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Tracing Transitions: The Effect of High School Closure on Displaced Students

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Although closure is an increasingly common response to the problems of chronically underperforming urban schools, few studies have examined the effect of closure on displaced students. The authors used multiple methods to study the academic performance and experiences of Latino and African American high school students in the year following the closure of their school. Quantitative analyses show declines in the transition cohort's academic performance after transferring to new schools. Qualitative findings help explain this pattern by describing students' interpretations of the closure and their experiences transitioning to new schools. Overall, the case study suggests that closure added stressors to students who were already contending with challenges associated with urban poverty.

Keywords: *urban education, adolescence, equity, high schools*

School closure has become an increasingly common way for districts to address problems of underperforming urban schools (Lipman & Haines, 2007; Maxwell, 2006; Olson, 2006). The Obama administration endorsed closure as part of an array of strategies to turn around 5,000 failing schools (Gewertz, 2009). The research base examining effects of closure on displaced students, however, is remarkably thin. We address this gap by sharing findings from a multiple-methods case study of the experiences of one cohort of Latino and African American students, more than 90% of whom were eligible for free or reduced-price lunch, whose high school was closed because of low performance. In addition to shedding light on potential outcomes of closure, this article contributes a method for understanding the effects of school closure that links analysis of quantitative academic performance data with qualitative data gathered through participatory research with students.

Prior Research

School Closure

School closure is one among a menu of options available to schools engaged in turnaround efforts (de la Torre & Gwynne, 2009). Unlike *reconstitution*, where staff are replaced while students remain at a school, or *conversion*, where schools

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are broken into small schools, we apply the term *closure* to situations where staff and students transfer to new schools (Galletta & Ayala, 2008; Malen, Croninger, Muncey, & Redmond-Jones, 2002). In some cases, such as the one studied in this article, schools are reopened with new students and staff after a 1-year hiatus. Two common explanations that districts provide for closure are low performance and underenrollment (de la Torre & Gwynne, 2009). School closures in urban districts have disproportionately affected schools with high percentages of African American and Latino students from low-income families (Lipman & Haines, 2007; Maxwell, 2006; Valencia, 2008).

The few studies of how closures affect displaced students yield a mixed picture. A recent quantitative study analyzed the performance of students from 18 elementary schools in Chicago that were closed between 2001 and 2006 (de la Torre & Gwynne, 2009). In the year of the closure announcement, students' test scores declined. In subsequent years, however, student achievement bounced back: The authors found neither positive nor negative effects on academic performance. One concern raised by the authors was the high percentage of students (40%) who transferred to schools that were either on probation or in the lowest quartile of performance on the Iowa Test of Basic Skills. Only 6% of students transferred to top performing schools, in part because of the distance of those schools from displaced students' neighborhoods.

Qualitative studies describing student and parent experiences tend to emphasize struggles and problems. For example, studies conducted in New Zealand and the United States reported that students and their families experienced feelings of loss and social dislocation after their neighborhood schools were closed (Lipman & Haines, 2007; Witten, McCreanor, Kearns, & Ramasubramanian, 2001). Lipman and Person's (2007) study of high school closures in Chicago reported several concerns raised by teachers and students. For example, teachers from receiving schools worried that displaced students would bring down test scores at the new schools; displaced students voiced concerns about their safety crossing gang-identified boundaries.

Student Mobility

Because closure causes unplanned mobility for students who are not in their graduation year, closure may have outcomes similar to other types of student mobility. Prior research finds that mobility, defined as nonpromotional school transfer, is associated with lower test scores, grades, and high school completion rates (Engec, 2006; Rumberger, 2003; Rumberger & Larson, 1998; Smith, Fine, & Paine, 2008). Whether or not mobility causes these negative outcomes is challenging to ascertain because mobile students often come from families living in poverty who struggle with a host of disadvantages (Pribesh & Downey, 1999; Rumberger, 2003). Furthermore, effects vary depending on whether school mobility is accompanied by residential change (Pribesh & Downey, 1999; Tucker, Marx, & Long, 1998).

Some studies, after controlling for prior achievement and family background variables, find little additional effect of mobility. For example, Pribesh and Downey's (1999) longitudinal study found that school mobility, when not accompanied by residential mobility, showed no effect on reading or math scores. They concluded that the effect of school mobility was "due to differences between movers and non-movers that are evident before any move occurs" (p. 527). Other studies, however, have controlled for similar background variables and found negative effects associated with school mobility. Rumberger and Larson (1998) performed regression analyses that controlled for prior student performance and family background and found that even just one change in schools between 8th and 12th grade constituted an "important risk factor" (p. 31) reducing the odds of graduating from high school. Also, Rumberger (2003) reported findings from a longitudinal study that found that school mobility in the last 2 years of high school predicted increases in behavior problems.

Scholars have made sense of these mixed results by distinguishing between a student's reasons for school transfer (Kerbow, 1996). Rumberger (2003) distinguishes between *strategic* transfers to improve one's educational prospects, which yield positive outcomes, and *reactive* transfers to get out of dangerous or poor performing schools, which yield negative outcomes. Closure in the wake of low performance represents a qualitatively different reason for transfer because it is externally imposed and may carry a stigma for students from the closed school.

Implications for This Study

Few studies have examined the experiences of students displaced by school closure. Extant studies have drawn different conclusions depending on whether data sources were quantified academic measures or qualitative accounts of student experiences. For this study, we combine multiple quantitative measures with in-depth qualitative research to gain a comprehensive picture of students' transitions to new schools postclosure.

Background About Jefferson High School and the Closure

Jefferson High School is located in a large urban school district, called here Riverside, in the western United States. (Because of IRB agreements, we use pseudonyms to refer to the city, school, and participating organizations.) Jefferson, more than 100 years old, had been a flagship school for the district and a cornerstone of its historically African American neighborhood. The student population changed after court-ordered busing ended in 1996 and new attendance boundaries were drawn. Soon after, middle class students and White students went elsewhere and the student population became almost exclusively Latino and African American students from low-income families from the surrounding neighborhood.

In 2000, Jefferson was rated unsatisfactory based on the results of the state achievement test, and the following year, it was converted from a comprehensive high school into three small schools. This conversion failed to show increases in test scores, and by 2005, Jefferson's combined School Accountability Index was the lowest of Riverside's high schools: Fewer than 6% of Jefferson students were proficient in math and fewer than 9% of students were proficient in writing. In addition, Jefferson enrollment had dropped by 47% since fall 2002. By 2006, 92% of students were eligible for free or reduced-price lunch. In 2006, the Riverside School Board voted to close Jefferson's three small schools for 1 year and reopen after one year for freshmen only. Ninth, 10th, and 11th graders were expected to transfer to other schools in the district. The Riverside School District (RSD) tried to support displaced students the following year by creating a resource center at the closed school, a mentoring program, a dropout prevention team, and a leadership group for Jefferson students. Jefferson reopened for incoming 9th graders, with a new principal and staff, after 1 year.

This study was initiated soon after the closure announcement, when a local youth organizing group expressed interest to Kirshner about designing an impact study. The RSD supported the project and became a partner. In a separate article, we analyzed students' narratives about the closure decision but not how they performed in new schools (Kirshner & Pozzoboni, in press). The purpose of this article is to understand students' performance in new schools and how they managed their transitions.

Research Design

Our study was motivated by two broad goals that called for two strands of research (Creswell & Tashakkori, 2007). In the first strand, called Academic Performance, our goal was to examine whether Transition Cohort students experienced a change in academic performance that could be attributed to the closure. The second strand, called Student Experiences, used qualitative methods to understand opportunities and challenges that students experienced in their transitions to new schools. These qualitative data were collected as part of a youth participatory action research (YPAR) project with former Jefferson students.

Strand 1: Academic Performance

Method

Data Sources

We investigated patterns in students' academic performance using three metrics: standardized test scores, dropout rates, and graduation rates. Consistent with other forms of community-based research, our study was designed in response to an unexpected event. As such, we sought to make optimal use of available data and naturally forming comparison groups.

