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Teacher Qualification and the Achievement Gap in Early Primary Grades

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Abstract

Title I of the No Child Left Behind Act (P.L. 107-110, 115 Stat. 1245, 2002) holds schools accountable for reducing the academic achievement gap between the different ethnic groups and requires elementary school teachers to have at least a bachelors degree and a state certification. The purpose of this study was to examine the relationship of the qualification requirement of NCLB to the goal of reducing the academic achievement gap. The study found that students with a certified teacher for most of their early school experience scored higher in reading than students who did not have a certified teacher. In addition, certification was associated with slightly narrowing the academic gap between African American and European American students across early elementary grades.

Keywords: teacher certification; teacher qualifications; student achievement; reading; value-added; Early Childhood Longitudinal Study.



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Cualificación docente y brechas en los resultados en los grados iniciales de la escuela primaria

Resumen

El artículo I de la ley No Child Left Behind (PL 107-110, 115 Stat. 1245, 2002) demanda que las escuelas asuman responsabilidades para reducir la brecha en los rendimientos académicos entre los diferentes grupos étnicos y además exige que los docentes de escuelas primarias tengan por lo menos una licenciatura y un certificación del Estado para enseñar. El objetivo de este estudio es examinar la relación entre el requerimiento de formación de NCLB con el objetivo de reducir la brecha de rendimiento académico. Este estudio encontró que estudiantes que tuvieron docentes con certificación durante la mayor parte de sus estudios tuvieron mejores resultados en los exámenes de lectura en comparación a estudiantes que no tuvieron un docente con certificaciones. Además, la certificación se asoció con una ligera reducción en la brecha de los resultados académicos de los estudiantes africano-americanos y europeo-americanos en los grados iniciales de la escuela primaria

Palabras clave: certificación de docentes, las formación docente, logros de los estudiantes; lectura; valor añadido; educación infantil, estudio longitudinal.

Introduction

The purpose of this study is to examine the differential effects of teacher qualifications on the reading achievement of African American and European American students as they move from kindergarten to third grade. The No Child Left Behind (NCLB) legislation (2001) in particular holds schools accountable for closing the achievement gap between subgroups. The act also has focused national attention on the importance of teacher qualifications by mandating that school districts employ *highly qualified teachers*, which the law defined as teachers with at least a bachelor's degree and full state licensure and certification. The requirement is based on the assumption that these qualifications are associated with teacher quality, reflected in student learning. This study examines the relationship of one central aspect of teacher qualification—state certification—with reading outcomes for African American and European American students.

The great majority of elementary teachers are “highly qualified” by NCLB standards. In 2006, 33 states reported having 90% to 99% of their classrooms taught by highly qualified teachers (Feller, 2006). However, qualified teachers are not evenly distributed. In more than a dozen states, approximately 30% of the teachers do not meet the NCLB definition of highly qualified. There is also a growing gap in teacher qualifications between schools serving low-income children and schools serving high-income children (Darling-Hammond, 2006). Of the 37 states who reported data, 24% reported having more qualified teachers in high-poverty schools than in all other schools, 38% reported having as many qualified teachers in high-poverty schools as in all other schools, and 38% reported having a lower percentage of qualified teachers in high-poverty schools than in all other schools (Center for Education Policy, 2004).

A number of recent studies have shown that teacher qualifications have a significantly positive relationship with academic achievement. Using data across grade levels aggregated at the state level, Darling-Hammond (2000) found that before and after controlling for poverty and language status, teacher certification had a stronger correlation with reading achievement than did class size, teacher salaries, or school spending. Several others (Ferguson, 1998; Goldhaber, 2002;

Rivkin, Hanushek & Kain, 1998; Sanders, 1998) found that teacher characteristics are more predictive of student achievement than are school characteristics. Using data from Texas, Hanushek, Kain, and Rivkin (2002) found that teacher differences accounted for a minimum of 4% of the variance in achievement. Using data from Tennessee, Sanders and Rivers (1996) found that the norm referenced test scores of students with the most “effective” teachers increased 36 percentile points more than students with the least effective teachers (as defined by their measure of student growth).

