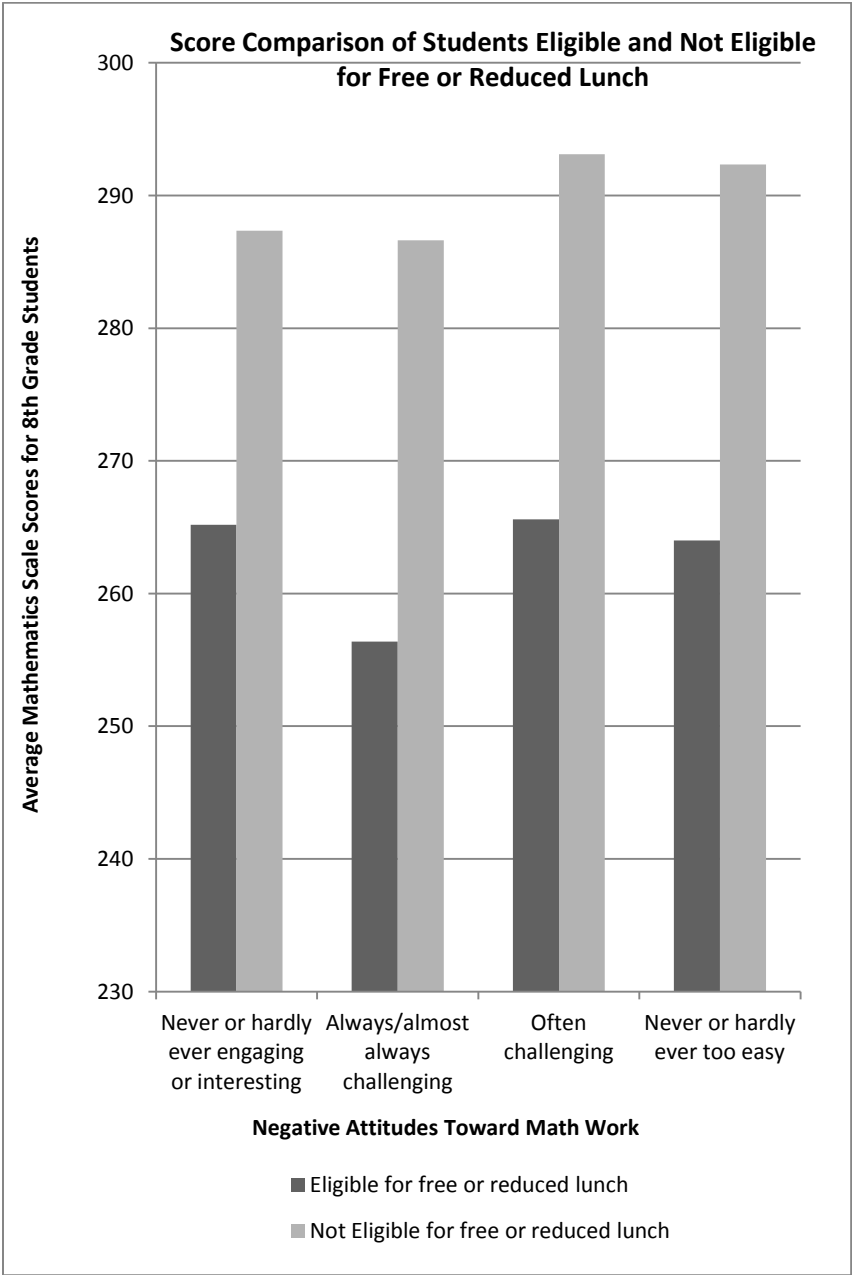


Figure 7

It was believed that this study would show that the scores of students eligible for free or reduced-price lunch and those not

eligible for free or reduced-price lunch would be positively correlated with their attitudes toward math work and that scores would be lower for students eligible for free or reduced-price lunch. Attitudes of the scores of students, both eligible and not eligible for free or reduced-price lunch, were positively correlated under all three topics. Under the topic “math work is engaging and interesting,” $R^2=.8719$, meaning that 87.19 percent of the variation can be explained by the variables measured (see Figure 8).

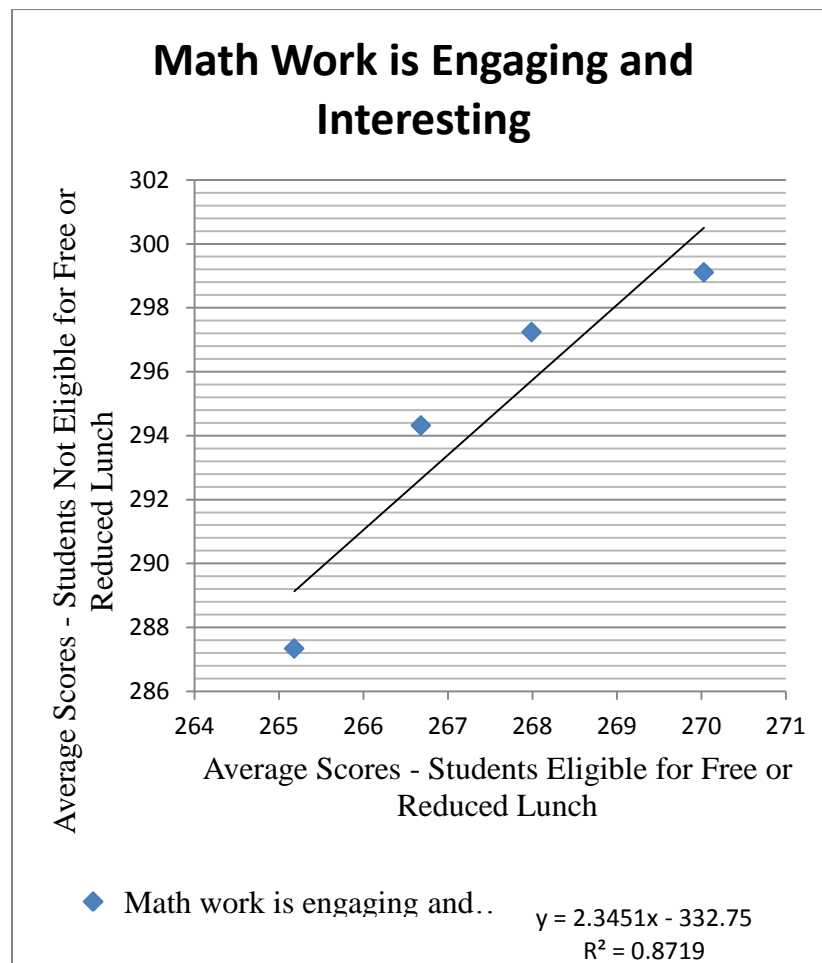


Figure 8

Under the topic “math work is too easy,” $R^2=.9761$, which means 97.61 percent of the variation can be explained by the variables measured (see Figure 9). Under the topic “math work is challenging,” $R^2=.9864$, indicating that 98.64 percent of the variation can be explained by the variables measured (see Figure

10). The topic “math work is challenging” showed the highest correlation, while the “topic math work is engaging and interesting” showed the lowest correlation.