Standardized test scores. For the analysis of test scores, we obtained 5 years of linked student standardized achievement scores (2002–2003 through 2006–2007) in three content areas (reading,

TABLE 1
Student Samples and Academic Years, by Outcome Measure

Student subsample	Outcome measure		
	Standardized test scores	Dropout rates	Graduation rates
Treatment group	Transition Cohort (2006, 2007)	Transition Cohort (2006, 2007)	Transition Cohort (2007)
Comparison group 1	Historic Jefferson (2003, 2004, 2005)	Historic Jefferson (2003, 2004, 2005)	Historic Jefferson (2003, 2004, 2005, 2006)
Comparison group 2	Other District (2003, 2004, 2005, 2006, 2007)		

writing, and mathematics) for all students from the RSD. The test publisher vertically aligned these scores to enable comparisons over time. These tests were administered in March of each year to students in grades 3 through 10. Student-level descriptive characteristics available in this data set include school attended, grade level, status as an English learner (EL), status as a racial or ethnic minority, and eligibility for free or reduced-price lunch (FRL). Status as a student with special needs (IEP) was not available in the test score data set.

Dropout and graduation rates. Student-level data on dropout and graduation were obtained separately from test scores. Dropout and graduation data pertain only to Jefferson students; we were not provided districtwide data for these variables. The district provided exit records for students attending Jefferson in the academic years 2003–2004 through 2005–2006, and for Jefferson students who had transitioned to other schools in 2006–2007. We used these records to analyze Jefferson students' graduation and dropout patterns before and after the closure. Student-level descriptive characteristics provided by the district include grade level, IEP, EL, minority, and FRL status. Because our student samples differ from one analysis to the next, we summarize the treatment and comparison groups we use for each analysis in Table 1.

Comparison Groups

The treatment group, hereafter referred to as the Transition Cohort, represents students who were in 9th, 10th, or 11th grade when the closure was announced. Transition Cohort students who stayed in the district enrolled in 23 comprehensive and alternative schools. Seventy percent of them attended four comprehensive schools. To identify whether their postclosure academic performance changed in ways that could be attributed to the closure, we establish two comparison groups: Historic Jefferson and Other District.

Historic Jefferson. Historic Jefferson comprised students who attended Jefferson prior to the closure, during the years 2003, 2004, and 2005. Including this group enables us to identify baseline test performance, graduation rates, and dropout rates to which to compare the Transition Cohort. Doing so helps us rule out an alternative explanation that trends we observed for the Transition Cohort were typical of preclosure Jefferson students.

Other District. Other District comprised all students in the district who never attended Jefferson. This group provides a second reference point to which to compare Jefferson students and enables us to rule out the alternative explanation that changes in Transition Cohort performance reflected district-level events that may have taken place during 2006 and 2007. Because districtwide student-level data on dropout and graduation rates were not available, Other District was only used for analyses of test scores.

Although we estimate our statistical models using all available student data, when reporting any closure effect, we restrict the treatment and comparison groups to minority students eligible for free or reduced-price lunch. This matches the profile of the modal Jefferson student at the time of the closure. Doing so helps us estimate a discrete effect of closure controlling for family background or poverty status, as suggested by the literature on student mobility (Rumberger, 2003).

Selection Threats

We consider the possibility of selection bias because the population of students at Jefferson was shrinking in the years prior to the closure. Those who remained at Jefferson may have differed in important ways from both Historic Jefferson and Other District students. Although our data do not permit us to describe characteristics of the students who left Jefferson each year, demographic data from the students who remained at the school show that EL representation grew substantially between 2002–2003 and 2006–2007, whereas minority and FRL representation grew slightly over the same time period. This increase in English learners may have affected academic performance trends. To limit the effect of this selection threat on our analysis, we include statistical controls in each model for students' status as minority, FRL, and EL. It should also be noted that the changing demographics at Jefferson were reflected in similar demographic patterns for enrollment across the district during that time. For graduation and dropout analyses, the Other District comparison group was not available. Still, in these analyses, we statistically control for EL, FRL, and minority status to limit the effect of shifting demographics on our conclusions.

Modeling Test Score Growth, Dropout, and Graduation

Standardized Test Scores

For the analysis of standardized test scores in reading, writing, and mathematics, we specify discontinuous individual trajectories via multilevel models (Singer & Willett, 2003). Data include assessment scale scores ranging from 150 to 1,000 for RSD students in grades 6 through 10 during the academic years 2002–2003 through 2006–2007.

We treat test scores from any Jefferson student before 2005–2006 as Historic Jefferson scores. As such, students may be members of the Historic Jefferson group in the years prior to 2005–2006 and members of the Transition Cohort in 2005–2006 and 2006–2007. We made this decision after exploratory analyses showed no substantial differences in preclosure scores between Historic Jefferson students and members of the Transition Cohort. In Appendix A, we provide plots of mean scores over time, by academic content area, for Transition Cohort, Historic Jefferson, and Other District students. These plots illustrate our exploratory finding that Transition Cohort test scores and rates of test score growth prior to the closure did not differ substantially from Historic Jefferson students. Table 2 presents means and standard deviations for test scores, along with sample sizes by grade, content area, and analytic component.

Two-level models are used to account for the nested structure of the data (i.e., yearly test administrations were nested within students). For the Transition Cohort, we model discontinuities in linear score trajectories following the closure announcement. For each model, the time metric GRADE is centered at grade 6. The interaction term (PCGRADE × CLOSURE) is the predictor of primary interest in these models. It allows us to surmise postclosure test score trends specifically for students attending Jefferson at the time of the closure. The time metric postclosure grade (PCGRADE) is assigned 1 for 2005–2006 (first test administration postclosure) and 2 for 2006–2007 (second test administration postclosure). CLOSURE is a dichotomous variable that takes a value of 1 if the student is a member of the Transition Cohort (academic years 2005–2006 and 2006–2007), and 0 otherwise. The final multilevel models include the dichotomous student (Level 2) covariates EL, Non-White/Asian (MINORITY), and FRL status. JEFHIST is a dichotomous variable that takes a value of 1 if an individual is a Historic Jefferson student (academic years 2002–2003 through 2004–2005), and 0 otherwise. Intercepts in these models represent the average achievement of non-EL, non-minority, non-FRL, non-Jefferson students. The multilevel models are specified as follows:

$$\text{Level 1 (TIME):}$$

$$Y_{ij} = \pi_{0i} + \pi_{1i}(GRADE_{ij} - 6) + \pi_{2i}(PCGRADE * CLOSURE)_{ij} + \varepsilon_{ij}$$

$$\text{Level 2 (Student):}$$

$$\pi_{0i} = \gamma_{00} + \gamma_{01} JEFHIST_i + \gamma_{02} FRL_i + \gamma_{03} EL_i + \gamma_{04} MINORITY_i + \xi_{0i}$$

$$\pi_{1i} = \gamma_{10} + \gamma_{11} JEFHIST_i + \gamma_{12} FRL_i + \gamma_{13} EL_i + \gamma_{14} MINORITY_i + \xi_{1i}$$

$$\pi_{2i} = \gamma_{20} + \xi_{2i}$$

TABLE 2
Sample Sizes and Descriptive Statistics, by Analytic Component

Subgroup	Surveys and interviews: Jefferson population	Surveys and interviews[a]
Total *N*	483	106
Missing data	75	
Race/ethnicity[b]		
African American	109 (22.6%)	19 (17.9%)
Hispanic	365 (75.5%)	84 (79.3%)
White	6 (1.3%)	1 (0.9%)
Native American	3 (0.6%)	
Not identified		2 (1.9%)
Gender		
Female	247 (51.1%)	52 (49%)
Male	236 (48.9%)	52 (49%)
Not identified		2 (1.9%)
Grade level[c]		
10	149 (39.8%)	49 (46.2%)
11	94 (25.1%)	29 (27.4%)
12	131 (35.0%)	27 (25.5%)
Not identified		1 (0.9%)

