

## Morale, participation and shortage in White-majority and White-minority schools: Principals' perceptions

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Prior research has shown that teacher-centred factors such as teacher participation in decision making, teacher morale, and shortage of teaching staff, can affect school performance. In this study we examined how these factors differ between White-majority and White-minority schools both before and after controlling for school characteristics such as school type, socioeconomic status, student-teacher ratio etc. Our results indicate significant differences in teacher morale and shortage of teaching staff between White-majority and White-minority schools, with these differences persisting even after controlling for basic school characteristics. Implications are discussed.

### Introduction

School principals have many responsibilities, including managing the day-to-day interactions within the school and providing instructional leadership that promotes the academic success of students. Principals also have the critical task of assisting teachers in expanding instructional capacity, promoting reflection, and encouraging mutual inquiry (Matthews & Crow, 2003). Increased accountability through educational mandates such as the 2001 *No Child Left Behind Act* (NCLB) and *Common Core State Standards* (CCSS) along with more strict measures for evaluating teacher performance requires both effective leadership and effective teachers in order to obtain student academic success (The Wallace Foundation, 2013). How school principals interact with, understand, and address the needs of teachers is an important component in creating school environments that foster longevity, high morale and leadership capability of teachers (Berry, Daughtrey & Wieder, 2010; Mulford, 2003; Richards, 2007; The Wallace Foundation, 2013). A large part of assessing the needs of teachers is generated by the principal's perceived understandings of those needs and knowledge of how those perceptions may differ across various educational contexts (Hoppey & McLeskey, 2013; Mendels, 2012).

With over 3 million full-time teachers in the teaching force (U.S. Department of Education, 2013), as many as 50 percent of new teachers leave within the first five years of being in the profession (Smith, 2007). A recent study by Goldring, Taie and Riddles (2014) found that after one year, 80 percent of teachers who held 1-3 years of experience remained in the school in which they were teaching, while 13 percent moved to a different school, and 7 percent left the profession altogether. According to the same study, among all teachers, regardless of length of employment, 8 percent moved to a different school and 8 percent left the profession. Thirty percent of those who moved to different schools left involuntarily. Although the reasons remain varied as to why teachers leave (Cha & Cohen-Vogel, 2011; Fairchild et al., 2012), prior literature suggests that teachers are more likely to leave schools with economically disadvantaged populations (Hanushek, Kain & Rivkin, 2004; Loeb, Darling-Hammond & Luczak, 2005). Additionally, schools with disadvantaged populations may lack resources, including facilities and technology

(Grissom, 2011), which may also contribute to the movement of teachers (Ingersoll, 2001). Shortage of teachers, including teachers who move to different schools and those who move outside of the teaching profession altogether (Cha & Cohen-Vogel, 2011), also hinges on the level of principal effectiveness (Richards, 2007). Branch, Hanushek and Rivkin's (2013) study demonstrated that teachers who leave schools with successful principals are likely to have been less effective teachers.

Student characteristics also contribute to teacher attrition, with studies showing that teachers move out of schools with higher minorities (Ingersoll, 2003; Hanushek et al., 2004; Strunk & Robinson, 2006), and non-minority teachers are more likely to leave high-minority schools (Strunk & Robinson, 2006). This places a disadvantage upon more challenging educational communities, especially those in high-minority, urban school districts (Fairchild et al., 2014). In addition, schools that experience high teacher turnover are more likely to employ less experienced teachers, which may contribute to low student performance (Grissom, 2011). Principal success can be attributed to the ability to create environments that attract and retain better teachers (Branch et al., 2013). The anticipation of probable shortages and the continual monitoring of the instructional practices of existing teachers may serve to benefit principals in retaining effective teachers (Grissom, 2011).