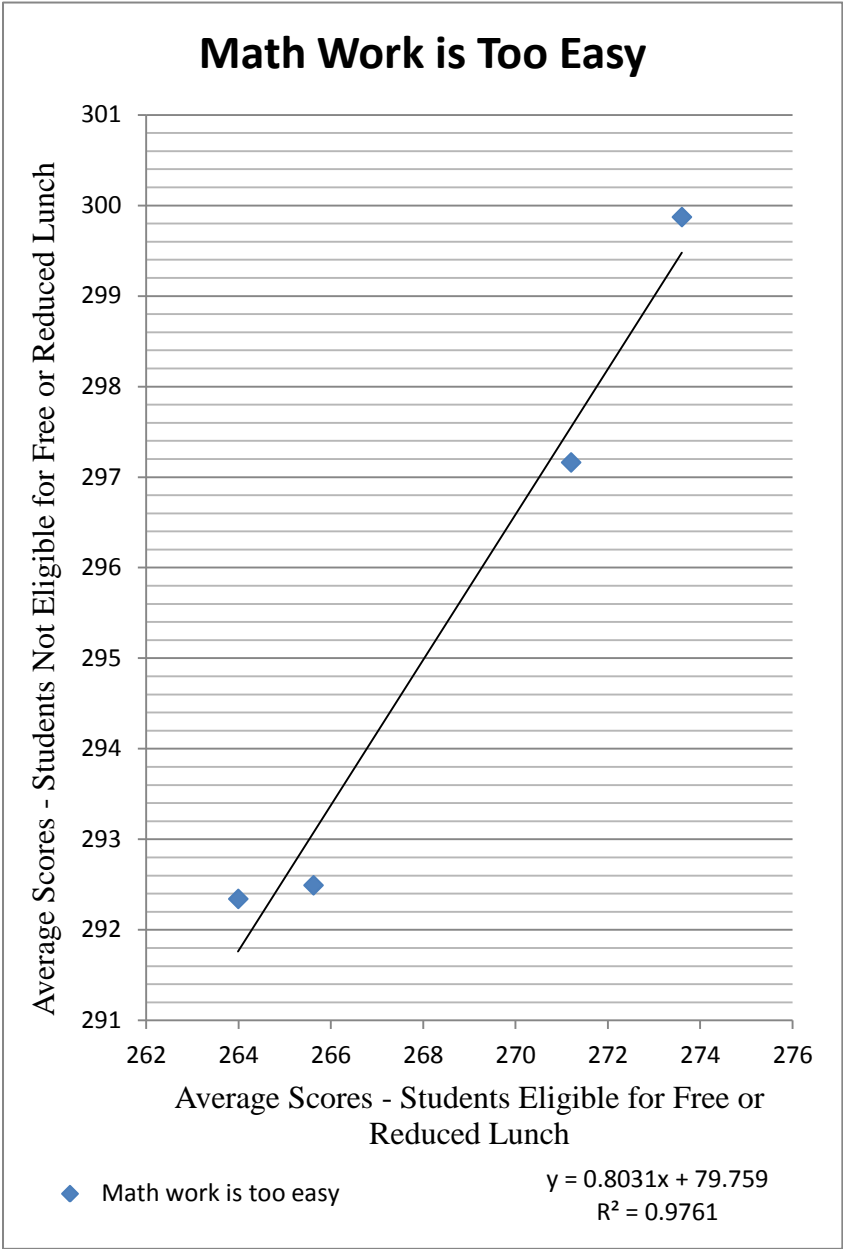


Figure 9

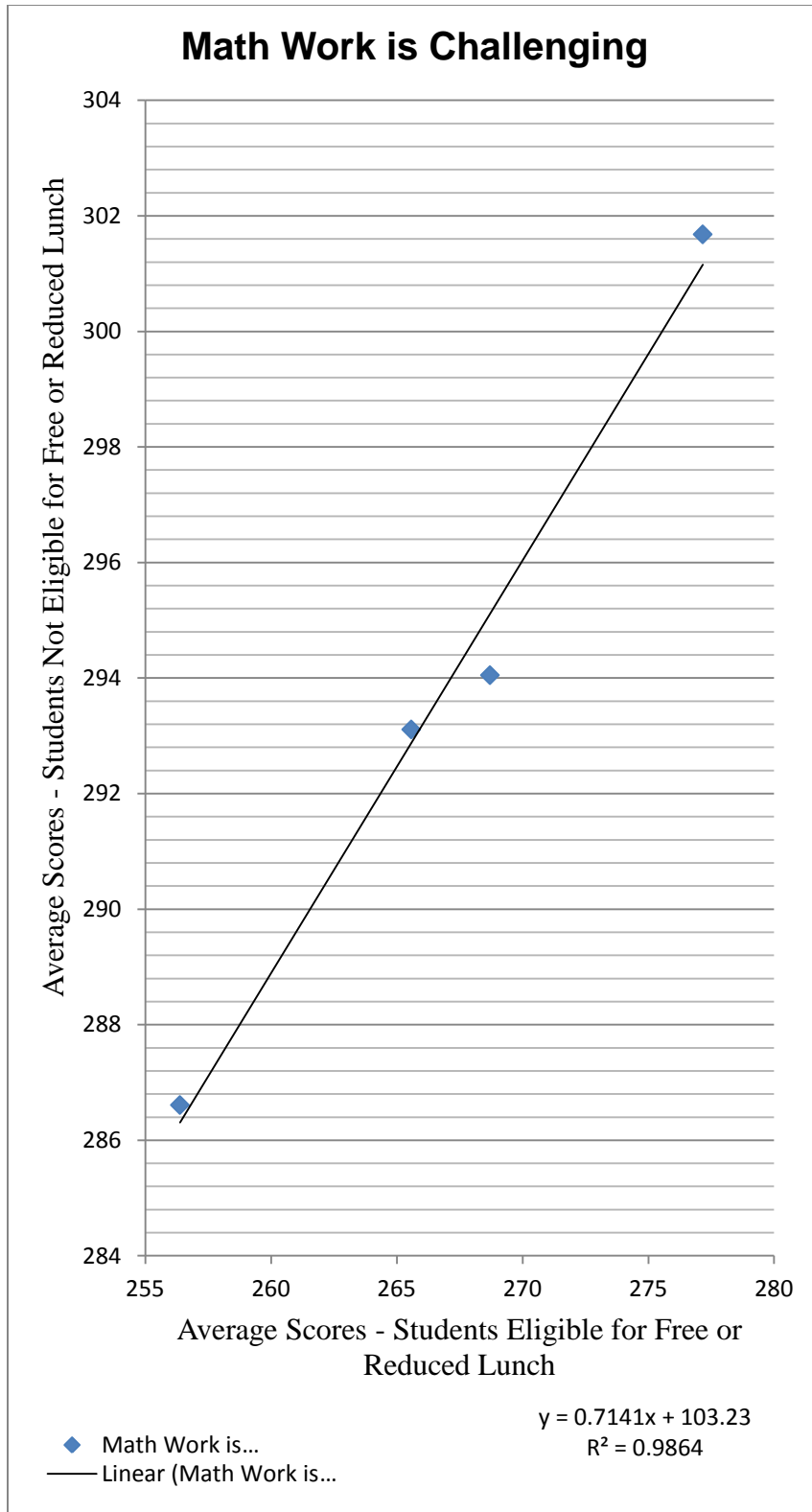


Figure 10

Discussion

The results of this study indicate that students scoring lower on achievement tests would have a more negative attitude toward math work than those who scored higher. This holds true and is especially evident under the topic “math work is challenging.” The difference from the other topics is extreme—19 points, much higher than in the other categories. The scores in the other topics were all relatively close, with a range of eight or less for both topics. This indicates that the other topics do not have as much of a bearing on the score.

Interestingly, the highest scores received under the topic “math is engaging and interesting” are under the subheading *often*. This indicates that students with the highest level of skills are sometimes bored and uninterested with the subject, perhaps because they come to understand the objectives more quickly than the others and still have to endure further teaching on the same topic. This same circumstance is evident when evaluating the scores of students eligible for free or reduced-price lunch and those not eligible. Under the same topic, the highest scores were received by students who chose “math work is *often* engaging and interesting.” However, the difference in scores is small.

The analysis of the scores of the students eligible for free or reduced-price lunch and those not eligible showed substantial differences. The evaluation of the average scores of all students demonstrated that the highest range or difference in scores observed is 19 points. All of the scores in the eligible and not eligible subgroups are in excess of 20 points lower in each category for students eligible for free or reduced-price lunch. The largest difference is 31 points under the category “math work is *often* challenging.” The maximum score for this achievement test was 500. The highest average score received in any category by students eligible was 277 as compared to scores over 300 for those not eligible.

The purpose of this study was to show that there is a positive correlation between achievement scores and student attitudes toward math work, which was supported by the evidence. The results under the topics “math is too easy” and “math is engaging and interesting,” are close, with a range of eight or less among all average scores, but still positively correlated. The results

under the topic “math work is challenging,” clearly show positive correlation and a larger range indicating a clear relationship.

Of the students who responded negatively toward math work, this study’s purpose was to determine if there was a positive relationship between achievement scores of students who receive free or reduced-price lunch and those who do not. The scores were correlated positively for both groups. The percentages of responders in each area are also closely related.

The hypothesis stated that the scores of students eligible for free or reduced-price lunch and those not eligible would be positively correlated. The scores are positively correlated in every category. It was further hypothesized that the scores for those eligible for free or reduced-price lunch would be lower than for those not eligible. This difference is extreme with differences from 22 to 31 points.

Kitsantas et al. (2010) used their model to show that high achievement scores were positively correlated with higher socioeconomic status and that areas of poverty had lower attitudes toward math and lower achievement scores. The results of this study also showed that students with a higher socioeconomic status, those not eligible for free or reduced-price lunch, receive higher achievement scores. This study also showed that students in poverty, receiving free or reduced-price lunch, have lower average achievement scores (Kitsantas et al. 2010).

Lebens et al. (2011) found that students who have difficulty with math have a negative attitude toward math. This stance is supported by this study. The negative attitudes defined in the study did yield the lowest scores, indicating that the students who have difficulty with math have a negative attitude toward math. The only exception was under the topic “math is never too easy” and the difference in scores is negligible at one point (Lebens et al. 2011).

Study Limitations

The study does have some weaknesses. There was not a lot of depth in the data, in that this information has only recently been studied in this type of graduated format through the archived data sites. In addition, one cannot be sure what the definition of each topic is to the individual student. For example, what is challenging to one student is most certainly not considered challenging by

another student. This would also cause discrepancy between the two populations studied, those eligible for free or reduced-price lunch and those not eligible. However, the percentages of students who chose each subheading were comparable, so this is not necessarily an issue.

More research should be conducted to determine ways to improve student attitudes toward math work. Even though causality was not established, it is important to students' future to ensure a love of mathematics. More research should also be conducted in regard to the disparity in scores between students receiving free or reduced-price lunch and those not eligible for it.

Based on the data in Figure 7, it is clear that average scores for students eligible for free or reduced-price lunch are significantly lower than those students not eligible. More research should be conducted to determine if environmental differences between the two groups lead to lower achievement scores and negative attitudes toward math work.

Conclusion

Based on the results of this study, it is clear that student attitudes and achievement scores are related. The students with the highest scores answered positively under each topic. The students with the lowest scores chose the negative stance under the topics. Correlation was positive for students eligible for free or reduced-price lunch and those not eligible. However, the difference in average scores was extreme and warrants further study. The clear discrepancy in scores between students eligible for free or reduced-price lunch and those not eligible could indicate that culture and socioeconomic status play an important role in attitudes toward math and achievement scores. Educators should take measures to ensure that students are engaged and interested when working with mathematics in an effort to keep a positive attitude.

References

- Bandura, A. 1982. "Self-efficacy Mechanism in Human Agency." *American Psychologist* 37 (2): 122-47. <http://jamie.smithportfolio.com/EDTE800/wpcontent/PrimarySources/Bandura3.pdf>.
- Bramlett, D. C., and S. Herron. 2009. "A Study of African-American College Students' Attitudes Toward Mathematics." *Journal of Mathematical Sciences and Mathematics Education* 3 (2): 43-52. <http://ww.msme.us/2009-2-6.pdf>.
- Dossey, J.A., I. V. S. Mullis, S. Gorman, and A. S. Latham. 1994. *How School Mathematics Functions: Perspectives from the NAEP 1990 and 1992 Assessments*. Princeton, NJ: National Assessment of Educational Progress. Retrieved from <http://www.eric.ed.gov/PDFS/ED377057.pdf>.
- Farooq, M. S., and S. Z. U. Shah. 2008. "Students' Attitude Towards Mathematics." *Pakistan Economic and Social Review* 46 (1): 75-83. Retrieved from <http://www.eric.ed.gov/PDFS/ED506772.pdf>.
- Hemmings, B., and R. Kay. 2010. "Prior Achievement, Effort, and Mathematics Attitude as Predictors of Current Achievement." *Australian Educational Researcher* 37 (2): 41-58. Retrieved from <http://www.eric.ed.gov/DFS/EJ907917.pdf>.
- Kitsantas, A., H. W. Ware, and J. Cheema. 2010. "Predicting Mathematics Achievement from Mathematics Efficacy: Does Analytical Method Make a Difference?" *The International Journal of Educational and Psychological Assessment* 5: 25-44. Retrieved from http://tijepa.books.officelive.com/Documents/V5_A2_TIJEPA.pdf.
- Lebens, M., M. Graff, and P. Maye. 2011. "The Affective Dimensions of Mathematical Difficulties in School-children." *Education Research International*, 2011, 13 pages. doi:doi:10.1155/2011/487072.
- National Center for Education Statistics. 2009 (November 19). *The Nation's Report Card: Mathematics 2009 Executive Summary*. <http://nces.ed.gov/nationsreportcard/pubs/main2009/2010451.asp>.

- National Center for Education Statistics. 2010 (May). *Average Mathematics Scale Score of 8th-Graders and Percentage Reporting Various Attitudes toward Mathematics Work, by Frequency of Attitude and Selected Student and School Characteristics: 2009*. [Data file]. Retrieved from http://nces.ed.gov/programs/digest/d10/tables/dt10_147.asp.
- National Center for Education Statistics. 2012 (April 27). NAEP Overview. <http://nces.ed.gov/nationsreportcard/about/>.
- Pajares, F. (2002). *Self-efficacy Beliefs in Academic Contexts: An Outline*. Retrieved February 2012, from <http://des.emory.edu/mfp/efftalk.html>.

**THE TAIL NO LONGER WAGGING THE DOG:
HOW WILL THE NEW COMMON CORE STANDARDS
AFFECT TEXTBOOKS?**

by

J. Jeannette Lovern, Ph.D.*

ABSTRACT

This study looks at the new *Common Core Standards for English Language Arts* and the new *Common Core Standards for Mathematics*. It compares the formats of each, which while developed in the same time frame and released for review at the same time, are quite disparate. It discusses how the standards were developed, the specificity of the new standards, particularly in the English Language arts, and the rigor of both sets of standards. Concepts that were once taught in middle school are now in the fourth- and fifth-grade standards. It looks at the early response of three large textbook publishers and whether *The Texas Effect* on textbook content will be negated. Finally, it discusses whether these *de facto* national standards will replace textbooks as the primary driver of how instruction is organized in American education.

The idea of national standards in the United States is not a new one. However, with the introduction of the Common Core Standards in 2010, and their adoption by 42 states by 2011, the United States has come the closest in its history to having consistent educational standards across the country. While not national standards *per se*, the fact that such a vast majority of the states have adopted them makes them almost *de facto* national standards. And it is probable that these standards will influence America's textbooks in at least three significant ways.

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Background

The Common Core Standards initiative was developed by the National Governors' Association and the Council of Chief State School Officers (NGA/CCSSO) as a method of uniting education standards nationwide. The standards-development process was completed in approximately one year by Achieve, Inc., a private contractor (Mathis 2010), and they were finalized on June 2, 2010 (Porter et al. 2010). The standards can be found at <http://corestandards.org/> as well as on the websites of the state departments of education that have adopted them.

States have long had individual standards, and the NGA/CCSSO indicate that these new standards build “on the foundation laid by states in their decades-long work on crafting high quality education standards” (Common Core Standards, ELA, p. 3). The new standards are based on international models, and are a synthesis of information published by scholars and professional organizations. NGA/CCSSO further ascertain that

the Standards are (1) research and evidence based, (2) aligned with college and work expectations, (3) rigorous, and (4) internationally benchmarked. A particular standard was included in the document only when the best available evidence indicated that its mastery was essential for college and career readiness in a twenty-first century, globally competitive society. (3)

Although the Common Core Standards initiative was not implemented by the federal government, nor are the standards “national standards” *per se*, the Obama administration did support the efforts of their development by providing funding to the organizations as they developed the standards and disseminated them for adoption (Mathis 2010).