Subgroup	Measure	Standardized tests: Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
					Reading			
Other District	*N*	22,576	22,187	20,810	21,104	16,728		
	M score (*SD*)	577.2 (91.7)	591.6 (89.8)	607.5 (91.7)	608.4 (124.4)	632.1 (135.1)		
Historic Jefferson	*N*	212	427	629	675	539		
	M score (*SD*)	551.4 (59.4)	549.1 (73.2)	571 (70)	595.1 (65.2)	616.9 (63.3)		
Transition Cohort	*N*				207	320		
	M score (*SD*)				518.7 (187.2)	539.8 (204)		
					Writing			
Other District	*N*	22,558	22,172	20,824	21,089	16,708		
	M score (*SD*)	487.8 (71.9)	505.7 (81.7)	513.7 (89.6)	511.4 (117.1)	525.8 (129.8)		
Historic Jefferson	*N*	213	427	627	676	539		
	M score (*SD*)	457.9 (47.1)	465.7 (57.7)	474.3 (63.8)	487.2 (61)	489.5 (66.4)		
Transition Cohort	*N*				208	320		
	M score (*SD*)				418.8 (162.8)	421.6 (174.1)		

(continued)

TABLE 2 (continued)

Subgroup	Measure	Standardized tests						
		Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
					Mathematics			
Other District	*N*	22,742	21,850	20,819	21,055	16,312		
	M score (*SD*)	476.7 (92.5)	496.5 (90)	505.7 (96)	515.9 (101.8)	531.6 (109.4)		
Historic Jefferson	*N*	241	455	539	624	559		
	M score (*SD*)	433.3 (67.4)	449.6 (67.6)	464.1 (68.1)	478.9 (66.3)	498.3 (66.3)		
Transition Cohort	*N*				211	308		
	M score (*SD*)				457.8 (137.2)	464.6 (144.3)		

Academic year	Dropout and graduation						
	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
2003–2004				356	252	221	201
2004–2005				330	228	183	180
2005–2006				267	204	189	146
2006–2007				29	206	143	174

a. Ten respondents completed both surveys and interviews. We did not list focus group participants in the table because we did not ask them to identify their ethnicity or grade levels.
b. Race/ethnicity and gender distributions are based on Riverside School District (RSD) records from June 2006, representing 9th, 10th, and 11th graders at the end of the academic year when Jefferson was closed.
c. Grade level distributions are based on a data set maintained by RSD personnel to track Jefferson students in the subsequent year. These data represent Jefferson students enrolled in RSD 1 year postclosure.

where $\varepsilon_{ij} \sim N(0, \sigma^2_{\varepsilon})$, $\begin{bmatrix} \xi_{0i} \\ \xi_{1i} \\ \xi_{2i} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma^2_0 & \sigma_{01} & \sigma_{02} \\ \sigma_{10} & \sigma^2_1 & \sigma_{12} \\ \sigma_{20} & \sigma_{21} & \sigma^2_2 \end{bmatrix} \right)$,

and Y_{ij} represents the score in academic content area Y for individual i in grade j.

As these specifications indicate, postclosure rate of change (π_2) is not modeled on FRL, EL, or minority status. We explored inclusion of these variables as Level 2 (student-level) predictors of test score trends following the closure. None of these covariates significantly influences score growth over that time period. Parameter estimates and goodness-of-fit statistics associated with unconditional means, unconditional growth, and final models are presented in Appendix B. Estimates of postclosure growth for the Transition Cohort (π_2) presented in Appendix B should be interpreted as deficits from estimates of average growth (π_1).

Dropout and Graduation Rates

The graduation and dropout data set spans the academic years 2002–2003 through 2006–2007. It includes only Jefferson Students because exit records for Other District students were not available to us. Table 2 includes the number of student records available by grade level and academic year. Using exit codes, we calculated two statistics for each year: (a) the percentage of students who dropped out, and (b) the percentage of 12th graders who graduated. These descriptive dropout and graduation rates are presented in Table 3.

For the dropout analysis, we define *postclosure* as the academic years 2005–2006 and 2006–2007. We do this because research participants told us that some Jefferson students dropped out in spring 2006 in response to the closure announcement. For graduation, however, we define *postclosure* as the academic year 2006–2007, because we do not believe that the closure announcement affected 12th graders who were on track to graduate in June 2006.

Using binary logistic regression, we model the closure's effect on students' likelihood of graduating or dropping out, conditional on student demographics and academic achievement. For the dropout model, the predictor of primary interest is the indicator POSTCLOSURE; it allows us to surmise the effect of the closure on students' likelihood of dropping out. POSTCLOSURE is a dichotomous variable that takes a value of 1 in academic years 2005–2006 and later, and 0 otherwise. Likewise, POSTCLOSURE is the substantive predictor of interest in the graduation model. It allows us to estimate the effect of the closure on students' likelihood of graduating. In the graduation model, POSTCLOSURE takes a value of 1 in 2006–2007 and 0 otherwise.

TABLE 3
Jefferson High School Dropout and Graduation Rates, by Academic Year

Academic year	Dropout rate	Graduation rate
2003–2004	11%	68%
2004–2005	14%	68%
2005–2006	16%	68%
2006–2007	17%	52%

Note. The closure announcement was made during the 2005-6 school year.

The dropout analysis requires a "nested dichotomies" modification to the standard binary logistic regression model (Fox, 2008). This is necessary because our data are longitudinal, and a student's presence in the data set in a given academic year is strictly dependent on whether or not he or she dropped out in the previous year. As such, we specify separate models for each grade level, and each specification includes only those students who had not previously dropped out. We aggregate the grade-level models' predicted probabilities, indices of statistical significance, and goodness-of-fit measures to report findings from omnibus models of dropping out during any of the four grades.

The models underlying the dropout and graduation analyses are specified as follows:

Base Model, Conditioning on Demographic and Achievement Factors:

$$P(Y_{ij} = 1) = \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)}$$

Full Model, Conditioning on Demographic and Achievement Factors and Postclosure Status:

$$P(Y_{ij} = 1) = \frac{\exp(\alpha + \beta X_i + \pi POSTCLOSURE_i)}{1 + \exp(\alpha + \beta X_i + \pi POSTCLOSURE_i)}$$

In the models above, Y_{ij} is a dichotomous variable that takes a value of 1 if student i dropped out in grade j, and 0 otherwise. In the graduation model, Y_{ij} takes a value of 1 if student i graduated

in grade 12. β is a vector of parameters associated with X, a vector of demographic and achievement factors, and π is the parameter associated with the indicator POSTCLOSURE. Parameter estimates and goodness-of-fit statistics associated with all dropout and graduation models are presented in Appendix C.

Results: Academic Performance

Trends in Standardized Test Scores

The multilevel discontinuity analyses indicate that the Transition Cohort's test score trends changed significantly after the closure announcement. Across the three content areas, comparison students typically gained about 10 points each year. In contrast, the Transition Cohort scores declined across the three content areas after the closure announcement. Figure 1 plots trajectories based on fixed effects estimated for the final model chosen for each content area. These "prototypical plots" are based on estimates for students who match the profile of the modal Jefferson students at the time of the closure announcement: minorities eligible for FRL.

In the 2 years of available data following the closure decision, depending on the content area, the Transition Cohort lost between 3 and 38 points each year. Over the same grade span, Other District students gained between 9 and 14 points and Historic Jefferson students gained between 8 and 19 points each year. For students in ninth grade in 2005–2006, the score gap between the Transition Cohort and Other District stood at 69 points in reading, 106 points in writing, and 64 points in math two test administrations after the closure announcement. Similarly, the gap between Transition Cohort and Historic Jefferson stood at 70 points in reading, 93 points in writing, and 46 points in math. The decline in test scores began after the closure announcement in 2006 and continued in 2007.

Trends in Dropout and Graduation Rates

Logistic regression estimates suggest negative trends in dropout and graduation rates. The predictive power of the base model of dropping out is significantly improved on by the addition of a postclosure indicator ($\chi^2 = 80.4$; $p < .001$). At each grade level, postclosure years were associated with an increase in the odds of dropping out. Minority FRL students with average achievement had a 7% chance of dropping out preclosure. Those students had a 15% chance of dropping out postclosure. Figure 2 presents a prototypical plot graphically illustrating the closure's effect on the probability of dropping out.