Although several studies have shown contrasting findings regarding the effects of teacher certification on the achievement at the secondary level, few studies have examined the effects of teacher certification on the achievement of elementary level students. Three separate studies have found no positive effect of teacher certification on elementary level achievement (Croninger, Rice, Rathbun, & Nishio, 2003, 2007; Rowan, Correnti, & Miller, 2002). These studies did not examine the effects of teacher certification on the achievement gap between African American and European American elementary school level students. Chatterji (2005) also found no positive effect of the percentage of certified teachers in a school on mathematics achievement of students in kindergarten and first grades.

Findings are also inconsistent regarding the relationship of teacher education level and student achievement (Goldhaber, Brewer, & Anderson, 1999; Greenwald, Hedges, & Laine, 1996; Hanushek, 1986). Meta-analyses by Hanushek and by Greenwald et al. found inconsistent evidence regarding the effect of teachers with master’s degrees on the academic performance of high school students. However, both meta-analyses found that more than half of the studies they examined showed a positive relationship between advanced teaching degrees and student achievement. Research findings on teacher degrees and the achievement of elementary students are inconsistent (Ferguson & Ladd, 1996; Rowan, Correnti & Miller, 2002).

Some studies have indicated differences in teacher qualifications associated with the predominant race of the students they teach. In particular, there is evidence that teachers of minority students were less prepared in respect to coursework and academic degrees than were teachers of European American students (Fryer & Levitt, 2004; Lee & Burkam, 2002). However, Fryer and Levitt (2004) found that teacher education level, race, and turnover accounted for virtually none of the variance in reading scores of African American and European American students. Their study did not examine the effect of NCLB qualification criteria. Croninger, Rice, Rathbun, and Nishio (2003) found that 7% of the variance in achievement scores was associated with teacher qualification. However, the researchers’ assessment of teacher qualification was not based on NCLB criteria, the study did not address the specific gap between the achievement of African Americans and European Americans, and the study included only students in kindergarten and first grade.

This study is guided by research questions focused on early achievement, achievement growth, and interethnic interactions: Is teacher certification associated with higher initial reading achievement in kindergarten or with rates of growth in reading between grades K and 3? Is the association of teacher certification with growth in reading consistent for both African American and European American students in poverty and not in poverty? The last research question calls for an examination of the interaction between growth in reading and race and also a determination of whether the availability of certified teachers contributes to a narrowing (or widening) of the achievement gap.

Since the Coleman Report (Coleman et al., 1966) brought the achievement gap between students of African American ancestry and European ancestry to widespread attention more than 40 years ago, the problem has been widely described and studied. The magnitude and persistence of the black-white achievement gap remains an important obstacle to the policy goal of equal educational and economic opportunity in the United States (Easton-Brooks & Davis, 2007; Fryer & Levitt,

2004). The finding of an association between SES, poverty, and academic achievement is also well established (Brooks-Gunn & Duncan 1997; Denton & West, 2002; Dickson & McCabe, 2001; Phillips 2000; Reardon, 2003; Sirin, 2005). However, after variance associated with SES is controlled in most of the regression studies just cited, significant unexplained variance associated with race remains to be explained. In a recent study, Fryer and Levitt (2004) found no significant difference in initial reading scores for African American and European American kindergarteners after controlling for several home background variables, including SES. However, they found that background variables could not account for an emerging gap between the two groups by grade three, suggesting differences in the quality of their educational experience.