As of 2012, a total of 45 states have adopted the Common Core Standards as their state standards. The eight states that have not include the two influential states, at least in terms of driving textbook content, of Texas and Virginia. In addition, Alaska, Minnesota, and Nebraska have not adopted them. Of the six United States territories, the District of Columbia and the Virgin Islands have adopted them, but the other four have not.

Organization of the Standards

English Language Arts Standards

The English Language Arts standards include standards in the five areas of:

- A) Reading Literature
- B) Reading Informational Text
- C) Writing
- D) Speaking and Listening
- E) Language

For each of those areas, there are *anchor standards*. These anchor standards are the same for grades kindergarten through twelfth grade, and there are ten or fewer for each of the five areas. For instance, the *Reading Literature* anchor standards are:

Table 1.1: Common Core Anchor Standards for Reading

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.
7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
10. Read and comprehend complex literary and informational texts independently and proficiently.

Each of these anchor standards is expanded upon for each grade level. A good example of the expansion and the progression that occurs is found in the area of literature:

Table 1.2: Reading Literature Standard 6, Elementary Progression

| |
|--|
| <p>6. Assess how point of view or purpose shapes the content and style of a text.</p> <p>Kindergarten: With prompting and support, name the author and illustrator of a story and define the role of each in telling the story.</p> <p>1st grade: Identify who is telling the story at various points in a text.</p> <p>2nd grade: Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud.</p> <p>3rd grade: Distinguish their own point of view from that of the narrator or those of the characters.</p> <p>4th grade: Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.</p> <p>5th grade: Describe how a narrator's or speaker's point of view influences how events are described.</p> |
|--|

It seems clear that the standard is about the concept of *point of view* and how it affects a literary piece. In kindergarten, the students will simply learn that *a story has an author* (a person who wrote story) and an illustrator (a person who drew the pictures for the story). In first grade, they will be expected to *figure out who is telling the story*, and it is presumed that stories will be used in which the person who is telling the story changes throughout. In the second grade, the students will be expected to note *how each person who is telling the story differs* from the way the others are telling the story. In third grade, the students move to *acknowledging that they themselves* have a point of view and that it may differ from the point of view of a person in a story. In fourth grade, *first-person and third-person narrations* are determined. And, in the fifth-grade, they discuss *how point of view affects the way the plot* is presented.

This same progression continues with the same anchor standard for grades six through 12:

Table 1.3: Reading Literature Standard 6, Middle School and Secondary Progression

| |
|--|
| <p>6. Assess how point of view or purpose shapes the content and style of a text.</p> <p>6th grade: Explain how an author develops the point of view of the narrator or speaker in a text.</p> <p>7th grade: Analyze how an author develops and contrasts the</p> |
|--|

points of view of different characters or narrators in a text.

8th grade: Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.

9th-10th grades: Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.

11th-12th grades: Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).

In middle school, the students analyze how the author develops the *point of view for various purposes*. In high school, they first move to considering *cultural points of view*, and then how points of view are used in text to *cause the reader to read between the lines*. The same ten anchor standards that are used for *Reading Literature* are used for the broad area of *Reading Informational Text*. The progression concerning the sixth standard is shown in the following table:

Table 1.4: Reading Informational Text Standard 6, Elementary through Secondary Progression

| |
|--|
| <p>6. Assess how point of view or purpose shapes the content and style of a text.</p> <p>Kindergarten: Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.</p> <p>1st grade: Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.</p> <p>2nd grade: Identify the main purpose of a text, including what the author wants to answer, explain, or describe.</p> <p>3rd grade: Distinguish the student’s own point of view from that of the author of a text.</p> <p>4th grade: Compare and contrast a firsthand and a secondhand account of the same event or topic; describe the differences in focus and the information provided.</p> <p>5th grade: Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.</p> <p>6th grade: Determine an author’s point of view or purpose in a text and explain how it is conveyed in the text.</p> <p>7th grade: Determine an author’s point of view or purpose in a text and analyze how the author distinguishes his or her position from that of others.</p> <p>8th grade: Determine an author’s point of view or purpose in a text and analyze how the author acknowledges and responds to</p> |
|--|

conflicting evidence or viewpoints.

9th-10th grades: Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.

11th-12th grades: Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Just as with the progression on this “point of view” standard for reading literature, this same standard follows an increase in complexity as it moves from students recognizing that someone wrote the information through comparing their own point of view to that of the author. Then, in the upper grades, they eventually analyze the effectiveness of the ways that authors present their various points of view.

There are also ten anchor standards for *Writing*. They include aspects of the writing process, techniques involved in writing, and consideration of audience. There are six anchor standards for *Speaking and Listening*. These emphasize analysis of speakers and sources and the information they provide. They also include how students can be speakers and share their own ideas. The final area is called *Language*. It includes six anchor standards related to using the conventions of grammar and usage, capitalization, punctuation, spelling, and vocabulary.

Following the standards for each of the areas, there are “texts illustrating the complexity, quality, and range of student reading.” There are five suggested books for teaching kindergarten literature and five suggested books for teaching informational text. There are also five of each suggested for first grade. These are:

Table 1.5: Exemplar Texts Suggested for Kindergarten and First Grade

Kindergarten Literature:

Over in the Meadow by John Langstaff (traditional) (c1800) [read aloud]

A Boy, a Dog, and a Frog by Mercer Mayer (1967)

Pancakes for Breakfast by Tomie DePaola (1978)

A Story, A Story by Gail E. Haley (1970)

Kitten's First Full Moon by Kevin Henkes (2004) [read aloud]

Kindergarten Informational Texts:

My Five Senses by Alikei (1962) [read along]

Truck by Donald Crews (1980)

I Read Signs by Tana Hoban (1987)

What Do You Do With a Tail Like This? by Steve Jenkins and Robin Page (2003) [read aloud]
Amazing Whales! by Sarah L. Thomson (2005) [read aloud]
1st grade Literature:
 "Mix a Pancake" by Christina G. Rossetti (1893) [read along]
Mr. Popper's Penguins by Richard Atwater (1938) [read aloud]
Little Bear by Else Holmelund Minarik, illustrated by Maurice Sendak (1957)
Frog and Toad Together by Arnold Lobel (1971) [read along]
Hi! Fly Guy by Tedd Arnold (2006)
1st grade Informational Texts:
A Tree Is a Plant by Clyde Robert Bulla, illustrated by Stacey Schuett (1960)
Starfish by Edith Thacher Hurd (1962)
Follow the Water from Brook to Ocean by Arthur Dorros (1991)
From Seed to Pumpkin by Wendy Pfeffer, illustrated by James Graham Hale (2004) [read aloud]
How People Learned to Fly by Fran Hodgkins and True Kelley (2007) [read aloud]

There is a footnote on the page indicating:

Children at the kindergarten and grade 1 levels should be expected to read texts independently that have been specifically written to correlate to their reading level and their word knowledge. Many of the titles listed above are meant to supplement carefully structured independent reading with books to read along with a teacher or that are read aloud to students to build knowledge and cultivate a joy in reading." (Common Core Standards, ELA, 32)

There are a similar number of texts suggested for the grade bands of 2nd-3rd, 4th-5th, 6th-7th-8th, 9th-10th, and 11th-12th. Classics like *Charlotte's Web* and *Sarah, Plain and Tall* are included in the 2nd-3rd-grade band and *Alice in Wonderland* and *Casey at the Bat* in the 4th-5th-grade band for literature. An example of an informational text for the 2nd-3rd-grade band is *Moonshot: The Flight of Apollo 11*, while *Hurricanes: Earth's Mightiest Storms* is suggested for 4th and 5th graders. For middle school, *Little Women* and *The Adventures of Tom Sawyer* are among those listed as literature, while *Narrative of the Life of Frederick Douglass, an American Slave* and *Travels with Charley: In Search of America* are among those suggested for informational texts. At the 9th-10th-grade levels, *Macbeth* and *Grapes of Wrath*

are among the literature suggestions and *The Gettysburg Address* is among the informational texts listed. For 11th and 12th graders, *Jane Eyre* and *The Great Gatsby* make the literature list, along with *Common Sense* and *Black Boy* on the informational text list. Following the bands for the K-12 illustrative texts, there is a note that states:

Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of grades K-5 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth. (32)

There is a similar note following the grades 6-12 illustrative texts. In Appendix B, there are approximately 50 titles per grade band that are considered to be exemplars.

The final part of the standards contains a section called “Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12.” Again, the anchor standards for *Reading* are listed, and again, specifics for each grade are included. The “point of view” standard (Standard 6) is shown below:

Table 1.6: Reading Literature Standard 6 for Literacy in History/Social Studies and in Science/Technical Subjects

| | |
|---|--|
| 6. Assess how point of view or purpose shapes the content and style of a text. | |
| Literacy in History/Social Studies | |
| 6th-8th grades: | Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts). |
| 9th-10th grades: | Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts. |
| 11th-12th grades: | Evaluate authors’ differing points of view on the same historical event or issue by assessing the authors’ claims, reasoning, and evidence. |
| Literacy in Science and Technical Subjects | |
| 6th-8th grades: | Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an |

| |
|---|
| <p>experiment in a text.</p> <p>9th-10th grades: Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.</p> <p>11th-12th grades: Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> |
|---|

With the same standard being applied (with increasing complexity) from grade to grade, and across all forms of reading (whether literature or informational text), it is assumed that students would fully understand *point of view* by the time they are graduated from high school. Also, it is assumed that all teachers will become fluent in the standards since there are only ten reading standards, ten writing standards, six speaking and listening standards, and six language standards throughout.

Math Standards

Interestingly, the Common Core Math Standards are organized differently than the English Language Arts Standards. This is probably the result of disparate groups creating each of the sets of standards, but as these standards were developed for the purpose of being adopted across the nation (*de facto* national standards) and are precursors to further standards in the other subject areas, it has been surprising to many educators that the creators did not attempt to make the formatting consistent.

For the Common Core Math Standards, there are individual standards within domains and clusters for each of the grades kindergarten through eighth grade. For the high school areas, the domains, clusters, and standards are divided into what are called *conceptual categories*. Each grade level (or conceptual category) begins with an overview listing the domains and clusters, followed by the standards being spelled out. The kindergarten overview includes:

Table 1.7: Common Core Math Standards Domains and Clusters for Kindergarten

| |
|---|
| <p>Counting and Cardinality ←[domain]</p> <p>Know number names and the count sequence.</p> <p>Count to tell the number of objects. [cluster] }</p> <p>Compare numbers.</p> <p>Operations and Algebraic Thinking</p> |
|---|

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

Work with numbers 11–19 to gain foundations for place value.

Measurement and Data

Describe and compare measurable attributes.

Classify objects and count the number of objects in categories.

Geometry

Identify and describe shapes.

Analyze, compare, create, and compose shapes.

The standards then spell out the specifics more fully. For example, the *counting and cardinality* domain for kindergarten contains the following six standards organized within the clusters:

Table 1.8: Common Core Math Standards for Kindergarten

Counting and Cardinality

Know number names and the count sequence.

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
 - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
 - b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
 - c. Understand that each successive number name refers to a quantity that is one larger.

5. Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.
7. Compare two numbers between 1 and 10 presented as written numerals.

There are similar standards for each of the other domains and clusters for kindergarten and each of the grade levels through eighth. The domains remain fairly consistent throughout the elementary grades; they change somewhat in middle school, as shown in the following table:

Table 1.9: Common Core Math Standards, Domains Kindergarten through Eighth Grade

| Kinder | 1st-2nd | 3rd-4th-5th | 6th-7th | 8th |
|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|--|
| Counting and Cardinality | | | | |
| Operations and Algebraic Thinking | Operations and Algebraic Thinking | Operations and Algebraic Thinking | Ratio and Proportional Relationships | |
| | | | Expressions and Equations | Expressions and Equations Functions |
| Number and Operations in Base Ten | Number and Operations in Base Ten | Number and Operations in Base Ten | The Number System | The Number System |
| | | Number and Operations—Fractions | | |
| Measurement and Data | Measurement and Data | Measurement and Data | | |
| Geometry | Geometry | Geometry | Geometry | Geometry |
| | | | Statistics and Probability | Statistics and Probability |

As shown, there are only four or five domains for each grade. Counting and cardinality is expected to be mastered in kindergarten, so it is not contained in the first-grade standards. Fraction study begins in the third grade, is further emphasized in the fourth, and should be mastered by the fifth grade. Statistics and probability is then taught in middle school.