We note two caveats. First, dropout rates were increasing at Jefferson before the closure, so it is not clear that the closure announcement and subsequent transition caused an increase in dropout rates. Second, if we define 2006–2007 as the beginning of the postclosure era in the dropout analysis, a revised logistic model indicates that the modal student's dropout probability increases from 8% to 16% in postclosure years, rather than from 7% to 15%.

Whereas dropout rates were higher postclosure than in previous years, graduation rates fell. The model including an indicator for postclosure years brings a significant improvement in predictive power over the base model ($\chi^2 = 19.7$; $p < .001$). Controlling for demographic factors, the postclosure year was associated with a 63% decrease in the graduation odds ratio ($p < .001$). Whereas minority FRL students with average achievement had a 71% chance of graduating in the preclosure years, they had a 49% chance of graduating postclosure. The prototypical plot in Figure 3 illustrates the closure's effect on the probability of graduating.

We note one caveat: We define *postclosure* in this analysis as the academic year 2006–2007. If we include 2005–2006 in the postclosure time period, a student's graduation odds ratio decreases about 40%, rather than 63%, in postclosure years.

Strand 2: Student Experiences

Quantitative data suggest that displaced students experienced academic struggles after the closure. These data are complemented by qualitative data about students' interpretations of the closure and their experiences during the transition year.

Method

Data Collection

During the school year after the closure announcement, we developed a participatory action research project with former Jefferson students. Ten students (eight in high school and two in college)

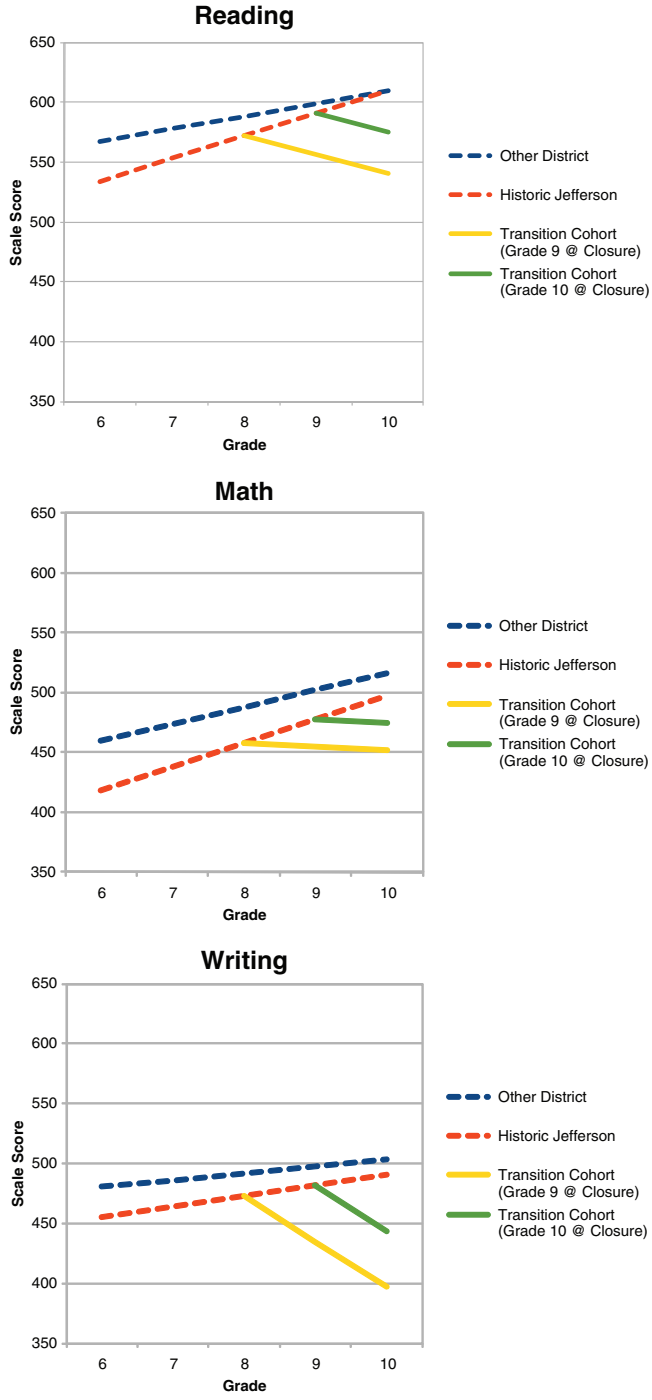


FIGURE 1. *Prototypical plots of minority, free or reduced-price lunch (FRL) test scores over time, by test subject.*

and four adults (including Kirshner and Pozzoboni) participated. The group, called here Tracing Transitions, was composed of African American, Hispanic, and White participants. Student researchers received monetary stipends. The Tracing Transitions group designed protocols, surveyed and interviewed students, analyzed data, identified results, and shared findings with district administrators and

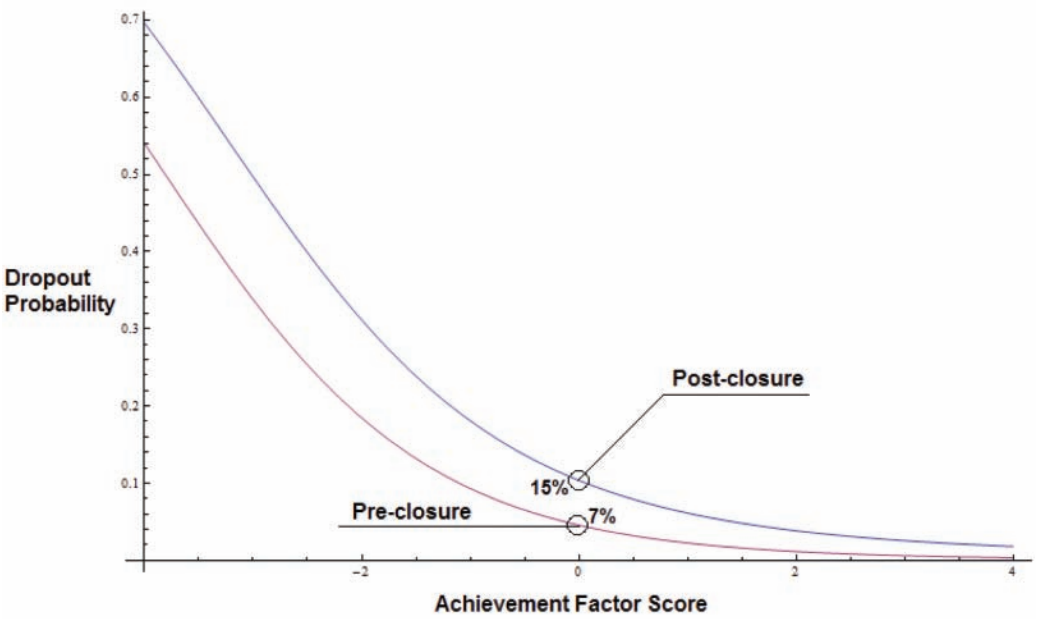


FIGURE 2. *Probability of dropout in pre- and postclosure years, across achievement scores.*