We maintain that good teaching should involve the ability to minimize the association between SES and achievement and to facilitate strong learning gains for students of all sorts of ethnicity and background. It follows from this definition that variance in achievement associated with SES should not be removed statistically in studies of teacher effectiveness before introducing teacher level variables. A methodological alternative is to employ poverty as a categorical family background variable in place of SES, and to examine the interaction between poverty, race, and teacher characteristics in respect to achievement. Poverty reflects the ability of families to provide for basic needs (Shapiro, 2004), and is predictive of achievement (Easton-Brooks & Davis, 2007; Lee 2002; Ream, 2005; Rothstein, 2004). Rothstein (2004) showed that African American families typically spend more time in poverty than do European American families. Therefore poverty is likely to have a more lasting effect on the achievement of African American students than on European American students.

Method

The method used in this study is based on value added model (VAM) techniques (Ballou, Sanders, & Wright, 2004; Callender, 2004; McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2004; Sanders, Saxton & Horn, 1997; Webster & Mendro, 1997). Rubin, Staurt, & Zanutto (2004) describe VAM as determining how much of the change in student performance over time can be attributed to differences in teachers. Rowan, Correnti, and Miller (2002) found when using the VAM approach, controlling for student background variables, teacher differences accounted for approximately 60–61% of the reliable variance in reading growth.

Approaches to VAM vary in respect to how researchers control for predictor variables. Sanders, Saxton, and Horn (1997), in one of the first studies to use VAM, excluded external predictor covariates such as ethnicity and SES and focused solely on the effects of teachers and schools for the Tennessee Value-Added Accountability System. A study using the Dallas Independent School District data (Webster & Mendro, 1997) examined the effects of teachers on students of varying ethnicity and discrete levels of SES. The current study employs a similar approach.

The analysis used a two-stage process to test whether teacher qualifications, as defined by NCLB, were associated with initial reading at kindergarten and with growth in reading, and with a reduction in performance gaps between African American and European American students at different levels of poverty. First, we examined an unconditional model, testing whether reading scores vary significantly at kindergarten and vary significantly over time. Secondly, we introduced a conditional model, testing whether teacher qualifications significantly influenced the reading scores of African American and European American students at different levels of poverty at kindergarten and their growth in reading over time.

Sample

Data used in this study came from the Early Childhood Longitudinal Study, Kindergarten through Grade 5 (ECLS-K-5), a longitudinal data collection project funded by the U.S. Department of Education. The complete data set included approximately 22,000 children entering kindergarten in 1998 through fifth grade in 2003. Surveyors collected data on students, their families, teachers, and school performance during the fall of their 2nd and 4th grade years and during the spring of their kindergarten, 1st, and 3rd grade and 5th grade years. For this study, the data from the spring of kindergarten, spring of 1st grade, and spring of 3rd grade was more consistent for examining reading growth.

Students who were in special education or had an Individualized Evaluation Plan (IEP) at any of the assessment points were eliminated from the study because such students are likely to receive instruction from multiple teachers, confounding the attribution of achievement growth in reading to a principal classroom teacher. Students who attended private schools or who transferred between schools at any of the assessment points were also eliminated from this study to avoid confounding teacher and school effects. In addition, only those students with data related to teacher certification were included. After removing students who did not meet the study specifications described above, 544 African American (12.3% of the sample) and 3,874 European American students (87.7%) from the ECLS-K-5 were included in the study. Of these, 24% of African American students and 16% of European American students were living in poverty. All statistical outputs were weighted using primary sampling unit weights (PSUs) based on geographic areas consisting of counties or groups of counties. The weights were designed to generate national estimates from the ECLS-K data. The weights also adjusted for unequal selection probability associated with the sampled populations and adjusted for non-response.

Students were placed into four subgroups based on race and level of poverty. Using federal poverty threshold criteria based on a combination of household size and annual household income, students living at or below poverty were coded -1, and students above poverty were coded 1. Race was coded -1 for African American and 1 for European American. The codes -1 and 1 were used to in order to examine interaction effects (Raudenbush & Bryk, 2002). We found the correlation between poverty at kindergarten, first grade, and third grade to be high and consistent ($r = .60$ to $.69$), and therefore used poverty at kindergarten as the criterion for poverty. The four subgroups consisted of 187 African Americans living in poverty (4.2% of the total sample), 370 European Americans living in poverty (8.4%), 357 African Americans not in poverty (8.1%), and 3,504 European Americans not in poverty (79.3% of the sample).