The high school conceptual categories are:

- A) Number and Quantity
- B) Algebra
- C) Functions
- D) Modeling
- E) Geometry
- F) Statistics and Probability

For all of the conceptual categories except modeling, there are domains and clusters within which the standards reside similar to the K-8 ones. For modeling, there are no domains or clusters or even a listing of standards. Rather, there are standards within the other categories marked with an asterisk that indicate they represent modeling.

Within the *number and quantity* conceptual category, used in the secondary schools, the domains and clusters include:

Table 1.10: Common Core Math Standards Domains and Clusters for the Secondary Concept Area of Number and Quantity.

| |
|--|
| <p>The Real Number System Extend the properties of exponents to rational exponents. Use properties of rational and irrational numbers.</p> <p>Quantities Reason quantitatively and use units to solve problems.</p> <p>The Complex Number System Perform arithmetic operations with complex numbers. Represent complex numbers and their operations on the complex plane. Use complex numbers in polynomial identities and equations.</p> <p>Vector and Matrix Quantities Represent and model with vector quantities. Perform operations on vectors. Perform operations on matrices and use matrices in applications.</p> |
|--|

Just as with the elementary and middle school standards, the standards themselves are found within the clusters, as exemplified with number and quantity's first domain shown below:

Table 1.11: Common Core Math Standards for the First Domain of the Number and Quantity Concept Area.

| |
|--|
| <p>The Real Number System Extend the properties of exponents to rational exponents</p> <ol style="list-style-type: none"> 1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(1/3)^3$ to hold, so $(5^{1/3})^3$ must equal 5.</i> 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents. <p>Use properties of rational and irrational numbers</p> <ol style="list-style-type: none"> 3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number |
|--|

and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

In addition, throughout the grade levels and high school conceptual categories, a separate set of eight overarching standards, which are called *Mathematical Practices*, are included. They are:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Unlike the English Language Arts standards that include 42 standards for each grade level, the number of standards per grade level varies here, ranging from 21 to 28 in the elementary grades, and from 24 to 29 in middle school. The high school conceptual categories range from 27 to 43, with the largest number in geometry.

In addition to the standards, there is an appendix entitled *Designing High School Mathematics Courses Based on the Common Core State Standards*. It provides guidance on how to incorporate the standards into either a traditional secondary math course structure (Algebra I, Geometry, Algebra II, Advanced Math) that leads to preparation for college, or an integrated pathway that includes Math I, Math II, Math III, and then a choice of a fourth year of math that is either college-preparatory or a career technical course. They indicate that the traditional path is used in the United States, but that most other countries use the integrated pathway (Common Core Standards, Appendix A, p. 4).

How the Standards May Affect Textbooks

There are four very likely ways that the standards may affect K-12 textbooks. They include:

1. mitigating the “Texas effect” that drives textbook content
2. providing specificity for language arts that various, and sometimes vague, state standards did not

3. causing reorganization of how math is offered in secondary schools
4. requiring more rigor in the textbooks to meet the standards

The “Texas Effect” Mitigated

The first major way that the new Common Core Standards may affect textbooks is related to decreasing the influence that Texas has had on textbook content. The fact that 42 states and two territories have adopted the Common Core Standards means that the sheer number of textbooks required for schools in which the new standards are in place will be the single largest block of purchasers. Historically, the state standards of Texas and California have driven textbook content. In 2009, Fletcher stated:

Because Texas purchases all the textbooks for all the subjects for school districts, and because of its sheer size—more than 8,000 schools educating 4.6 million students—Texas drives the textbook market. This means most publishers create their products to fit Texas specifications and with the Texas vetting process and clientele in mind. Publishers make some modifications for other states and large districts, but for the vast majority of publishers, the Texas template is the starting point. (paragraph 2)

Robelyn (2010) concurs:

Texas has long been seen as having an outsized influence on publishers’ wares, because of both the size of the market, which is second only to California’s, and the fact that it’s among the 20 “adoption” states that identify lists of approved instructional materials for districts to use. With the adoption of the Common Core Standards by the vast majority of the states, Texas’ influence is diminished. (2)

With 45 states (including several “adoption” states) using the same standards, the “Texas effect” may actually disappear. As of 2012, only the standards for English Language Arts and for Mathematics have been implemented as Common Core Standards, but the ones for social studies and for science are currently being developed. It is assumed that they too will be widely adopted.

Specificity for Language Arts

The second way the standards will likely influence textbooks is related to the specificity of the new standards, especially in the English language arts. Because the new standards include exacting language for each grade level, it is likely that new textbooks will be developed that are equally specific. One of the new *Language* standards and its progression is shown:

Table 1.12: Common Core Language Standard 2, Grades Kindergarten through Third Grade

| | |
|----------------------------|--|
| Language Standard 2 | |
| Kindergarten: | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize the first word in a sentence and the pronoun <i>I</i> . b. Recognize and name end punctuation. c. Write a letter or letters for most consonant and short-vowel sounds (phonemes). d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships. |
| 1st grade: | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize dates and names of people. b. Use end punctuation for sentences. c. Use commas in dates and to separate single words in a series. d. Use conventional spelling for words with common spelling patterns and for frequently occurring irregular words. e. Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions. |
| 2nd grade: | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize holidays, product names, and geographic names. b. Use commas in greetings and closings of letters. c. Use an apostrophe to form contractions and frequently occurring possessives. d. Generalize learned spelling patterns when writing words (e.g., cage → badge; boy → boil). e. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings. |
| 3rd grade: | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize appropriate words in titles. |

- b. Use commas in addresses.
- c. Use commas and quotation marks in dialogue.
- d. Form and use possessives.
- e. Use conventional spelling for high-frequency and other studied words and for adding suffixes to base words (e.g., *sitting, smiled, cries, happiness*).
- f. Use spelling patterns and generalizations (e.g., word families, position-based spellings, syllable patterns, ending rules, meaningful word parts) in writing words.
- g. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings.

As shown, the level of specificity for the *Language* standards is even greater than for the *Reading* standards (which themselves are fairly specific). Standard 2a is about capitalization. In kindergarten, students learn to capitalize the first word of a sentence and the word *I*. In first grade, they add in dates and names of people. In second grade, they learn to capitalize other proper nouns (names of holidays, products, and places). In third grade, they learn about capitalization in titles.

This level of specificity is in contrast to previous state standards that were often vague, demonstrated in the previous Kentucky standards. Capitalization is addressed under what was termed Enduring Understanding 3, under the *Writing Conventions* section of the curriculum and mentioned with a single word (capitalization) in the third skill expected of students. Note also that the primary grades have a single set of standards entitled *Primary*, rather than individual standards for kindergarten, first grade, second grade, and third grade.

Table 1.13: Previous Kentucky Standard for Writing, Grades Kindergarten through Third

Enduring Understanding 3: Students will understand that standard grammar and usage are important in making meaning clear to the reader; nonstandard grammar may be used for intended effect.

Kindergarten-3rd Grade: EL-P-WV-S-3

Students will apply correct grammar skills (e.g., complete sentences, various sentence structures, subject/verb agreement); mechanics (e.g., capitalization, punctuation); and usage (e.g., to/too/two; there/their).

The implication of having a standard that literally states that in second grade students will learn to capitalize holidays, product names, and geographic names as opposed to having a standard that says primary students will “apply mechanics (punctuation, capitalization)” is large. Previously, with vague standards, if one were to ask a teacher or curriculum specialist what determined exactly what was taught in the second grade, the answer would typically be, “The textbook.” In other words, the tail was wagging the dog. The tail (a useful tool for swatting flies and showing emotion) should be wagged based on the direction it receives from the dog. The dog shouldn’t be going back and forth because the tail is moving it. Likewise, a textbook is just a tool. It should be driving instruction. Instead, the standards and the teacher (the dog, in this metaphor) should be using the tools (the textbook) to achieve their goals. With the level of specificity found in the new Common Core Standards, it is presumed that the textbook will no longer be the starting point when a teacher sits down to plan instruction. The standards themselves will be.

In addition, while the writers of the Common Core Standards include language that indicates that the listings of the literature and information text “exemplars” are simply examples, it is likely that textbook developers will create textbooks including most of those “exemplars.” And, while they may not completely abandon stories and informational text they currently have in their textbooks that are not in the Common Core list of examples, they will most certainly move them to the grade level that most clearly matches the examples. Also, the discussion questions for the texts will most likely be reworked to align with the standards.

Re-design of the Math Courses

A third way that the new Common Core standards may have a huge effect on textbooks involves the fact that the Math standards in the secondary area were written using what they termed “conceptual categories” rather than in the format of traditional math courses. And Appendix A attached to those standards provides “pathways” to meet the standards through either a traditional high-school math series (Algebra I, Geometry, Algebra II, Advanced Math) or an integrated pathway based on international models. The difference between the pathways is not just in what course the material is taught. Trammel (n. d.) explains

the difference on the National Council for Teachers of Mathematics (NCTM) website:

An integrated mathematics lesson typically begins with a context-based problem, and concepts emerge as students attempt to solve the problem. In contrast, a traditional mathematics lesson typically begins with the presentation of a mathematical concept and ends with students' attempting to apply the concepts. In the integrated mathematics lesson, students immediately experience the usefulness of the mathematics.

Another potential difference between integrated and traditional mathematics is that students who are participating in an integrated program usually analyze data and make and test conjectures about mathematical models. These activities are vastly different from simply applying a model given, as in most traditional programs.

A teacher's role in an integrated mathematics classroom normally shifts to that of a facilitator who uses probing questions to stimulate students and interact with them. In such a role, the teacher guides the instruction in an inquiry-based approach. This role is in stark contrast to many direct-instruction programs in which the teacher is primarily a lecturer. (paragraphs 3-5)

Obviously, if a school district chooses the integrated pathway, a traditional algebra textbook or a geometry textbook will not work. While the Common Core Standards provide information in Appendix A that would allow schools to meet the standards using the traditional pathway, it appears that the "international" aspect of the integrated pathway is somewhat encouraged over the traditional pathway.

Rigor

A final way the standards will likely influence textbooks involves the rigor of the standards. In a Fall 2010 Center on Education Policy report on a survey conducted with state officials, it was reported that the states that have adopted the common standards most often cited the rigor of the standards and their potential to guide statewide education improvement as *very*

important or *important* considerations in their decision to adopt the standards. Thus, obviously, the rigor of the standards will influence the rigor of textbooks. One way that this will likely occur involves the “fewer and deeper” aspect of the new standards. While previous state standards often covered a little bit of everything every year, the new standards have fewer broad concept areas for each grade level. Math textbooks that used to have 15 short chapters covering numerous concepts will likely be replaced with textbooks specific to the four or five domains in the Common Core Standards for that grade level. For instance, a fourth-grade math book will probably have the five units of operations/algebraic thinking, number and operations in base ten, fractions, measurement, and geometry, as these are the five domains under which the 28 fourth-grade standards fall. Thus students won’t just keep relearning a little bit about fractions each year. Instead, in the fourth grade, it will be fully one-fifth (and possibly more) of the math curriculum.