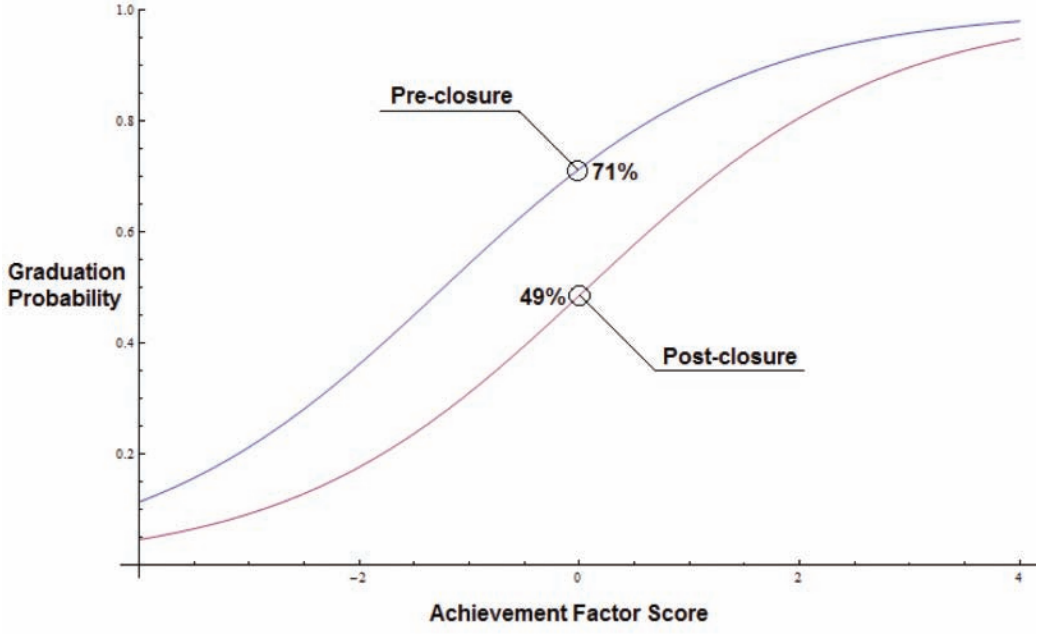


FIGURE 3. *Probability of graduation in pre- and postclosure years, across achievement scores.*

community members. Subsequent to those presentations, four students continued for a 2nd year and reanalyzed data, wrote and published an article, presented research at conferences, and met with participatory youth research teams from across the United States. We developed the YPAR project because we believe that young people should have the opportunity to participate in inquiry about institutions and settings that shape their lives (Cammarota & Fine, 2008; Cook-Sather, 2002; Kirshner, in press).

Five sources informed our qualitative analysis for this article: surveys, peer interviews, focus groups with nonattending students, field notes, and interviews with youth researchers.

*Open-ended surveys (*n = *95)*. Youth and adult researchers designed a two-page survey that asked students to describe their experiences in new schools in their own words. Prompts asked about goals, feelings of success and adjustment, perceived support from adults, level of challenge in classes, transportation, social environment, and extracurricular activities. Bilingual team members translated surveys into Spanish, which were then edited by a professional translator. For recruitment, at most schools an announcement was made inviting Jefferson students to attend a lunch meeting, where pizza was provided, to share their experiences. Some youth researchers recruited students to fill out surveys between classes or on the bus to school.

*Peer interviews (*n = *21)*. Youth researchers completed 21 ten-minute interviews and typed summaries of each interview. The interview protocol asked students to describe what was best and worst about their new schools and what they thought people should hear about the closure.

Focus groups with nonattending students. Kirshner and Pozzoboni led two focus groups with 12 former Jefferson students (8 males and 4 females) who were not in school and had not graduated. Some of them were trying to get back into school. These students are referred to in this article as *nonattenders*. We recruited them through an organization whose mission was to help out-of-school youth return to school. We asked students to describe their experiences since Jefferson closed, the circumstances of their leaving school, and their feelings about the closure. We sought out nonattending youth because the surveys and peer interviews recruited students who were still in school and we knew that some displaced students were not attending.

Field notes from YPAR research meetings (June 2006–May 2007, 47 meetings). We documented group discussions about Jefferson student experiences.

Interviews with Tracing Transitions participants (8 interviews). Kirshner and Pozzoboni interviewed youth researchers about their experiences on the Tracing Transitions team and in new schools.

Data Analysis

Phase 1: YPAR. Student and adult researchers created codes, coded survey and interview data, and analyzed coding bins in a collaborative process (described in Kirshner & Pozzoboni, in press). The group identified a set of themes that on first glance appeared contradictory: More than half of the respondents reported feelings of success in their new schools and more than half of respondents also reported missing Jefferson and compared their new schools unfavorably with Jefferson. Student researchers described this combination of challenge and persistence in a way that mirrored the concept of resiliency (Benard, 2004; Masten, 1994).

Phase 2: Reanalysis of data using a resiliency frame. After Tracing Transitions ended, we, the three authors, reanalyzed the qualitative data. Consistent with resiliency theory, we developed a set of codes to describe challenges reported by students as well as resources and opportunities that facilitated their transitions. (Codes and decision rules are available from the authors upon request.) We independently coded 27 text statements and achieved an interrater reliability rating of .75 using Cohen's kappa. These codes were not mutually exclusive; text statements could be assigned multiple codes. After coding our remaining data, we viewed frequencies of codes as well as matrices that showed intersections between them (LeCompte & Schensul, 1999). We examined internal variation across data sources, ethnicity, grade levels, and schools. We met several times with four youth members of Tracing Transitions and one adult community member to ask their perspectives on puzzles in our data, test the validity of our emerging claims, and discuss implications (Prasad, 2005). We also discussed our findings and solicited feedback from community adults, two former Jefferson students, and administrators from RSD. In the last stages of data analysis, we identified areas of convergence and divergence between qualitative and quantitative strands (Creswell & Plano-Clark, 2006; Woolley, 2009).

Validity of Qualitative Data

Selection threats. We did not link academic records to individual respondents, so it is possible

that our qualitative sample was not representative of the full cohort in terms of academic performance. Also, unlike survey recruitment, which did not rely on personal connections, youth researchers recruited peers to interview whom they already knew, which may have created a biased sample of peer interviewees. Comparisons of themes in peer interviews and surveys, however, did not show meaningful differences.

Managing researcher bias. First, we managed bias by treating surveys, peer interviews, and focus groups as our primary data sources, rather than field notes or interviews with Tracing Transitions members, so as not to overrepresent the views of the youth researchers in our analysis. Second, adult and youth researchers participated in activities where we stated our goals for the study and our personal views of the closure. Doing so helped us clarify our purpose and make our biases transparent to each other so that they could be "displayed, dissected, challenged, and pooled" (Fine, 2008, p. 223). Third, we addressed bias by collecting data that could disconfirm our personal views and by including codes for both benefits and challenges, so as to capture respondents' range of experiences.

Results: Student Experiences

Students' Views of the Closure

Prior research on student mobility suggests that outcomes vary depending on whether students' reasons for transfer are strategic or reactive (Rumberger, 2003). District officials wrote in a public letter that the closure was a "rescue mission" to save students from a chronically failing school. Our data show, however, that most students interpreted the closure as an unwanted and externally imposed mandate rather than a strategic opportunity. Students were upset to have to leave a school where they felt supported and from which older relatives had graduated. At public meetings, students articulated strong connections to teachers, fellow students, and the surrounding neighborhood. Some viewed the closure as racist and part of a broader process of gentrification.

One year after the decision, in our open-ended survey that asked for "final thoughts" about the closure, 35 out of 36 statements that evaluated the decision conveyed opposition through statements such as, "It was a great school and it shouldn't have closed," and "It was unfair to shut down Jefferson—it didn't help Jefferson's problems it only made them worse." In addition to praising the positive qualities of the school, students objected to a decision-making process that lacked their input. Survey statements included, "They locked us out with no remorse," "They didn't care about how the students feel over this!," and "The district screwed us over and they are probably going to do it again. . . . Out of nowhere they decided to close the school." (See Kirshner & Pozzoboni, in press, for analysis of students' narratives about the closure.) Students' sadness about leaving their old school and their anger about how the decision unfolded provide an important context for understanding their transitions to new schools.

Navigating Transitions to New Schools

We focus on the *relational* and *academic* tasks that students encountered as they navigated transitions to their new schools; these tasks illuminate the academic performance data. In managing these tasks, we found that many students adopted a *resilient stance*.

Relationships. The most prevalent transition task for students involved forming new relationships and managing old ones disrupted by the closure. In terms of new relationships, roughly half of the survey and interview respondents stated that there was an adult at their new school who treated them well. In most cases, they used words such as *good*, *nice*, *fair*, or *respectful* to describe their treatment. For example, as the year progressed, two student researchers developed a close relationship with their new principal who got to know them personally. This trend of feeling well treated, however, was accompanied by several types of relational struggles reported by students.