Dependent Variables

Reading item response theory (IRT) scores nested within students were the observed dependent variable. Each student surveyed in the ECLS-K was administered reading assessments at the end of kindergarten, first grade, and third grade. Assessments consisted of two stages. In the first stage, a 12–20 item routing test was administered to each student. Performance on the first stage routing items guided which one of the several alternative second-stage tests was administered to each student. The second-stage test consisted of items of appropriate difficulty by each student's ability level as indicated by the first-stage routing test. Given that all students were not administered the same test, item response theory (IRT) scale scores were computed for each student. IRT scores represent estimates of the number of items students would have answered correctly if they had answered all of the 92 reading questions in both the stages. The IRT reading scores were comparable

across students within a wave and across waves. These comparisons allow for analysis of reading performance over time. The reliability of test scores was very high ($r=0.93$) (Pollack, Atkins-Burnett, Najarian, & Rock, 2005). NCES (1999) provided more detailed information about the tests administered. We treated the intercept and the slope of the growth trajectories across grades K, 1 and 3 as unobserved dependent variables.

Independent Variables

NCLB (2001) mandates that school districts employ highly qualified teachers, defined as teachers with at least a bachelor's degree and full state licensure and certification. We originally set out to examine the effects of teacher's degree level and types of teacher certification on the reading achievement of African American and European American students. However, at two of the three assessment points in the ECLS dataset, the teacher education level variable did not distinguish among teachers with a high school diploma, associates, or baccalaureate degree. This ambiguity made analysis of the effects of teacher education level as mandated by NCLB on achievement (i.e. at least a bachelors degree) impossible. Therefore, predictor variables included teacher certification (as a proxy for teacher qualification), race, and poverty. Interactions among the predictor variables were also included, and are described below.

Type of teacher certification in the original ECLS data set was coded along a five-point continuum: no certification (coded 1), temporary/probationary certification (2), alternative program certification (3), regular state certification (4) and advanced professional certification (5) at each grade level. To provide a direct test of our third research question, we recoded certification as a dichotomous variable to allow for the analysis of interaction effects. Teachers were coded as *certified* if they had either a regular state certification or advanced professional certification, and *not certified* if they had a no certification, temporary/probationary, or an alternative program certification. Alternative certification programs vary widely, but most involve little instruction in principles of teaching and learning and a much shorter period of directly supervised practice (Darling-Hammond, 2000), supporting the coding of alternative program certification as "uncertified." The data were then aggregated across the three grade levels and coded -1 if the student had one or no teacher who was at least regularly certified at all of the assessment points, and coded 1 if the student had two or more teachers who were at least regularly certified at all three of the assessment points.

Analysis

We used a two-level hierarchical linear model (HLM) to test whether the independent variables were associated with change in students' IRT reading scores, using the HLM6.4 software application (Raudenbush, Bryk & Congdon, 2004). First, we examined the unconditional model, essentially the level-1 of a two-level model (see equation below). In the level-1 analysis, the reading assessments at kindergarten, first, and third grades were used to estimate linear growth models for individual students without the influence of predictor variables. The growth curves for individual students were defined by distinctive intercept and slope parameters. The level-1 estimates were representative of the residual IRT reading growth curve through generalized least-squares (GLS) techniques. In addition, the model demonstrates whether the average relationship between the assessment points (time) and the residual reading scores were different from zero. The model also tested whether there were sufficient variances in the growth parameters to justify additional analysis.

The unconditional model functioned as a baseline model for comparison with the theoretical (conditional) model.