Because of the rigor, standards that were once taught in middle school have moved to the elementary grades, and the new standards are considered to go more deeply into a concept than previously. This is shown when comparing the previous Kentucky state standards with the Common Core ones. In the 7th-grade standards, there was a broad area of measurement. The standards included in that area are:

Table 1.14: Previous Kentucky *Measurement* Standard for Seventh-Grade

| |
|--|
| <p>MA-7-M-S-SM1 Students will describe and provide examples of U. S. Customary and metric units of measurement; use these units to solve real-world and/or mathematical problems.</p> <p>MA-7-M-S-MPA1 Students will read and use measurement tools (e.g., rulers, scales, protractors, angle rulers).</p> <p>MA-7-M-S-MPA2 Students will estimate and find angle measures and segment measures</p> <p>MA-7-M-S-MPA3 Students will estimate and find circle measurements in standard units (radius, diameter, circumference, area) and relationships among them.</p> |
|--|

MA-7-M-S-MPA4

Students will develop and use the formulas for area of a triangle, a parallelogram and a trapezoid and relate each to the formula for the area of a rectangle ($b \times h$).

MA-7-M-S-MPA5

Students will determine the length of sides (to the nearest eighth of an inch or nearest centimeter), area and perimeter of triangles, quadrilaterals (rectangles, squares, trapezoids) and other polygons. (Using the Pythagorean theorem will not be required as a strategy.)

MA-7-M-S-MPA6

Students will explain how measurements and measurement formulas are related or different (e.g., perimeter and area of rectangles).

MA-7-M-S-MPA7

Students will investigate and demonstrate fixed area with changing perimeter and fixed perimeter with changing area.

In the new Common Core Standards, these standards are met in the fourth- and fifth-grade standards within the Measurement and Data domain. In seventh grade, in the new standards, there is no Measurement domain, but in the Geometry domain, there are some standards related to measurement. However, the six standards are much more rigorous than the seventh-grade standards above:

Table 1.15: Common Core Standards, Seventh-Grade Math in the Geometry Domain

Draw, construct, and describe geometrical figures and describe the relationships between them.

1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Based on the new standards, math textbooks will have to be rewritten so that fourth- and fifth-grade textbooks contain material that was previously found in middle-school texts. And the middle-school texts will have to include material that goes much deeper into the concepts than what was previously taught.

Early Response of the “Big Three”

Robelyn (2010) indicates that the gradual consolidation of the K-12 textbook industry has resulted in three companies now dominating the market nationally. They are Pearson, McGraw-Hill, and Houghton Mifflin Harcourt. Below is a look at what they are doing to address the new Common Core standards.

Pearson. Pearson has a two-phase plan for aligning their textbooks with the Common Core Standards (commoncore.pearsoned.com). In Phase 1, they are seeking to have 100 percent alignment to the Common English Language Arts Standards and the development of *Common Core Implementation Guides* that guide teachers in using their current materials. These should be completed in 2011. In Phase 2, which is to be completed by 2012, they plan to develop Common Core assessments. Along with this, they will be creating crosswalk correlations that focus on the content that will be tested on those assessments. The *Common Core Assessment* will be fully implemented in 2014. Pearson claims that 30 states already use their current assessments. It is assumed that the new Common Core Assessments will be used by those states as well as others that have adopted the standards. Kentucky, for example, which previously had its own state test, will begin using the Pearson assessments in school year 2011-2012, with their plan to transition to the Common Core Assessment when it is fully implemented in 2014.

Pearson has already developed digital materials that align with the Common Core Standards for both English Language Arts and for Math. These include their Waterford Early Learning® Common Core software for grades Pre-K through second grade,

the Scott Foresman Reading Street™ Common Core for K-6, the SuccessMaker® Common Core for K-8, and the Prentice Hall Literature™ Common Core for grades 6-12. They indicate that these software packages were written for the Common Core using a backward design to reach the desired goals of the standards.

Will new textbooks using that same backward design be far behind?

McGraw-Hill. In a press release dated November 3, 2010, The McGraw-Hill Companies announced the following:

NEW YORK, Nov. 3, 2010 /PRNewswire/ — High school educators across the country who are working to align math curriculum with new Common Core State Standards (CCSS), need not look any further than McGraw-Hill School Education Group’s Core-Plus Mathematics®, an integrated, reform-based program that is one hundred percent aligned to the CCSS Standards of Mathematical Content and the CCSS Standards of Mathematical Practice. Developed by the Core-Plus Mathematics Project (CPMP) with funding from the National Science Foundation, the curriculum is designed to prepare students for success in postsecondary education and careers.

“It is amazing how closely the second edition of Core-Plus Mathematics aligns with the Common Core State Standards for Mathematics, both in content and in the vision of mathematical proficiency described by the Standards for Mathematical Practice,” said Ann Peterson, a mathematics teacher at Grand Junction High School in Grand Junction, Colo. “The Modeling Standard is embedded seamlessly throughout all four courses, supporting students as they develop creative problem solving strategies, and emphasizing the rich connections among the different strands of mathematics.”

The second edition of Core-Plus Mathematics offers a four-year curriculum that replaces the traditional sequence with courses that each feature interwoven strands of algebra and

functions, statistics and probability, geometry and trigonometry, and discrete mathematics. The first three courses in the series provide a common core of broadly useful mathematics, while the fourth continues the preparation of students for college mathematics and statistics courses.

For those states that decide to use the “international” model of the integrated pathway explained in Appendix A of the Common Core Standards for Mathematics, McGraw-Hill already has a series of textbooks available.

In the area of language arts, McGraw-Hill indicated in an April 5, 2011, press release that it had created a reading series for California based on the new Common Core Standards. California adopted the Common Core Standards in 2010. The press release states:

LOS ANGELES, April 5, 2011 /PRNewswire/ — In one of the largest district-wide reading adoptions in history, McGraw-Hill Education is pleased to partner with the Los Angeles Unified School District to bring *California Treasures* to elementary school students at the start of the 2011-2012 school year.

California Treasures, a research-validated 21st Century K-6 comprehensive reading language arts program, couples high quality and culturally responsive literature with differentiated instruction, purposeful practice, writing support, and an embedded classroom management system. The program aligns to Common Core California Standards (CCCS). (qtd. in Stanton)

While this is a textbook series specific to California, it is very likely that McGraw-Hill will respond to the market and adapt the series to other states that have adopted the Common Core Standards.

Houghton-Mifflin Harcourt. On the Houghton-Mifflin Harcourt website, there is no specific mention of textbooks that have been aligned with the Common Core Standards, but they do offer what

they call “professional services” related to the standards. They state:

Houghton Mifflin Harcourt experts partner with districts and schools to build educator capacity in teaching the Common Core Standards, and introduce best instructional practices and strategies through curriculum audits, classroom-embedded training, demonstration lessons, and courses.

Our instructional resources are designed to address your Common Core adoption needs as well as complement your existing programs. This includes cost-effective teacher and student materials that align your teaching and learning programs with Common Core Standards.

It appears that at this time, they are not developing new texts, but rather providing professional development that would allow schools to meet the Common Core Standards using their current materials.

Conclusion

The new Common Core Standards are unprecedented in the number of school districts in the United States that will be affected. In the past, the textbooks seemed to drive instruction in most schools. And, while the textbooks were usually somewhat based on state standards (especially those of California and Texas), now there will be a unified national audience for textbooks directly aligned with these common standards.

It is very early in this process (since the Common Core Standards were only finalized and disseminated in June 2010), but the researcher believes that we can expect to see big changes in textbooks in the next few years that will align with the Common Core Standards.

References

- Center for Education Policy, 2010. “States’ Progress and Challenges in Implementing Common Core State Standards.” Retrieved from <http://www.cep-dc.org/displayDocument.cfm?DocumentID=374>.
- Common Core Standards. (n.d.) Retrieved from <http://corestandards.org/>.

- Pearson editorial staff. n. d. *Understanding the Common Core State Standards Initiative*. Boston: Pearson Education. Retrieved from <http://commoncore.pearsoned.com>.
- Fletcher, G. H. 2009. "The Disruption of the Traditional Textbook Model Continues." *THE Journal*. Retrieved from <http://thejournal.com/articles/2009/06/24/the-disruption-of-the-traditional-textbook-model-continues.aspx>.
- Houghton-Mifflin Harcourt. n. d. "Smooth Transitions. Sustainable Success." Retrieved from <http://www.hmheduication.com/commoncore/common-core-transition-success.php>.
- Mathis, W. J. 2010. "The 'Common Core' Standards Initiative: An Effective Reform Tool?" Great Lakes Center for Education Research and Practice. Retrieved from http://greatlakescenter.org/docs/Policy_Briefs/Mathis_NationalStandards.pdf.
- Porter, A., J. McMaken, J. Hwang, and R. Yang. 2010. "Common Core Standards: The New U. S. Intended Curriculum." Presented to the Brookings Institution. Retrieved from http://www.brookingstsinghua.cn/~media/Files/events/2010/1028_race_to_the_top/1028_race_to_the_top_porter_paper.pdf.
- Robelen, Erik W. 2010. "Texas' Influence Over Textbook Content Could Shift With Changes in the Market." *Education Week* 29 (30): 1-15.
- Stanton, T. Nov. 3, 2010. "McGraw-Hill Offers Reform-Based High School Math Program That Is Fully Compliant with Common Core State Standards." Press Release. McGraw-Hill. Retrieved from <http://www.mcgraw-hill.com/releases/education/20101103.shtml>.
- Trammel, T. n. d. "Integrated Mathematics? Yes, but Teachers Need Support!" NCTM. Retrieved April 20, 2011 from <http://www.nctm.org/resources/content.aspx?id=1712>.

**ANSWERING THE CALL FOR THE REFORM OF
ELEMENTARY MATHEMATICS TEACHING:
INCREASING ELEMENTARY MATHEMATICS
TEACHERS' PERCEIVED EFFICACY
THROUGH A DISTRICT-WIDE PROFESSIONAL
DEVELOPMENT INITIATIVE**

by

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ABSTRACT

Using a quantitative approach, this investigation found that elementary mathematics teachers who participated in a two-year professional development initiative improved their perceived self-efficacy in mathematics content, standards and curriculum, technology resources, and assessment strategies for meeting the needs of diverse learners. Participants reported that their instructional practices changed significantly from a “one size fits all” and “tell, show, and do” model to an approach utilizing interactive and engaging activities derived from an analysis and deep understanding of their students’ own thinking behaviors. The participants also reported that their attitudes toward mathematics had improved significantly and that there had been a direct impact on the students as a result of their professional development.

Introduction

Evidence from the Trends in International Mathematics Science Study (TIMSS) (National Center for Educational Statistics 2005 & 2007), and other national reports provides a warning that U. S. students still do not rank well compared to students of other nations with which the United States competes economically (U. S. Department of Education, Institute of Education Sciences [DOE

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IES] 2007). To compete internationally in mathematics education and workforce education, much work is needed to improve student learning.

National test results (U. S. DOE IES 2007) reveal that mathematics achievement in Kentucky needs improvement. Of the 50 states that participated in the 2009 National Assessment of Educational Progress (NAEP) fourth-grade assessment (U.S. DOE IES 2009), Kentucky students' average scale scores were lower than those of students in 23 states, higher than 10 states, and not different from 16. Kentucky students made minimal gains as evidenced by the 2009 NAEP scores. Kentucky's average score for fourth graders was 239, the same average score achieved by the entire nation's public schools. The national average NAEP score for fourth graders has remained constant since 200 (U.S. DOE IES 2009). When Kentucky's scores are compared to those of the nation as a whole, growth is measured against a stagnant benchmark.

While the eighth graders' average score of 279 was not markedly different from the national average score of 282 (U. S. DOE IES 2009), at the high school level, there is even greater cause for alarm. According to a report from the National Research Council (2001) in *Adding It Up: Helping Children Learn Mathematics*, too few children in the United States are leaving elementary and middle school with adequate mathematics skills and thus do not have the understanding needed to achieve the mathematics content that is taught at the high school level. This is evident when looking at Kentucky's 2009 ACT State Profile Report that indicates only 40 percent of students taking the test would be ready for college algebra.