Disrupted relationships. Roughly 40% of survey and peer interview respondents reported a sense of loss or that their friendships or relationships were disrupted by the transition. For example, when asked to explain the "most important part" about the story, one interviewee said that the closure "broke apart" her friendships with peers

and teachers. She said that seeing "my teachers go to other schools" made it "difficult to start all over at the new school." Survey respondents expressed similar sentiments, such as, "I still don't want to be here. I wish I could be at Jefferson where I got along with more people," and "I feel sad because in this school I don't know a lot of people."

Weaker relationships with new school adults. Roughly 40% of respondents wrote that new relationships were weaker than those they had experienced at Jefferson. One student wrote, "It is way different because at Jefferson I had relationships w/ my teachers and here I really don't." Students explained that their relationships with Jefferson teachers were characterized by trust and love. For some, new teachers communicated a narrower set of priorities: "They don't care about you—they just want to do their job and that's it." Another student wrote, "As far as I can see, some of the teachers that I know are nice to me and treat me good, but the thing is they don't care if you pass their class."

Stereotypes about Jefferson students. Roughly one quarter of survey and interview respondents reported feeling mistreated by youth or adults at their new schools. Some described being labeled or stigmatized because they were from Jefferson. One respondent wrote, "There [***sic***] are always thinking that we are dumb and every time one student does something wrong they always say that that's why they closed Jefferson." Others wrote, "They look at us as failures that come from a bad school," and "People label us as bad, stupid, or useless but people don't know what it feels like to be forced out and no one will ever understand the struggles we face every day." Focus group participants said that security guards blamed alleged crime increases in the receiving school's neighborhood on the influx of Jefferson students.

Academics. Students reported that academic norms, routines, and expectations were different in their new schools. What this difference meant varied among students. A small number of respondents (8%) expressed appreciation for the greater number of programs and resources at their new schools, which they contrasted with the dearth of extracurriculars and AP classes at Jefferson. For example, one survey respondent wrote, "The students are getting more education now than they did at Jefferson because of the teacher and class sizes and all the extracurricular activities we should have had at Jefferson." Others reported that they had "more opportunities," "more programs," "more learning and education," and "better opportunities to go to college." One of the student researchers exemplified this view after transferring to the district's arts magnet, where he took advantage of a thriving theater program.

Roughly half of survey respondents reported that their new classes were harder than Jefferson classes. (One third reported that they were the same, and one eighth reported that they were easier.) We observed two meanings of "harder classes" in our data. A small number of students reported higher academic expectations. One interviewee, for example, said that he felt challenged "because [of] all of the homework and classes that are offered here." One survey respondent wrote that he got to write 10-page papers and "I never done one before."

The second, more common, explanation of harder classes focused on the absence of student–teacher relationships or one-to-one support. Throughout all of our data sources—surveys, peer interviews, focus groups, and discussions with youth researchers—students voiced a common theme that "help" and "support" were readily available at Jefferson but much harder to obtain in new schools. For example, survey respondents explained that "teachers don't explain the work that we have to do" and "we don't feel the support or receive help like we did at Jefferson." Peer interviews echoed these survey results: "At Jefferson . . . if you didn't understand something, you got help right away." Another interviewee elaborated on this theme:

> At Ben Franklin it is somewhat a struggle . . . because you really don't get help when you are stuck or need help. Ever since I came to Ben Franklin my grades went downhill. I was making good grades at Jefferson but now it's all bad. When I need help on work I go to Mr. J., a former teacher that worked at Jefferson. The teachers just look at you and don't say nothing until you say something to them.

One of the focus group participants raised a similar point when talking about his experiences in his new school, prior to dropping out:

> You try to ask for help and they look at you like you're stupid because you're falling behind. . . . She's like, "You have to talk to me after class and make an appointment for another day." . . . Back in Jefferson . . . you just come to class and tell the teacher to help you.

Albert, one of the student researchers, told a similar story, which he attributed partly to the large class sizes in his new school: "I'd raise my hand . . . if I didn't understand something, and the teacher would say, 'Well, yes, see me on your own time because I have 35 other kids and I can't stop the class just for you.'"

Jefferson students were accustomed to smaller classes and instructional practices where they received one-on-one help and felt personally known and cared for by their teachers. They were not used to having to make an appointment with the teacher for help.

Resilient stance. Many students adopted instrumental goals for school that focused on graduation. This view was captured most succinctly by the student who wrote, "I don't have feelings for this school because I only came here to be able to graduate." Others wrote about wanting to "get done with school" and "move on to something better." As one youth researcher put it, describing displaced students, "Some students . . . weren't going to try to make new friends. . . . They were just going to . . . get through it and go on about their business." For these students, focusing on getting the diploma or going to college helped them to endure a difficult time.

This narrowing of goals was connected to a broader pattern of persistence in the face of adversity. A majority (62%) of survey respondents responded affirmatively when we asked, "Do you feel like you are being successful at your new school?" Youth researchers interpreted this as evidence that students wanted to make the best of a difficult situation—that they developed a resilient stance.

Discussion

We carried out two strands of research to understand the postclosure transitions of Jefferson students. In our quantitative analysis of academic performance, we found a decline in test performance, an increase in the probability of dropping out, and a decline in the probability of graduating. Qualitative data show that students navigated relational and academic tasks adjusting to their new schools. Although we observed variation in how students managed these tasks, two powerful themes were social disruption and academic struggle. In this discussion, we elaborate on areas of convergence and divergence between these two strands of research (Creswell & Plano-Clark, 2006) and highlight specific contributions to student mobility research and closure policy.

Convergence Between Strands

Social disruptions and increase in dropout. Qualitative data suggest that disrupted relationships made it difficult for students to adjust to new schools. Although most respondents reported that they were treated well by teachers in receiving schools, the quality of their relationships with teachers was weaker than what they experienced at Jefferson. The closure cut students off from adult school personnel to whom they felt connected and displaced them from a school that had deep symbolic meaning because of its history in their community. When these relational ties were cleaved, an important protective factor for students disappeared, which we think contributed to the changes in graduation and dropout rates (Croninger & Lee, 2001; Lee & Smith, 1999).

Classroom struggles and decreases in graduation rates and test scores. About half of our survey and interview respondents reported that new school classes were harder. For students for whom this meant higher expectations and intellectually engaging curricula, we view this as a positive outcome. Some students expressed appreciation for access to AP classes, more challenging assignments, and other learning opportunities. In our data, however, many expressed that they were accustomed to a high level of personal support and flexibility that was not met in their new schools. The combination of academic challenge and a decline in individualized support may explain aggregate declines in academic performance and graduation rates.

In regard to the declines in test scores, qualitative data suggest that two factors were at work. For the first test administration, 1 month after the closure announcement, students' anger about the decision likely fueled disenchantment and resistance to the test. The fact that this trend continued in the second administration, 1 year postclosure, is harder to explain. This result differs from de la Torre and Gwynne's (2009) analysis of elementary school closings, which showed declines during the announcement year but then a return to normal trajectories in subsequent years. The persistent decline could be a sign of students' continued disenchantment with the purpose of high-stakes testing. It could also be explained by their classroom struggles, consistent with Lee and Smith's (1999) research showing that when high academic press is not accompanied by high social support, students' test performance suffers.

Divergence Between Strands

Although quantitative indicators suggest that many students struggled in the transition year, more than half of students responded affirmatively when asked if they felt successful in their new schools. This divergence may be partly explained by the wording of the question ("Do you feel like you are being successful at your new school?"). Also, because those who responded to surveys were in school, they did not represent the full cohort. Finally, this divergence points to students' adoption of a resilient stance characterized by a narrowing of goals and persistence in the face of adversity. For these students, the fact that they had endured the closure and were still in school made them successful, even if they struggled academically.