Creating a collegial, supportive environment within the school assists teachers in their professional growth (Matthews & Crow, 2003; Hoerr, 2005) which in turn leads to a culture of trust, shared decision making, and increased chances for school effectiveness (Matthews & Crow, 2003). Novice teachers who become part of a school culture that promotes community and partnerships among teachers, and where teachers can develop leadership capacity are more likely to remain in the field (Nieto, 2009; Pasternak, Rigoni & Roberts, 2012). By fostering a culture of shared responsibility, principals provide opportunities for collaboration in decision making and increased leadership capacity within teachers (Berry, Daughtrey & Wieder, 2010). Teachers are more likely to remain in schools that promote shared participation in school decision-making (Cha & Cohen-Vogel, 2011) and offer opportunities to contribute to school-wide decisions, including selection of materials and resources, identifying best practices within the school, professional development, inclusive leadership (Lindahl, 2011; Boyd et al., 2011), and assisting with school scheduling (Boyd et al., 2011). In addition to shared decision making, teachers can assist in selecting professional development opportunities embedded within the school day that help strengthen instructional practices, establish relationships of trust, and focus on improving student learning (Poekert, 2012). Targeted professional development can lead to increased teacher effectiveness and a greater likelihood of longevity within the field (Darling-Hammond, 2010). Principals can utilise teacher participation to create meaningful professional development opportunities, which can lead to greater likelihood of teacher retention and improved academic success for students (Berry, Daughtrey & Wieder, 2010; Iarussi & Larwin, 2015; O'Keefe, 2002; Richards, 2007).

Another aspect that has an effect on student learning is teacher morale (Richards, 2007). With increased accountability and higher teacher standards, school principals not only

have to consider teacher shortages and teacher participation within schools, but they also have to devote attention to teacher morale. Teacher morale is affected by factors that include teacher influence, administrative support, staff relations, student behaviour, facilities and safety (Boyd et al., 2011). Identifying the onset of low morale in the building may be difficult, but there tend to be indicators such as emergence of differing or opposing ideas (Matthews & Crow, 2009). Keeping a pulse on the school climate and culture is integral in maintaining the norms of the school for veteran teachers, novice teachers, and other school constituents; in understanding ongoing professional development needs; and in assessing teacher morale (Matthews & Crow; 2009). With a shared vision, school principals can anchor the school community by reinforcing the core values (Hoppey & McLeskey, 2013; Mendels, 2012).

Our review of the literature on teacher shortage, participation, and morale suggests some degree of connection among these three factors. An effective school principal must possess a high level of skill and aptitude to monitor and address these components, as they have the potential to affect student learning. In the current study we explore these factors in a race-based context both before and after controlling for a number of potential covariates such as school type, school size, school performance based on student outcomes, and school socioeconomic status. The specific research question that we test is, "Is there a significant mean difference in principals' perceptions of teacher participation, shortage, and morale between White-majority and White-minority schools?" The rest of this paper is organised in three sections. The first describes the sample and our analytical method. Statistical results are presented in the second, and a discussion of those results is presented in the final section.

## Method

### Sample

The data for this study were extracted from the U.S. student and school data files (NCES, 2014a) of the 2012 administration of the *Program for International Student Assessment* (PISA). PISA is an international survey of literacy of 15-year old students in areas such as mathematics, reading, and science that has been overseen by the Organization for Economic Cooperation and Development (OECD) every three years since the year 2000. In addition to the literacy assessment component, the survey collects information about student demographics, student perceptions and attitudes, school characteristics, and perceptions of school principals. In 2012, more than 60 countries participated in PISA with about half of them being OECD member states. Country level PISA samples are designed to be nationally representative of their target populations. The sampling is stratified and occurs in two stages. A random sample of schools is selected in the first stage followed by a random selection of students within each selected school in the second stage. The 2015 administration of PISA did not include all questions that were part of the school survey in PISA 2012. For example, none of the questions related to Teacher Morale (see Table 1) were included in the PISA 2015 school questionnaire. For this reason a direct comparison between PISA 2012 and PISA 2015 results is not possible, and PISA 2012 school survey remains the latest with information on all three teacher-related

variables that are the focus of this study. More information about the contents of school questionnaires in previous PISA surveys can be found at OCED (2016) and the official OECD PISA website (<https://www.oecd.org/pisa/aboutpisa/>).