Research on the factors contributing to student achievement repeatedly cite teacher expertise as one of the most important factors in determining student achievement (Ball 1990; Ball Thames, & Phelps 2008; Battista 1999; Darling-Hammond & Ball 2004; Stiff 2000). It is obvious from years of failed reforms in mathematics education that teachers tend to teach only mathematics with which they are comfortable, and evidence suggests that U. S. teachers lack essential knowledge for teaching mathematics. This lack of knowledge directly impacts how they teach mathematics (Ball 1990; Ma 1999). According to Blank and Langesen (2001), forty percent of elementary and middle school

mathematics teachers do not feel qualified to teach their content, and only seven percent of elementary teachers have minored or majored in mathematics education or mathematics. Many teachers report that they do not have sufficient conceptual understanding of mathematics and rely on rote computations and algorithms for instruction (Gerretson, Bosnick, & Schofield 2008).

Literature Review

Mathematics instruction in the United States focuses on low-level skills and rarely attends explicitly to the important mathematical relationships (Hiebart et al. 2003; Rowan, Harrison, & Hayes 2004; Stigler, Gonzales, Kawanka, Knoll, & Serrano 1999; Weiss, Pasley, Smith, Banilower, & Heck 2003). Horizon Research, Inc. staff and consultants conducted 364 structured observations of math and science lessons. They found that only 14 percent of the lessons had a climate of academic rigor, and most lessons lacked adequate opportunities for sense-making. The findings of this study indicate that high quality questioning and an emphasis on developing conceptual understanding is a persistent need for U. S. teachers (Weiss et al. 2003). These findings are consistent with research that reports that teachers know the reform recommendations, yet few teachers apply these recommendations in their classrooms (Stigler et al., 1999). Meeting the challenge of reform-based teaching will require teachers to have deep insights about mathematics, about students as learners of mathematics, and about pedagogy that will support students' learning.

There seems to be universal agreement that students' mathematical achievement is unlikely to occur without serious attention to the ongoing professional development of teachers of mathematics. The 2000 National Survey of Science and Mathematics Education found that more than half of the elementary, middle, and high school mathematics teachers recognize at least a moderate need for professional development using inquiry- or investigation-oriented teaching strategies, understanding student thinking, and assessing student learning in mathematics. In spite of the need, 68 percent of elementary teachers reported spending less than 16 hours of related professional development in mathematics over the last three years (Weiss, Banilower, McMahon, & Smith 2001). The research

findings and student achievement data reflect the compelling need for high quality professional development opportunities for mathematics teachers focused on developing knowledge of effective mathematics instruction, curricula, and assessment from pre-kindergarten through grade eight.

It is generally accepted that intensive, sustained, job-embedded professional development focused on the content that teachers teach is more likely to improve teacher knowledge, classroom instruction, and student achievement (Garet, Porter, Desimone, Birman, & Yoon 2001; Guskey 2003; Kennedy 1999; Loucks-Horsley, Hewson, Love, & Stiles 1998; Darling-Hammond & Ball 1998; Darling-Hammond, Wei, Andree, Richardson, & Orphanos 2009). Programs to improve mathematics and science education often attend to a number of specific goals for teachers, including developing a vision for reform, deepening content knowledge, promoting understanding of student thinking, and engaging in reflective practice. Teachers need the opportunity to “unpack” the mathematical content they are going to teach, struggle with important mathematical ideas and explore the conceptual underpinnings and interconnections among topics. Situating teachers in a constructivist learning environment, wherein their thinking is the focus of thoughtful discussion and reflection, promotes transfer of learning to teachers’ practice (Schifter 1998).

Weiss, Pasley, Smith, Banilower, and Heck (2003) argued that teachers need a clear vision of effective instruction and advocate specific interventions to assist the realization of this vision to effectively guide the design and implementation of their lessons. These interventions include: (1) the opportunity to analyze high quality lessons and identify the effective elements, (2) the use of textbooks and supplementary material designed to provide targeted professional development opportunities, and (3) teachers engaging in high quality professional learning opportunities with a focus on developing both content and pedagogical knowledge. Cohen and Hill (1998) found that engaging teachers in the reform-based curriculum and assessments resulted in both teacher growth and increases in student achievement.

According to Ball and Cohen (1999),

Teachers can certainly learn subject matter, as well as knowledge of children, learning and pedagogy, in

a variety of courses and workshops. But the use of such knowledge to teach depends on knowledge that cannot be learned entirely either in advance or outside of practice. (12)

Professional development of teachers should be situated in daily practice. When development training occurs in the practice setting, the everyday work of teaching becomes the object of ongoing investigation and thoughtful inquiry. Rather than teachers learning theories and applying them to practice of teaching, theories or general principles emerge from closely examining practice. Furthermore, providing teachers the opportunity to test these emerging practices through application with their students increased the likelihood that teachers would continue to use these reform-based practices (Schifter 1998; Franke & Kazemi 2001).

Teachers need collegial support as they transform their instructional practices and beliefs to align with the reform recommendations. Creating structures to provide teachers with the necessary support is critical to any initiative involving change. The opportunity to collaboratively plan, analyze, and reflect on practice and to have the emotional support of colleagues promotes and sustains ongoing improvements in teachers' practices. Consistent with the research literature on the benefits of creating high-performing professional learning communities is the value of aligning professional development with district goals and initiatives. Anderson's (2003) review of the literature on the district role in educational change concluded that district-wide improvements in teaching and learning were more likely when professional development focused specifically on district learning goals and when districts worked to align school district policies and practices with the focus of the professional development. Professional development standards promoted by the National Staff Development Council (NSDC) to produce stronger learning are outlined as a guide to ensure effective changes for teachers and students. According to the NSDC, the design of any effective professional development program should include context standards, process standards, and content standards (Darling-Hammond et al. 2009).

In spite of the call for reforms and the plethora of knowledge and information informing this work, there have been no significant changes in how the teaching and learning of mathematics occur in U. S. classrooms. The students' less than stellar performance in mathematics and the low numbers of students pursuing degrees in the STEM disciplines places the U. S. in a position where we are not globally competitive. In this study, we argue that the problem begins with the instruction of elementary students and that the root cause is that elementary mathematics teachers are not adequately prepared to teach mathematics appropriately. We believe the problem lies not only in the initial preparation of elementary teachers but, more importantly, in the lack of ongoing, sustained, job-embedded, and content-specific professional development that practicing teachers receive.

Context of the Study

A rural school district in Kentucky identified the need to address declining mathematics achievement across grade levels. Math instruction at the elementary level consisted of teacher-focused direct instruction with an emphasis on developing procedural knowledge through practice worksheets. Middle school teachers reported that many of their incoming students did not know their multiplication tables, could not add, multiply or divide fractions or decimals, and struggled with estimating answers to arithmetic calculations to determine the reasonableness of solutions. The school district's initial response included the adoption of various supplementary mathematics programs, sending teachers to workshops, and mandating from 60 to 90 minutes of daily math instruction. The only results of these actions were that teachers used the same instructional strategies for longer periods of time and that student achievement continued to decline.

During the 2006-2007 school year, the district conducted a needs assessment of teaching and learning mathematics in elementary classrooms. They convened a committee of district administrators, teachers, and mathematics leaders and consultants to collect and analyze data and develop an action plan. The findings indicated the following:

- Teachers relied on textbooks for the selection of content and instructional strategies with little or no consideration of

student cognition when planning and implementing instruction.

- Direct instruction was the norm for most classrooms—with students learning in a whole group setting with little or no active participation.
- Student learning consisted of performing paper and pencil calculations using standard procedures and algorithms.
- Differentiation of instruction was not evident in classrooms during math instruction.
- Teachers lacked the understanding of the role of state and national content standards in math instruction; many reported having no opportunity in previous professional developments to access the national standards.
- New technology had been installed in the classrooms but there was little evidence that the teachers were using it as part of their math instruction.
- There was a minimum amount of evidence that formative assessment strategies were being used to measure student progress in order to provide immediate attention to students' learning needs; end-of-year summative assessments were the norm.
- Teachers were attending professional developments at other sites that were focused on math, only to return to their classrooms and resume what they had been doing.

The committee recommended that developing elementary teachers' knowledge of mathematics content, pedagogy, curriculum, and assessment was a critical and necessary priority. District administrators further determined that elementary teachers needed intensive, job-embedded, content-specific math professional development.

During the 2007-2008 school year, quarterly grade-level professional development for all elementary teachers was implemented. The professional development was orchestrated by the Title I Coordinator and the District Elementary Curriculum Specialist with support of the Technology Integration Specialist and ten Math Interventionists who represented each elementary school in the district. The professional development was scheduled for teachers to meet for one entire school day with their grade level each nine weeks equating to meeting four times per year. Two days

of training were offered during the summer to provide teachers an opportunity to create the instructional resources needed to supplement their teaching.

The professional development provided emphasis upon the reform vision of the National Council of Teachers of Mathematics (NCTM 1991), and the participants were heavily involved in learning to provide effective instruction in the five content standards: 1) number operations, 2) geometry, 3) measurement, 4) data analysis and probability, and 5) algebraic reasoning. The participants also had explicit instruction on a variety of effective mathematics teaching strategies including intervention strategies for struggling students. The professional development focused on concrete learning of mathematics content by use of manipulatives which also supported the research that was shared with the teachers. These concrete experiences contributed to the teachers' having a stronger conceptual understanding of the mathematical concepts as well as helping them to focus on the importance of guiding students to understand the meaning of their answers to math problems.

Technology and children's literature were integrated into each professional development session to help teachers design and plan how they would implement various differentiation strategies to meet the needs of diverse learners. In these professional development sessions, the teachers became active learners in varied settings all utilizing hands-on activities either in small group settings, partner-pair-share activities, or whole group discussions.

During the first session of the day, teachers worked on aligning their district curriculum to both national and state standards and developing appropriate formative assessments to meet the standards. The second session consisted of analyzing student responses and addressing concerns derived from previously designed common assessments. The third session engaged teachers in actual teaching episodes that either targeted the mathematics standards or modeled the formative assessment strategies discussed in the morning session. In the final session of the day, teachers integrated reform-based technology resources into their daily lessons. A crucial element of each day's training was time for teachers to talk, share their reflections, and discuss different strategies for teaching difficult concepts. It was often during this time that teachers saw the relevance of professional development

and discovered how to differentiate activities to meet the needs of all students.

Theoretical Framework

The framework serves to define our investigation of the professional development work and is based on the principles of effective mathematics professional development, efficacy theory, and constructivism. Based on the research findings of Cayci (2011), those teachers who have positive attitudes towards the teaching profession convey themselves to be better prepared to teach children. Teachers of elementary mathematics also need to have positive attitudes towards the teaching of mathematics to be effective teachers. Effective teaching that leads to student achievement requires teachers to possess the knowledge of strong pedagogy and engage in classroom practices that relate to mathematical content, pedagogy, child development, and student thinking in an integrated way. This framework was developed to design and implement the professional development program that addresses these practices.

Research into effective professional development for mathematics teachers echoed the same essential elements as professional development in general. Firestone, Mangin, Martinez, and Polovsky (2005) stated that successful content knowledge training consists of the subject matter being presented in a classroom friendly form that includes materials, examples, and student activities. Opportunities to incorporate these concepts and suggestions into their daily teaching are also critical (Firestone et al. 2005). Mathematics teacher training should also concentrate on pedagogical strategies that require teachers to manipulate materials and ideas in order to explore concepts and make connections between ideas. According to Firestone et al. (2005), teachers should be introduced to a set of activities, materials, or ideas and then be given the opportunity for practice and reflection. The learning opportunities for teachers should model the instructional strategies they are expected to use. To be effective, these activities and strategies should represent an integral part of the teachers' daily practice rather than additional tasks. According to Stiff (2000), high quality mathematics professional development should include time—time for teachers to examine reform-based curricula,

time to collaborate with colleagues, and time to integrate new mathematics content and teaching strategies. Additional research-based recommendations indicate that mathematics teachers should receive low to moderate levels of instruction in mathematics theory and applications of mathematics as well as content standards, the use of curriculum materials, the use of technology, and strategies for assessing student learning (Telese 2008).