Caveats

With regard to our investigation of test score trends, it would strengthen our analysis to have more than two data points postclosure. Our analysis was limited by the district's policy of administering standardized tests only through 10th grade. The consistency in student declines across three content areas (reading, writing, math), however, suggests to us that the postclosure change in trajectory was not a fluke.

Readers may wonder whether the academic struggles observed in our aggregate data were driven by one or two schools that were especially inhospitable or low performing. If so, our claims about a "closure effect" would need to be tempered by recognition of variability in receiving schools. We did not model academic performance trends for each transition school because most schools received fewer than 15 displaced students, which was inadequate for statistical tests. Moreover, our goal was to test for a closure effect net variation among schools. Nevertheless, to explore whether outcomes from one or two transition schools had disproportionately influenced our results, we examined test score trends for Transition Cohort students from the four schools that received 20 or more displaced students. We did not find evidence that our findings are driven by one or two weak schools. Of the four schools, three showed postclosure test score losses for the Transition Cohort and the fourth school exhibited modest score increases. Examining variation in outcomes across receiving schools is an important area for future studies of school closure.

As an observational study of one group of students whose experience was shaped by the local sociopolitical context, we do not claim that closures cause declines in academic performance. Nevertheless, the level of convergence we observed among academic indicators and between quantitative and qualitative findings points to several important implications.

Contributions to Mobility Literature

Closure is qualitatively different from other causes of mobility. Prior research has found that the effect of student mobility varies depending on what caused it. For example, residential and school mobility combined appear to be more harmful than just school mobility (Pribesh & Downey, 1999). Also, strategic transfers are more likely than reactive transfers to lead to positive outcomes (Rumberger, 2003). Evidence from this study suggests that closure provides a qualitatively different context for mobility. Students greeted the closure and subsequent school transfer as an unwelcome mandate. Many believed that their school was

targeted for closure because it was the school with the highest proportion of low-income Latino and African American students. Many also reported a feeling of stigma when they entered new schools because their school was shut down for low student performance. For these reasons, although closure-induced transfer is an instance of the broader phenomenon of student mobility, it represents a distinct type whose unique sociopolitical meaning merits further attention. The message sent to students by closure has the potential to marginalize them further from school.

Closure-induced mobility was associated with negative outcomes not explained solely by family background. Prior research on mobility has drawn inconsistent conclusions about the effect of mobility separate from family background and prior student performance. Some argue that negative outcomes associated with mobility are due to factors that existed for the mobile student prior to school transfer (Pribesh & Downey, 1999). This study, however, lends empirical support to scholars such as Rumberger (2003) who argue that mobility between 8th and 12th grade is itself a risk factor. Jefferson students who experienced closure-induced mobility performed worse than earlier cohorts of Jefferson students and other contemporaries in the district with similar backgrounds. Further research would benefit from examinations of the interaction between poverty and mobility. This is especially important because closures disproportionately target schools serving low-income students (Lipman & Haines, 2007; Valencia, 2008).

Student-centered research complements outcome research. In participatory research, students investigate critical public issues and gather nuanced data about peer experiences (Rubin & Jones, 2007). With the exception of work by Rumberger (2003), most mobility research focuses on quantitative outcome variables. Qualitative data gathered in partnership with students help to explain quantitative patterns and, just as important, can yield practical implications for school personnel, some of which we discuss below (Flyvbjerg, 2001).

Implications for Closure as a Turnaround Strategy

Closure, hailed as an important tool for improving chronically failing schools, rests on a thin base of research. Whether or not the Jefferson closure will benefit future cohorts of students at the reopened school is an open question because research on turnaround strategies is at an early stage (Herman et al., 2008; Malen et al., 2002). Our study focused on students who were displaced by closure and found that forced mobility aggravated, rather than alleviated, academic challenges facing students who, prior to closure, lagged behind same-district peers of similar background. The decline in graduation rates and increase in dropout rates are particularly troubling given that closure is touted as a remedy for students attending failing schools.

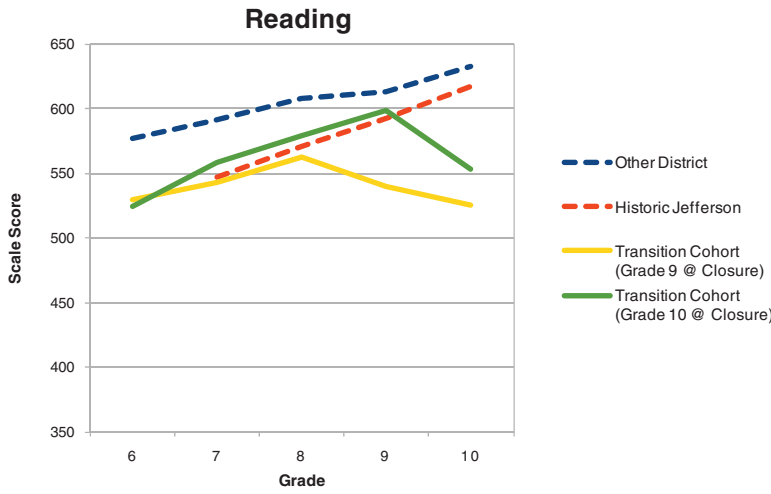
In the event that districts do close schools, this study points to some steps that might support students in their postclosure transitions. Most important is to ensure that there are demonstrably higher quality schools available to displaced students and adequate time for students to research their school options. Furthermore, our data also suggest the importance of connecting displaced students to teachers or school personnel who can provide supplemental academic support to meet higher expectations in new schools.

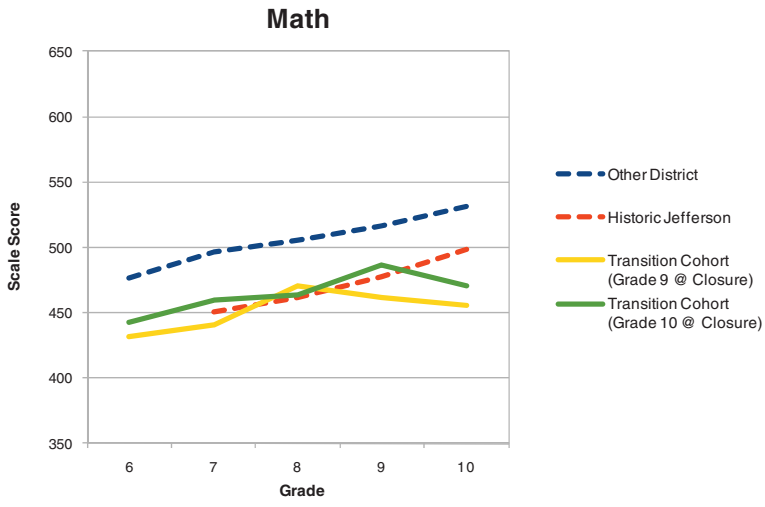
A second recommendation is to develop a decision-making process that includes students and their families. Facilitating youth and community involvement increases the possibility that such a decision is not perceived as coerced and that students will have more time to be strategic about where they choose to transfer. Doing so is developmentally appropriate for students of high school age, as prior research has suggested (Rubin & Jones, 2007; Zeldin, Camino, & Calvert, 2003).

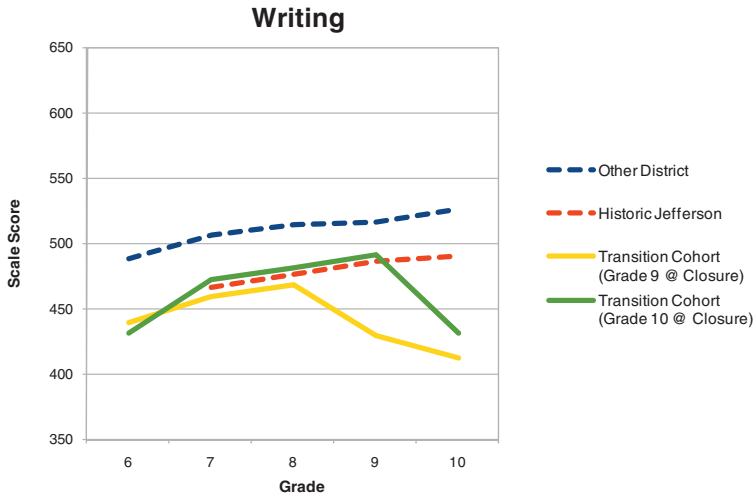
Chronically underresourced and underperforming urban schools demand urgent attention. Policies to turn schools around, however, must be guided by knowledge about their consequences for the students who walk their halls—students who are typically youth of color from poor and working class families. Heilig and Darling-Hammond (2008) cautioned the educational field to protect low-income students from "bearing the brunt of accountability strategies that impose test-based sanctions on the schools they attend" (p. 107). Their warning is especially relevant when considering the effect of closure on displaced students.