In the U.S. the survey is administered by the National Center for Education Statistics (NCES). The 2012 U.S. PISA sample consisted of 4,978 students enrolled in 162 schools, and was representative of 3,538,783 students enrolled in 31,091 schools across the country. The U.S. data files contain additional variables (such as race) that are not available in the international version of the dataset (NCES, 2014b). The original dataset contained missing values on variables of interest in this study with the proportion of missing data ranging between 2% and 6%. In order to preserve the natural variation in those variables and to keep the sample representative of its target population, we imputed missing data using single random imputation (Allison, 2001). This method involves an iterative Markov Chain Monte Carlo (MCMC) estimation where missing values on each variable are imputed by regressing that variable on all remaining variables included in the analysis model (IBM Corp, 2013). Thus, after missing data imputation we had 162 schools in our sample with complete information.

### **Outcome measures**

The following three scales measured a school principal's perception of participation of teachers in decision making processes at her school, morale of those teachers, and shortage of qualified teachers. Items underlying these scales are presented in Table 1. Following PISA convention, we standardised all three scales to have a mean of 0 and a standard deviation of 1 in our sample.

#### *Teacher participation*

This scale measured a school principal's perception of participation of teachers in decision making at her school (OECD, 2013). This scale was based on twelve items. A sample item included, "Regarding your school, who has considerable responsibility for the following task? Selecting teachers for hire." Response categories for all items were 1 (tick), and 2 (no tick). Responses on these twelve items were combined into a single scale with higher values on the scale being indicative of greater teacher participation. Cronbach's alpha for this scale was .75 in our sample and standardised scaled scores ranged between -1.32 and 2.15.

#### *Teacher morale*

This scale measured a school principal's perception of morale of teachers employed at her school (OECD, 2013). This scale was based on four items. A sample item included, "Think about the teachers in your school. How much do you agree with the following statement? Teachers work with enthusiasm." Response categories for all items were 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). Responses on these four items were combined into a single scale with higher values on the scale being indicative of greater teacher morale. Cronbach's alpha for this scale was .83 in our sample and standardised scaled scores ranged between -4.06 and 1.40.

*Teacher shortage*

This scale measured a school principal's perception of shortage of qualified teachers at her school (OECD, 2013). This scale was based on four items. A sample item included, "Is your school's capacity to provide instruction hindered by any of the following issues? A lack of qualified English teachers." Response options for all items were 1 (not at all), 2 (very little), 3 (to some extent), and 4 (a lot). Responses on these four items were combined into a single scale with higher values on the scale being indicative of greater teacher shortage. Cronbach's alpha for this scale was .77 in our sample and standardised scaled scores ranged between -0.78 and 5.07.

Table 1: Teacher participation, teacher morale, and teacher shortage scales in PISA 2012

<i>Teacher participation</i>	Regarding your school, who has considerable responsibility for the following tasks?	<ol style="list-style-type: none"> <li>1. Selecting teachers for hire</li> <li>2. Firing teachers</li> <li>3. Establishing teachers' starting salaries</li> <li>4. Determining teachers' salary increases</li> <li>5. Formulating the school budget</li> <li>6. Deciding on budget allocations within the school</li> <li>7. Establishing student disciplinary policies</li> <li>8. Establishing student assessment policies</li> <li>9. Approving students for admission to the school</li> <li>10. Choosing which textbooks are used</li> <li>11. Determining course content</li> <li>12. Deciding which courses are offered</li> </ol>
<i>Teacher shortage</i>	Is your school's capacity to provide instruction hindered by any of the following issues?	<ol style="list-style-type: none"> <li>1. A lack of qualified science teachers</li> <li>2. A lack of qualified mathematics teachers</li> <li>3. A lack of qualified English teachers</li> <li>4. A lack of qualified teachers of other subjects</li> </ol>
<i>Teacher morale</i>	Think about the teachers in your school. How much do you agree with the following statements?	<ol style="list-style-type: none"> <li>1. The morale of teachers in this school is high</li> <li>2. Teachers work with enthusiasm</li> <li>3. Teachers take pride in this school</li> <li>4. Teachers value academic achievement</li> </ol>