The National Council of Teachers of Mathematics (NCTM) stressed the importance of focusing on high standards and in-depth learning opportunities for teachers. The professional development standards set by NCTM focus on (1) modeling good mathematics teaching; (2) knowing mathematics and school mathematics; (3) knowing students as learners of mathematics; (4) knowing mathematical pedagogy; (5) developing as a teacher of mathematics; and (6) defining teachers' roles in professional development. Professional development should be challenging, authentic, collegial, and collaborative, addressing both the teaching process and the learning process. It must provide teacher-centered, curriculum-specific opportunities and long-term support targeted at developing teachers who can teach high quality mathematics education to every student (NCTM 2000).

Knowledge is constructed in social contexts. According to Steffe and D'Ambrosio (1995), constructivist teachers study the knowledge constructions of their students and interact with students in a learning space designed by, at least in part, the teacher's working knowledge of students' understanding of concepts and ideas. The definition implies that constructivist mathematics teachers listen to learners in ways that allow them to build a model of each learner's mathematical knowledge. Within this context, teacher reflection is seen as an essential factor for constructing teacher knowledge, particularly teacher pedagogical knowledge (Wilson et al. 1987). A constructivist approach to teaching, which encourages a deep learning approach on the behalf of the learner, promotes self-efficacy. Teachers create an environment in which they and their students are encouraged to think and explore mathematics. Constructivism leads to new beliefs about excellence in teaching and learning and about the roles of both teachers and students in the process (Steffe & D'Ambrosio 1995).

Self-efficacy is defined as the beliefs people have about

their capabilities to produce designated levels of performance that exercise influence over events that affect their lives (Bandura 1993). Teacher efficacy can be defined as “the extent to which a teacher feels capable to promote students learning, can affect teachers’ instructional efforts in areas such as choice of activities, level of effort, and persistence with students” (Ware & Kitsantas 2007). Teacher efficacy has been found to be associated with many powerful forces in instructional strategies and willingness to embrace innovations. Efficacy expectations influence teachers’ thoughts and attitudes, their choice of classroom activities, the amount of effort they are willing to expend, and their determination to overcome obstacles (Ware & Kitsantas 2007). The task of creating learning environments conducive to development of cognitive skills depends on the self-efficacy of teachers. Those who have a high sense of efficacy are more likely to use inquiry and student-centered teaching strategies that can motivate students. Teachers who have a low sense of self-efficacy are more likely to use teacher-directed strategies, such as lecture and reading from a text which relies on negative sanctions to get students to study (Bandura 1993). It is not simply a matter of how capable one is, but how capable one believes himself or herself to be. Teacher efficacy has been suggested as a concept through which to describe teacher quality. A teacher’s quality of performance and commitment to work is related to his or her belief that effective teaching can bring about student learning regardless of external factors.

Purpose of the Study

The purpose of this study was to investigate the impact that teacher participation in a two-year professional development program focused on developing teachers’ grade-specific knowledge of mathematics content and pedagogy had on the participating teachers’ perceived self-efficacy.

Methodology

Participants

The participants for this study consisted of 155 elementary K-5 teachers working in ten elementary schools in one school district in a southeastern state. The teachers taught math at their

assigned grade level. All of the K-3 teachers in self-contained classrooms participated as did all of the 4th- and 5th-grade teachers who taught math. This job-embedded math professional development took place four times a year over a two-year period. Two optional days of training were conducted in the summer to provide teachers the opportunity to create supplementary instructional resources, collaborate with other teachers, and meet with the professional development provider.

Data Sources

The Science Teaching Efficacy Beliefs Inventory (STEBI), an instrument developed and validated by Riggs (1988) to measure teachers' personal self-efficacy and outcome expectancy beliefs for science teaching and learning, was adapted by the researchers for this study. The STEBI is a 25-question survey using a 6-point Likert-type scale and was chosen for its construct validity, reliability, and wide use in the field. A comparable instrument for mathematics was not found. The researchers replaced any reference to science with mathematics and named the new instrument the Math Teaching Efficacy Beliefs Inventory (MTEBI).

All of the teachers participated in the MTEBI prior to the training, but the ceiling effect made their responses invalid. Although most of the teachers indicated they had high self-efficacy in mathematics, the students' math scores did not indicate that to be true. The researchers decided to use the MTEBI as a reflective tool at the end, allowing the teachers to look back at where they truly were at the beginning of the training, and again, where they were after they had completed the training. This data source, used as the culminating assessment, indicated whether teachers believed their mathematics teaching effectiveness had improved over the two years during which the professional development was provided.

Data Analysis

The purpose of this study was to investigate the impact of participation in a two-year professional development initiative on teachers' instructional practices and beliefs and on student performance. Possible scores for the Math Teaching Efficacy Beliefs Inventory (MTEBI) ranged from 25 to 150. A paired sample T-test was conducted to compare the means of the teachers' reflection of where they were prior to the professional

development training program with their post-training reflection. An item analysis for the 25 questions was conducted, and then the questions were sorted into the categories of Personal Efficacy and General Efficacy as identified in the research literature.

Results

The researchers did a one-tailed paired sample T-test comparison of the Mathematics Teaching Efficacy Beliefs Inventory (MTEBI) pre-training and post-training mean scores.

Table 1: Paired Samples T-Test Pre-Training and Post Training

| | Mean | N | Std. Deviation | Std. Error Mean |
|------------|--------|-----|----------------|-----------------|
| Total Pre | 102.28 | 155 | 14.197 | 1.140 |
| Total Post | 123.25 | 155 | 11.256 | .904 |

t = -18.692, df = 154, p-value <.0005

95 percent confidence interval for the mean difference: 18.746 to 23.177

For the MTEBI, as predicted, teachers' scores on the post-training survey reported an increase in their mathematics efficacy beliefs when compared to the pre-training scores, and it was found that overall teacher mathematics teaching self-efficacy showed a statistically significant increase.

For the purpose of this study, the researchers categorized the questions into two groups—general efficacy and personal efficacy. Woolfolk and Hoy (1990) argued that it is misleading to combine the two categories into a single score, and in most studies there was a weak positive correlation between the two scores. Therefore, the researchers treated the questions as addressing two different aspects of teacher efficacy: *general efficacy*, a reflection of the teachers' beliefs about the general factors associated with how students learn mathematics, and *personal efficacy*, the individual teachers' perception of their own effectiveness to teach math. The researchers argued that personal efficacy describes the individual teachers' perception of their effectiveness, whereas general efficacy describes the teachers' beliefs about the general factors associated with how students learn mathematics.

Table 2 indicates the mean difference and percent of increase on items related to general efficacy.

Table 2: Item Analysis: General Efficacy

| General Efficacy | | | |
|------------------|-----------------|---|-------------------|
| Question Number | Mean Difference | Question | Percent Increased |
| 1 | .72 | When a student does better than usual in math, it is often because the teacher exerted a little extra effort. | 57.2 |
| 4 | 1.02 | When the math grades of students improve, it is most often due to their teacher having found a more effective teaching approach. | 73.8 |
| 7 | .71 | If students are underachieving in math, it is most likely due to ineffective math teaching. | 57.7 |
| 9 | .96 | The inadequacy of a student's math background can be overcome by good teaching. | 69.6 |
| 10 | .24 | The low math achievement of some students can generally be blamed on their teachers. | 28.7 |
| 11 | .61 | When a low achieving child progresses in math, it is usually due to extra attention given by the teacher. | 54.2 |
| 13 | .47 | Increased effort in math teaching produces change in some students' math achievement. | 48.2 |
| 14 | .50 | The teacher is generally responsible for the achievement of students in math. | 50.0 |
| 15 | .74 | Students' achievement in math is directly related to their teacher's effectiveness in math teaching. | 61.3 |
| 16 | .73 | If parents comment that their child is showing more interest in math at school, it is probably due to the performance of the child's teacher. | 60.7 |
| 20 | .55 | Effectiveness in math teaching has little influence on the achievement of students with low motivation. | 48.8 |
| 25 | .80 | Even teachers without good math teaching abilities can help some kids learn math. | 55.4 |

As shown on the table, as a result of the professional development, teachers showed a 55.5 percent increase overall in their beliefs about the general factors associated with how students learn mathematics. Teachers believed there was a connection between student improvement and teachers having found a more effective teaching approach regardless of the student's math background. Also, they determined that an increase in the amount of interest shown in math at school by a student was a direct result of teacher performance. Question #10 had the smallest percent increase reflected in the analysis stating the belief that low math achievement of some students cannot be blamed on the teacher.

Table 3: Item Analysis: Personal Efficacy

| Personal Efficacy | | | |
|-------------------|-----------------|---|-------------------|
| Question Number | Mean Difference | Question | Percent Increased |
| 2 | 1.68 | I am continually finding better ways to teach math | 91.0 |
| 3 | .58 | When I try very hard, I teach math as well as I do most subjects. | 49.4 |
| 5 | 1.60 | I know the steps necessary to teach math concepts effectively. | 88.7 |
| 6 | .48 | I am very effective in monitoring math achievement through hands-on activities. | 53.0 |
| 8 | .73 | I generally teach math effectively. | 50.3 |

| | | | |
|----|------|---|------|
| 12 | 1.17 | I understand math concepts well enough to be effective in teaching elementary math. | 75.4 |
| 17 | 1.01 | I find it easy to explain to students why and how mathematics works. | 70.2 |
| 18 | .86 | I am typically able to answer students' math questions. | 62.9 |
| 19 | 1.06 | I wonder if I have the necessary skills to teach math. | 63.1 |
| 21 | .96 | Given a choice, I would invite the principal to evaluate my math teaching. | 54.2 |
| 22 | 1.16 | When a student has difficulty understanding a math concept, I am usually able to help the student understand it better. | 70.2 |
| 23 | .65 | When teaching math, I usually welcome student questions. | 52.1 |
| 24 | 1.19 | I know what to do to turn students on to math. | 68.1 |

Table 3 presents the item analysis for the questions reflecting personal efficacy, showing a 65.3 percent increase—a 9.8 percent larger increase than the general efficacy percent increase. This indicates that the individual teachers' perceptions of their effectiveness to teach math grew stronger than did their general efficacy. Question #2 scored the highest percent increase of all of the questions on the survey, stating that the teachers are continually finding better ways to teach math.

Discussion

Teachers in the study have changed the way they are teaching mathematics. These changes were attributed to the focus and quality of the professional development experiences. The structure of the professional development experiences was aligned with the research literature defining high quality professional development. The professional development was sustained for a two-year period, with ongoing quarterly professional development sessions. Additionally, teachers received ongoing collaborative support from the mathematics interventions specialist in each of the ten schools. The professional development was embedded in their authentic and daily work and was grade-level and content-specific. The foci of the sessions were on the development of teachers' content and pedagogical content knowledge. The teachers unpacked the standards, planned their curriculum, and learned instructional practices to address the specific content and pedagogical demands of their grade level. Teachers saw high quality instructional strategies modeled by master teachers, had

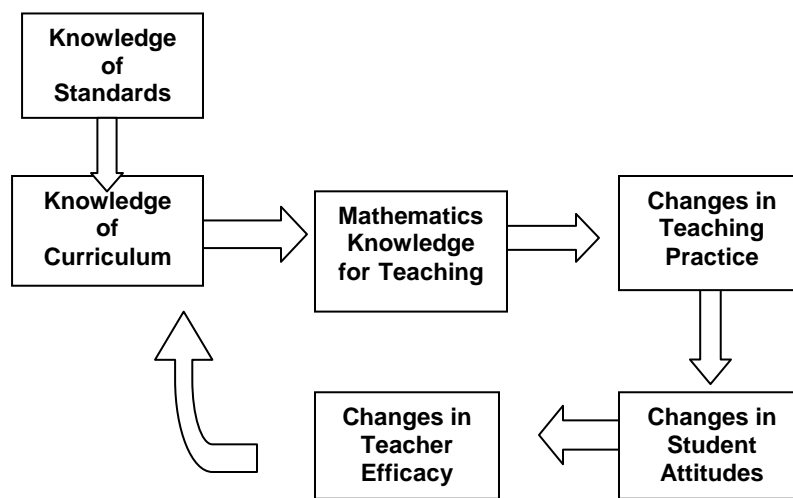
opportunities to wrestle with the mathematics concepts addressed in challenging mathematics problems, and returned to their classrooms prepared with the resources needed to implement these strategies and activities. Teachers tested these new strategies with their students and gained personal and professional value and relevance for transforming instructional practices. Given the nature of open-ended activities and more effective questioning strategies, teachers had opportunities to develop knowledge of their students' understanding or misunderstanding of important mathematics ideas. Coupled with their developing knowledge of formative assessment strategies, teachers had a doorway open to understand student thinking. Teachers returned to the next professional development sessions with the opportunity to reflect and share their experiences within a context of collegiality and collaboration. The professional development structure provided teachers the opportunity to develop their necessary mathematical knowledge for teaching within a context of collegial support.