Unconditional model: Fully unconditional model. The analysis used a fully unconditional model as specified below:

Level 1

$$Y_{ij} = B_0 + B_1(\text{Time}) + r_0$$

(Reading score of student i at time j is a function of the initial score—the intercept—and the amount of time elapsed, plus random deviation unique to student i).

Level 2

$$B_0 = G_{00} + U_{00}$$

$$B_1 = G_{10} + U_{10}$$

(The initial reading score of student i is the grand mean of scores plus a random deviation unique to student i ; the rate of growth in scores for student i is the average rate of growth plus a random deviation unique to student i).

Next, the variance in the unconditional intercept and slope parameters were compared to a two-level conditional HLM model. The level-1 of the conditional model is same as the level-1 of the unconditional model. The difference is that the variability of the intercept and slopes were influenced by the regression coefficients of the predictor variables. If the intercept or slope values in the conditional model are lower than the unconditional intercept or slope values, respectively, then the predictor variables had a positive effect on the initial reading scores at kindergarten (intercept) and the growth rate (slope) (Raudenbush & Bryk, 2002). If the intercepts or slope in the conditional model are higher, the predictor variable had a negative effect. No change in the intercept or slope value indicates no effect of the predictor variables. Level-2 predictor variables were regressed on the intercept and slope. The coefficients from these regressions indicated the level of the direct effect of the predictors on the initial reading scores at kindergarten or the growth in reading over kindergarten, first, and third grades.

The interactions of race and poverty and also of teacher certification and race were included initially to examine whether the effects of teacher qualifications on initial reading scores and reading growth were consistent across conditions of race and poverty. A correlation analysis showed a strong positive correlation between the variable representing the interaction of teacher and race and the variable representing the interaction of teacher certification and poverty ($r = .90, p < .01$). To avoid issues of multicollinearity, the interaction of teacher education and poverty was excluded from this analysis.

Conditional model: Fully conditional model with predictor variables and random effects. The analysis used a fully conditional model as specified below:

Level 1

$$Y_{ij} = B_0 + B_1(\text{Time}) + r_0$$

Level 2

$$B_0 = G_{00} + G_{01}(\text{Teacher certification}) + G_{02}(\text{Poverty}) + G_{03}(\text{Race}) + G_{04}(\text{Race*Poverty}) + G_{05}(\text{Teacher certification*Race}) + U_{00}$$

$$B_1 = G_{10} + G_{11}(\text{Teacher certification}) + G_{12}(\text{Poverty}) + G_{13}(\text{Race}) + G_{14}(\text{Race*Poverty}) + G_{15}(\text{Teacher certification*Race}) + U_{10}$$

Results

Table 1 displays the descriptive statistics for all four sub-groups. The table shows that regardless of level of poverty, the mean reading score of European American students was higher than the two African Americans subgroups. In addition, as these students moved from kindergarten to third grade, the reading achievement gap between African American students and European American students increased, regardless of poverty level.

Table 1.
Descriptive statistics

	African Americans				European Americans			
	In Poverty		Not In Poverty		In Poverty		Not In Poverty	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Reading, kindergarten	38.2	10.6	38.8	10.4	46.8	14.2	44.7	11.6
Reading, 1st grade	66.7	20.6	66.9	19.0	82.2	21.4	79.6	19.9
Reading, 3rd grade	111.8	22.3	111.6	21.3	130.8	20.6	129.5	20.0
Certification type	0.39	0.92	0.42	0.91	0.48	0.87	0.49	0.86

Students in poverty were more likely to have at least a regularly certified teacher over the three assessment points at a greater rate than did students not in poverty (Table 1), although the correlation between poverty and certification was small ($r = .201, p < .01$). At kindergarten, 92% of African Americans and 88% of European Americans in poverty had at least a certified teacher. In comparison, 90% of African Americans and 85% of European Americans not in poverty had at least a certified teacher at kindergarten. At first grade, 91% of African Americans and 87% of European Americans in poverty had at least a certified teacher, while 89% of African Americans and 87% of European Americans in poverty had at least a certified teacher. At third grade, 89% of African American and 86% of European students in poverty had at least a certified teacher. In comparison, 84% of African American and 86% of European American students not in poverty had at least a certified teacher at third grade.