Appendix A

Mean Test Scores Over Time, by Academic Content Area







Appendix B
Test Score Multilevel Model Estimates

Fixed effects			Reading			Writing			Mathematics		
			Unconditional model	Unconditional growth model	Final model	Unconditional model	Unconditional growth model	Final model	Unconditional model	Unconditional growth model	Final model
Initial status, π_{0i}	Intercept	γ_{00}	597.4***	578.55***	627.8***	503.05***	492.6***	532.1***	498.37***	475.1***	511.3***
			(0.44)	(0.54)	(1.02)	(0.41)	(0.44)	(0.83)	(0.42)	(0.50)	(0.94)
	JEFHIST	γ_{01}			−32.9***			−25***			−41.6***
					(4.3)			(3.55)			(3.74)
	FRL	γ_{02}			−36.3***			−31.8***			−33.1***
					(1.16)			(0.94)			(1.02)
	EL	γ_{03}			−40.9***			−29.3***			−7.9***
					(1.3)			(1.1)			(1.11)
	Minority	γ_{04}			−25.5***			−19.8***			−18.1***
					(1.19)			(0.96)			(1.06)
Rate of change, π_{1i}	Intercept	γ_{10}		9.8***	8.64***		5.5***	8.89***		12.6***	11.53***
				(0.24)	(0.46)		(0.21)	(0.4)		(0.19)	(0.37)
	JEFHIST	γ_{11}			8.41**			2.87*			5.93**
					(1.74)			(1.29)			(1.4)
	FRL	γ_{12}			4.63***			3.07***			3.75***
					(0.51)			(0.43)			(0.41)
	EL	γ_{13}			−1.04*			−3.93***			−2.86**
					(0.52)			(0.52)			(0.49)
	Minority	γ_{14}			−2.57**			−6.18***			−1.44*
					(0.54)			(0.47)			(0.44)
Postclosure rate of change, π_{2i}	Intercept	γ_{20}		−28.9**	−26.5**		−44.8***	−43.6***		−1.29	−17.18*
				(6.9)	(6.19)		(6.1)	(6)		(4.33)	(4.5)
Variance components											
Level 1	Within-subject	σ^2_ε	5697.6	4091.3	4148.0	4162.5	3053.9	3108	3163.3	2292.8	2316.8
		σ_ε	75.48	63.96	64.40	64.52	55.26	55.75	56.24	47.88	48.13
Level 2	In initial status	σ^2_0	6385.1	1304	457.8	5938	2583.5	216	7040.8	2763.9	1600.9
		σ_0	79.91	36.11	21.40	77.06	50.83	14.70	83.91	52.57	40.01
	In rate of change	σ^2_1		802.5	796.4		562.4	554.6		360.9	343.8
		σ_1		28.33	28.22		23.71	23.55		19.00	18.54
	In postclosure rate of change	σ^2_2		16627.4	15500.2		12838.4	11925.5		5272.7	5083.6
		σ_2		128.95	124.50		113.31	109.20		72.61	71.30
	Correlation	ρ_{01}	ICC = 0.53	−0.54	−0.88	ICC = 0.59	0.2	0.352	ICC = 0.69	−0.18	−0.148
		ρ_{02}		−0.02	0.04		−0.06	0.032		0.19	0.49
		ρ_{12}		0.005	−0.001		0.003	−0.002		0	−0.002

(continued)

Appendix B (continued)

Fixed effects		Reading			Writing			Mathematics		
		Unconditional model	Unconditional growth model	Final model	Unconditional model	Unconditional growth model	Final model	Unconditional model	Unconditional growth model	Final model
Pseudo R^2 statistics and goodness of fit	$R^2_{y,y}$		0.03	0.21		0.02	0.23		0.03	0.2
	R^2_{ε}		0.282	0.282		0.266	0.266		0.275	0.275
	R^2_0			0.649			0.916			0.421
	R^2_1			0.008			0.014			0.047
	R^2_2			0.068			0.071			0.036
	Deviance	1279917	1270576	1222589	1254219	1242350	1194806	1234763	1225222	1185899
	AIC	1279923	1270596	1222625	12542245	1242370	1194842	1234769	1225242	1185935
	BIC	1279952	1270691	1222797	1254253	1242466	1195014	1234797	1225338	1186107
	LL	−639959	−635288	−611295	−627109	−621175	−597403	−617381	−612611	−592950
	χ^2			47987***			47544***			39323***
	df			8			8			8
	p value			$p < .001$			$p < .001$			$p < .001$

Note. JEFHIST = Historic Jefferson student; FRL = free or reduced-price lunch; EL = English learner; ICC = Intraclass Correlation Coefficient; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; LL = Log-likelihood.

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

Appendix C
Dropout and Graduation Binary Logistic Model Estimates

		Base dropout models				Full dropout models				Graduation models	
Effects		9th grade	10th grade	11th grade	12th grade	9th grade	10th grade	11th grade	12th grade	Base model	Full model
Intercept	α	–3.4***	–3.54***	–3.51***	–3.37***	–3.58***	–3.9***	–4.3***	–5.25***	0.51	0.79**
		(0.32)	(0.32)	(0.35)	(0.37)	(0.34)	(0.35)	(0.42)	(0.66)	(0.27)	(0.29)
FRL	β_1	0.006	–0.4	–0.23	–0.83**	–0.06	–0.53	–0.43	–1.12***	0.09	0.19
		(0.26)	(0.22)	(0.28)	(0.31)	(0.26)	(0.23)	(0.28)	(0.32)	(0.22)	(0.23)
IEP	β_2	–1.16**	–0.19	–0.29	0.34	–1.13**	–0.12	–0.21	0.47	0.31	0.30
		(0.38)	(0.32)	(0.40)	(0.46)	(0.28)	(0.32)	(0.4)	(0.46)	(0.33)	(0.33)
EL	β_3	–1.29***	–0.62**	–0.38	0.27	–1.29***	–0.61	–0.39	0.25	0.23	0.44
		(0.31)	(0.25)	(0.32)	(0.42)	(0.30)	(0.25)	(0.33)	(0.42)	(0.28)	(0.29)
Minority	β_4	0.33	0.84**	0.13	–0.45	0.33	0.83**	0.11	–0.46	–0.01	–0.06
		(0.28)	(0.3)	(0.33)	(0.4)	(0.28)	(0.31)	(0.33)	(0.4)	(0.26)	(0.26)
Achievement[a]	β_5	–0.87***	–0.64***	–0.51***	–0.18	–0.84***	–0.6***	–0.44**	–0.13	0.67***	0.74***
		(0.12)	(0.15)	(0.14)	(0.19)	(0.14)	(0.12)	(0.15)	(0.19)	(0.14)	(0.15)
Postclosure	π_6					0.41	0.81***	1.42***	2.73***		–0.97***
						(0.24)	(0.23)	(0.33)	(0.60)		(0.22)
Goodness of fit											
χ^2 change			2354.1				80.4			30.3	19.7
df			20				4			5	1
p value			$p < .001$				$p < .001$			$p < .001$	$p < .001$

Note. FRL = free or reduced-price lunch; IEP = student with special needs; EL = English learner.

a. We use principal components extraction to create a standard normal achievement composite for each student, based on 9th-grade test scores in reading, writing, and mathematics. The first principal component, which forms the basis of our achievement composite, accounts for 86% of the variance in 9th-grade test scores.

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

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