The findings of this study indicate that teachers perceived themselves to be more effective mathematics teachers after the training, with greater knowledge of mathematics and how to teach mathematics to their students. The development of teacher efficacy is a cyclical and iterative process. Bandura (1977) categorized four types of experiences that play a role in the formation of teacher efficacy: mastery experience, physiological arousal, vicarious experience, and verbal persuasion. In this study, through active and collaborative high quality professional development sessions, teachers learned new and more effective approaches to teaching mathematics. Teachers had opportunities to develop knowledge of mathematics standards and curriculum, mathematics content knowledge, constructivist pedagogy, and formative assessment strategies and to apply these skills to the education of their students. These experiences developed their mastery experience. Attempting to teach in an unfamiliar way and to test new instructional strategies in the classroom can be very stressful. Opportunities to develop strategies to overcome or to successfully manage stress are important for developing teacher efficacy. The quarterly professional development sessions, with teachers from the same grade level who were teaching the same content and attempting the same instructional strategies, were situated in a collaborative and positive environment that enabled teachers to

process their stress in a productive manner. These experiences enhanced their ability to develop efficacy through physiological arousal. Teachers had the opportunity to develop vicarious experience as they observed master teachers modeling constructivist pedagogy and mathematics lessons and activities in the professional development sessions. Teachers received emotional support, feedback and encouragement throughout the two-year initiative from master teachers, mathematics intervention specialists, principals, and each other. A large support network was built which provided teachers advice, moral support, and enthusiasm. This verbal persuasion contributed to increased teacher efficacy.

Shulman (1986) states that teaching mathematics changes as a teacher's mathematical knowledge changes. Teachers implemented the instructional practices in their classrooms and observed the positive changes in their students' achievement and attitudes toward mathematics. Teacher reflections on the positive changes that were occurring in the teaching and learning of mathematics became the perceptions they developed about their personal and general efficacy. As the students became more successful and enthusiastic about learning and in doing mathematics, the teachers' personal and general efficacy increased. The researchers illustrate the role of the student and the teacher in this process in Figure 1.

Figure 1: Cyclical Change



Conclusion and Recommendations

This study provided insights on how one district in Kentucky addressed the need to increase elementary students' mathematics achievement. Through high quality, ongoing, sustained, job-embedded professional development focused on developing the teachers' knowledge of mathematics content and constructivist pedagogy, the district realized an increase in teacher efficacy. Additional effects included more positive attitudes expressed by both students and teachers. While the effects of this study are limited to the participants, it can be inferred that the professional development initiative is worthy of replication and continuation. It is recommended that districts make it a high priority that sustained, job-embedded professional learning for elementary mathematics teachers become part of school district's comprehensive plan.

Because this study indicated that sustained, job-embedded professional development increased teachers' general efficacy, principals should be encouraged to prepare and implement a well designed professional development program that can make a positive impact on teacher practice. Several important components are required for such program. One component is that sufficient time be provided for the professional development to be communicated and absorbed. District administrators need to understand that effective learning opportunities sustained over time are required to develop teacher capacity to teach reform-based mathematics. This study's professional development program was conducted over a period of two consecutive years, with teachers meeting for one full instructional day four times a year.

A second required component of the professional development program is that it be job embedded. To be effective, the content and pedagogy strategies should represent an integral part of teachers' daily practice rather than become additional tasks. Teachers need to grapple with real issues related to the new content and instructional processes they face in their own classrooms.

A third component is mentorship of teachers between professional development sessions. The main goal and focus of the mentor would be to help teachers use newly gained mathematics content knowledge and research-based pedagogy strategies in their

classrooms. Mentoring strengthens teachers' confidence in using new knowledge gained from the professional development sessions in their classrooms and develops the teachers to their fullest potential.

The final component is the professional development program's focus on content and strategies. Exploration of content and concentration on pedagogical strategies for instruction requires time and support. Teachers must have the opportunity to manipulate materials and ideas and make connections between math concepts and student learning.

Darling-Hammond et al. (2009) found that high quality professional development was linked to instructional improvement of the school district. Similarly, the findings of this study suggest that principals who engage their teachers in high quality professional development will discover that the teachers show an increased general efficacy. Thus, the findings from this study provide direction for moving teachers closer to their goal of high levels of mathematics instruction.

References

- Ball, D. L. 1990. "The Mathematical Understandings That Prospective Teachers Bring to Teacher Education." *Elementary School Journal* 90 (4): 449-66.
- Ball, D. L., and D. K. Cohen. 1999. "Developing Practice, Developing Practitioners: Toward a Practice-Based Theory of Professional Education." *Teaching as the Learning Profession: Handbook of Policy and Practice*. Ed. L. Darling-Hammond & G. Sykes. San Francisco: Jossey-Bass. 3-32.
- Ball, D. L., M. H. Thames, and G. Phelps. 2008. "Content Knowledge for Teaching: What Makes It Special?" *Journal of Teacher Education* 59 (5): 389-407. doi: 10.1177/0022487108324554.
- Bandura, A. 1993. "Perceived Self-Efficacy in Cognitive Development and Functioning." *Educational Psychologist* 28 (2): 117-48.

- Battista, M. T. 1999. "The Mathematical Miseducation of America's Youth: Ignoring Research and Scientific Study in Education." *Phi Delta Kappan* 80 (6): 424-33. Retrieved from <http://www.kappanmagazine.org>.
- Blank, R. K., and D. Langesen. 2001. "State Indicators of Science and Mathematics Education 2001: State-by-State Trends and New Indicators from the 1999-2000 School Year." Washington, D. C.: Council of Chief State School Officers.
- Cayci, B. 2011. "The Relationship between the Elementary Teacher Candidates' Teacher Efficacy and Their Attitudes towards the Profession of Teaching." *Education* 132 (2): 402-18.
- Cohen, D. K., and H. C. Hill. 1998. *State Policy and Classroom Performance: Mathematics Reform in California* (Consortium for Policy Research in Education No. 23). Philadelphia: Consortium for Policy Research in Education.
- Darling-Hammond, L., and D. L. Ball. 1998. *Teaching for High Standards: What Policymakers Need to Know and Be Able to Do*. National Commission on Teaching and America's Future. Retrieved from <http://www.nctaf.org/documents/teaching-high-standards.pdf>.
- Darling-Hammond, L., R. C. Wei, A. Andree, N. Richardson, and S. Orphanos. 2009. *Professional Learning in the Learning Profession: A Status Report on Teacher Development in the United States and Abroad*. Retrieved on 12 April, 2009 from <http://www.nsd.org/news/NSDCstudy2009.pdf>.
- Firestone, W. A., M. M. Mangin, M. C. Martinez, and T. Polovsky. 2005. "Leading Coherent Professional Development: A Comparison of Three Districts." *Educational Administration Quarterly* 41 (3): 413-48.
- Garet, M. S., A. C. Porter, L. Desimone, B. F. Birman, and K. S. Yoon. 2001. "What Makes Professional Development Effective? Results from a National Sample of Teachers." *American Educational Research Journal* 38 (4): 915-45.
- Gerretson, H., J. Bosnick, and K. Schofield. 2008. "A Case for Content Specialists as the Elementary Classroom Teacher." *The Teacher Educator* 43 (4): 302-14.
- Guskey, T. R. 2003. "What Makes Professional Development Effective?" *Phi Delta Kappan* 84 (10): 748-50.

- Franke, M. L., and E. Kazemi. 2001. "Learning to Teach Mathematics: Focus on Student Thinking." *Theory into Practice* 40 (2): 102-109.
- Kennedy, M. M. 1999. *Form and Substance in Mathematics and Science Professional Development*. Madison, Wis.: National Institute for Science Education Brief 13 (November 1999): 1-7. Retrieved June 3, 2009 from <http://www.wceruw.org/archive/nise/Publications>.
- Loucks-Horsley, S., P. Hewson, N. Love, and K. E. Stiles. 1998. *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, Calif.: Corwin Press.
- Ma, L. 1999. *Knowing and Teaching Elementary Mathematics*. Mahwah, N. J.: Erlbaum.
- National Center for Educational Statistics. 2005. National Assessment of Educational Progress. Washington, D. C.: United States Department of Education Institute of Education Sciences. Retrieved June 29, 2009, from <http://nces.ed.gov/NATIONSREPORTCARD>.
- National Center for Educational Statistics. 2007. National Assessment of Educational Progress. Washington, D. C.: United States Department of Education Institute of Education Sciences. Retrieved June 29, 2009, from <http://nces.ed.gov/NATIONSREPORTCARD>.
- National Council of Teachers of Mathematics. 1991. *Professional Standards for Teaching Mathematics*. Reston, Va.: Author.
- National Research Council. 2001. *Adding It Up: Helping Children Learn Mathematics*. Ed. J. Kilpatrick, J. Swafford, and B. Findell. Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, D. C.: National Academy Press.
- Rowan, B., D. M. Harrison, and A. Hayes. 2004. "Using Instructional Logs to Study Mathematics Curriculum and Teaching in the Early Grades." *Elementary School Journal* 105:103-27.
- Schifter, D. 1998. "Learning Mathematics for Teaching: From a Teachers' Seminar to the Classroom." *Journal of Mathematics Teacher Education* 1 (1): 55-87.

- Shulman, L. 1986. "Those Who Understand: Knowledge Growth in Teaching." *Educational Researcher* 15 (2): 4-14.
- Steffe, L., and B. D'Ambrosio. 1995. "Toward a Working Model of Constructivist Teaching: A Reaction to Simon." *Journal for Research in Mathematics Education* 26: 146-59.
- Stiff, L. October, 2000. "Preparing to Teach Young Children." *NCTM News Bulletin*. Retrieved on September 3, 2008 from www.nctm.org/about/content.asp?id=1252.
- Stigler, J. W., P. Gonzales, T. Kawanaka, S. Knoll, and A. Serrano. 1999. *The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States*. Washington, D. C.: National Center for Educational Statistics.
- U. S. Department of Education, Institute of Education Sciences (DOE IES). 2007. *Highlights from the Trends in International Mathematics and Science Study (TIMSS) 2003* (NCES No. 2005-005). Washington, D. C.: Author.
- U. S. Department of Education, Institute of Education Sciences (DOE IES). 2009. *The Nation's Report Card: Mathematics 2009* (NCES No. 2010451). Washington, D. C.: Author.
- Ware, H., and A. Kitsantas. 2007. "Teacher and Collective Efficacy Beliefs as Predictors of Professional Commitment." *The Journal of Educational Research* 100 (5): 303-10.
- Weiss, I. R., J. D. Pasley, S. Smith, E. R. Banilower, and D. J. Heck. 2003. *Looking Inside the Classroom: A Study of K-12 Mathematics and Science Education in the United States*. Retrieved May 23, 2009 from <http://horizon-research.com>.
- Weiss, I. R., E. R. Banilower, K. C. McMahaon, and P. S. Smith. 2001. "Report of the 2000 National Survey of Science and Mathematics Education." Retrieved July 3, 2009 from <http://horizon-research.com>.
- Woolfolk, A. E., and W. K. Hoy. 1990. "Prospective Teachers' Sense of Efficacy and Beliefs About Control." *Journal of Educational Psychology* 82 (1), 81-91.

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