Table 2 shows the findings of the unconditional analysis. The variances (random error) illustrate that the average initial reading scores students at kindergarten varied significantly (U_{00}) and the reading gains of students also varied significantly (U_{10}).

Table 2.
Unconditional model of IRT reading scores

	<i>Estimate</i>	<i>SE</i>
For intercept (B_{00})		
Intercept (G_{00})	45.6***	0.15
Random error (U_{00})	233.7***	7.02
For slope (B_{10})		
Intercept (G_{10})	34.8***	0.18
Random error (U_{10})	85.5***	2.18
<i>Pseudo R</i> ²	0.63	

*Pseudo R*²: $\frac{\text{unconditional estimated mean} - \text{unconditional growth}}{\text{unconditional estimated mean}}$ (Singer & Willett, 2003)

The residual variance in the unconditional model represents unexplained variance that may be associated with the independent variables. In the unconditional model, we are interested in understanding what proportion of the unexplained variance is accounted for by time or growth in reading scores. The residual variance for the intercept mean decreases as the model changes over time (from 233.7 to 85.5). This difference represents the amount of within-person variance. The *Pseudo R*² (Singer and Willett, 2003) implies that 63% of the variance in the unconditional model is explained by time.

Table 3 displays the findings of the conditional analysis. The intercept (B_{00}) was smaller than the intercept of the unconditional analysis (41.5 vs. 45.6), indicating that some of the predictor variables had a significant positive effect on reading scores at kindergarten. The smaller conditional model slope also indicates that some of the predictor variables had a positive effect on the reading growth (31.9 vs. 34.8).

Table 3.

Conditional model of IRT reading scores

Model	Coefficient	Standard Error	T-Ratio
Intercept (B_{00})	41.5***	0.3	136.7
Certification (G_{01})	2.6***	0.3	8.5
Poverty (G_{02})	-0.4	0.2	-1.6
Race (G_{03})	3.2***	0.3	10.6
Race*Poverty (G_{04})	-0.1	0.2	0.6
Certification*Race (G_{05})	0.3	0.3	0.9
Slope (B_{10})	31.9***	0.3	107.5
Certification (G_{11})	0.7**	0.3	2.5
Poverty (G_{12})	0.05	0.2	0.3
Race (G_{13})	3.6***	0.3	13.1
Race*Poverty (G_{14})	0.3	0.2	1.5
Certification*Race (G_{15})	-0.6*	0.3	-2.1

* $p < .05$; ** $p < .01$; *** $p < .001$

The effect of certification was significant at kindergarten, implying that students with at least a regular certified teacher scored 5.2 points higher at kindergarten.¹ Teacher certification was also significantly associated with the growth in reading overtime: students with certified teachers for at least two of the three grade levels studied averaged 1.5 IRT units greater growth per year. Poverty, which was not independent of race, was not a significant predictor of reading status or growth when race was controlled. When holding all other variables constant, a significant effect of race indicates that European Americans scored 6.5 points higher than African Americans at kindergarten and the gap grew 7.1 points per year.

The significant negative interaction between teacher certification and race as a predictor of growth in reading indicates that the presence of certified teachers had a greater impact on the growth in reading for African American students (coded -1) than for European Americans (coded +1), given that the overall effect of certification on the growth of the combined sample was positive.

¹ The interaction should be double the coefficient, reflecting the coding of certification as either -1 or +1.

The findings in table 4 points out that certification in combination with race and poverty accounts for 6% of the variance in the initial reading score at kindergarten. Similar to Hanushek, Kain, and Rivkin (2002), we find that teacher qualification accounts for 8% of growth in reading achievement.