*Note.* Source = OECD (2012a). Response choices for teacher participation scale were 1 (tick) and 2 (no tick); for teacher shortage scale were 1 (not at all), 2 (very little), 3 (to some extent), and 4 (a lot); and for teacher morale scale were 1 (strongly agree), 2 (agree), 3 (disagree), and 4 (strongly disagree). Cronbach's alpha was .75 for teacher participation, .77 for teacher shortage, and .83 for teacher morale.

**School racial composition**

This variable divided the sample into two categories, (1) schools where the percentage enrolment of White students exceeded 50%, and (2) schools where such enrolment did not exceed 50%. Since a large majority of schools in our sample ( $n = 103$  or 63.6%) fell in the former category, in order to have sufficient group sizes we did not divide White-minority schools into sub-categories based on enrolment majority of any other racial

group. The reference category for this variable was White-minority. The term White here is synonymous with Caucasian. Thus, students of Hispanic or Latino origin, and all Asian students are part of the non-White category.

### **Control variables**

#### *School type*

This is a nominal variable that takes a value of 0 for private schools and a value of 1 for public schools. In our sample 79% of the schools were public ( $n = 128$ ) while the rest were private.

#### *School socioeconomic status*

This variable represents the mean socioeconomic status of students enrolled in a school, and is meant to account for any differences across schools that are due to differences in socioeconomic status of students enrolled in those schools. Student socioeconomic status in PISA is an index based on three scales: parental education, parental occupation, and home possessions. The reliability of this index has been shown to range between .63 and .69 for the U.S. in past PISA administrations (OECD, 2006, 2009, 2012b). In order to facilitate interpretation of our statistical results we standardised this variable to have a mean of 0 and a standard deviation of 1 in our sample of 162 schools. The values of this variable ranged between -2.78 and 1.84.

#### *Student-teacher ratio*

This variable was obtained after dividing the total number of students enrolled by the number of teachers in a school. The student-teacher ratio ranged between .88 and 117.76 ( $M = 15.36$ ,  $SD = 9.08$ ). The standardised values for this variable ranged between -1.59 and 11.28 ( $M = 0$ ,  $SD = 1$ ). The large maximum value for this variable was due to the presence of an extreme value. When weighted, this extreme value was representative of 41 schools in the population. Since the analytical method used to obtain empirical results does not make any specific assumption about the distribution of this variable in the population, in order to keep our sample representative of the entire population of high schools in the U.S. we decided to retain this extreme value in our analyses.

#### *Student performance*

We used this variable to control for student performance differences across schools. For a school this variable is measured as the mean score of all students in that school in three areas of literacy, mathematics, reading, and science. The standardised values of this variables ranged between -2.86 and 1.62 ( $M = 0$ ,  $SD = 1$ ) in our sample.