Table 4.

Variance explained in initial and slope for IRT reading scores

Models	Intercept	Slope
Unconditional	233.7	85.5
Conditional	220.5	79.0
Proportion of variance explained	0.06	0.08

Proportion of variance explained is the proportion of unconditional variance not included in the conditional model (Raudenbush and Bryk, 2002).

Discussion

The findings in this study are generally consistent with previous research suggesting modest evidence of improved achievement for students with qualified teachers (Croninger, Rice, Rathubun, & Nichio, 2003 and 2007; Darling-Hammond, 2000; Ferguson & Ladd, 1996; Goldhaber & Brewer, 2000; Monk & King, 1994; Rivikin, Hanushek, & Kain, 1998; Rowan, Chiang, & Miller, 2002). However, the study also echoes findings of other studies that found that the achievement gap between African Americans and European Americans increases from kindergarten through third grade (Brooks-Gunn & Duncan, 1997; Fryer & Levitt, 2004).

These findings imply that teacher qualifications are meaningful but far from sufficient as a policy tool for reducing the achievement gap. The findings suggest that the presence of a certified teacher is associated with higher growth in reading for both African American and European American students but is marginally more important for African American students. At the same time, certification itself is meaningful only to the extent that it is associated with differences in the instructional practices of teachers, practices that in turn reflect the pedagogical and content knowledge of teachers and their ability to draw on that knowledge in moment-to-moment interactions in the classroom (Darling-Hammond, 2000).

A surprising finding of this study was that students in poverty were more likely to be taught by a certified teacher than students not in poverty. Overall, 87% of African Americans in poverty and only 79% of African Americans not in poverty had at least a certified teacher across kindergarten, first, and third grades. Of both European American subgroups, 90% had at least a certified teacher across kindergarten, first, and third grades. Often urban inner cities are associated with having uncertified teachers, or teachers with alternative or temporary certification. In this data set, however, African American students and European American students in poverty attending urban inner city public schools had at least a certified teacher at all assessment points more often than those students attending school in small/rural communities or urban fringe/large towns. European American students not in poverty attending public schools in a small town, rural, urban fringe, or large town had at least a certified teacher at all three assessment points at a higher rate than did students in urban inner city communities. The lack of independence in the relationship between poverty, certification, and student race complicates the interpretation of the unique contribution of certification in the model.

Few studies have examined the effects of teacher qualifications on the gap in reading achievement gains between African American and European American students in early elementary grades. Several studies (Croninger, Rice, Rathbun, & Nichio, 2003 and 2007; Darling-Hammond, 2000; Ferguson & Ladd, 1996; Goldhaber & Brewer, 2000; Lewis, Prasad, Carey, Bartzal, Farris, & Smerdon, 1999; Monk & King, 1994; Rivikin, Hanushek, & Kain, 1998; Rowan, Chiang, & Miller, 2002; Sanders, 1998) have examined the effects of teacher *qualifications* and *quality* on achievement. These studies have examined variables such as teacher certification type, teacher tenure, the number of courses taken in subject area, education level, years of experience, professional development training, methods used to teach reading, time spent on reading, and attitudes about student learning. However, limited studies have applied these variables to understanding the effects of teachers on the achievement gap between African American and European American students. To better understand the effects of teachers on the reading achievement gap between African American and European American students in early elementary grades, further research is needed on the instructional practices of teachers who are especially effective in improving the achievement of African American students, and the implications of these practices for teacher training and certification.

Although the consequences of the accountability focus of NCLB are outside the scope of this study, we applaud the attention it has brought to the achievement of students in disadvantaged situations. In support of more effective policy, the examination on the effects of teachers on reducing the academic achievement gap can serve as a tool for implementing effective teacher and school strategies directed at strengthen the academic performance of African American students and other students in positions of disadvantage in early elementary school settings.

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