### **Analytical method**

Principal perceptions about teacher participation, teacher morale, and teacher shortage were treated as unobserved latent traits, and were mapped on a continuum by applying the Rasch model (Rasch, 1961) to dichotomous responses on teacher participation scale, and the partial credit model (Master, 1982) to the multi-category responses on the remaining two scales. The estimated latent trait values for each school principal were included in

PISA 2012 school data file (OECD, 2012b). Following notation used by Embretson and Reise (2000) the Rasch model is given by (1) and the partial credit model is given by (2).

$$P(X_{si} = 1 | \theta_s, \delta_i) = \frac{e^{\theta_s - \delta_i}}{1 + e^{\theta_s - \delta_i}} \tag{1}$$

where  $P$  is the probability of correct response on item  $i$  for person  $s$ ,  $\delta$  is item difficulty, and  $\theta$  is the unobserved value of latent trait.

$$P(X_{si} = x) = \frac{e^{\sum_{j=0}^x \{\theta_s - (\delta_i + \lambda_j)\}}}{\sum_{x=0}^M e^{\sum_{j=0}^x \{\theta_s - (\delta_i + \lambda_j)\}}} \tag{2}$$

where  $\sum_{j=0}^0 \{\theta_s - (\delta_i + \lambda_j)\} = 0$ ,  $P$  is the probability of choosing response  $x$  out of  $M$  possible choices,  $\lambda$  is the category intersection parameter, and all remaining symbols are as defined earlier.

We computed descriptive statistics and correlations for our outcome variables, school racial composition, and control variables. We estimated a multiple regression equation for each outcome with school racial composition and control variables as predictors. Each regression also included all possible two-way inter-predictor interactions. Our multiple regression model for outcome  $m$  is given by (3).

$$Y_{im} = \beta_{0m} + \sum_{j=1}^4 \beta_{jm} C_{jim} + \beta_{5m} SRC_{im} + \sum_{k=6}^{11} \beta_{km} (C_j \times C_{-j})_{im} + \sum_{l=12}^{15} \beta_{lm} (C_j \times SRC)_{im} + \varepsilon_{im} \tag{3}$$

where  $Y_{im}$  is the value of outcome  $m$  for school  $i$ ;  $M = 3$  outcomes (teacher participation, teacher morale, and teacher shortage);  $\beta$ 's are regression coefficients;  $C$  denotes  $J = 4$  control variables (school type, school socioeconomic status, student-teacher ratio, and student performance);  $SRC$  = school racial composition;  $C_j \times C_{-j}$  are  $K = 6$  unique two-way interactions among control variables;  $C_j \times SRC$  are  $L = 4$  two-way interactions between  $SRC$  and the four control variables; and  $\varepsilon_{im}$  is the school- and outcome-specific error term.

In order to ensure that our sample size was sufficient to detect at least a medium effect size ( $f^2 = .15$ , or  $R^2 = .13$ ), we performed an *a priori* power analysis at .05 level of significance (two-tailed) and .80 power with 15 predictors, and obtained an estimated sample size of 56. Alternatively, holding all else constant our sample size of 162 is large enough to detect an effect size as small as  $f^2 = .05$ . We evaluated underlying assumptions for each estimated regression equation, used normalised sampling weights in all computations, used Cohen's (1992) cutoffs for interpretation of effect sizes, evaluated all tests of hypotheses at .05 level of significance, and performed all computations with SPSS 22.0.

## **Empirical results**

### **Descriptive statistics and correlations**

Descriptive statistics and correlations for our three outcome variables and their predictors are presented in Tables 2 and 3 respectively. Figures presented in Table 2 suggest presence of a significant mean difference between White-majority and White-minority schools in teacher morale and teacher shortage,  $p < .001$  with higher morale and less shortage in White-majority schools. The unadjusted marginal mean difference on teacher participation was not significantly different from zero in the two groups,  $p > .05$ . In addition to differences on outcome measures, White-majority schools tended to have on average higher student performance,  $p < .001$ , higher social economic status,  $p < .001$ , and low student-teacher ratio,  $p < .001$ . Although an examination of private-public school differences is not the purpose of this study, our unadjusted marginal means suggested that on average private schools had significantly higher teacher morale, higher student performance, higher socioeconomic status, and lower student-teacher ratio, as compared to public schools,  $p < .001$ . The difference in mean teacher participation was not significantly different from zero between the two types of school,  $p > .05$ .

The pattern of correlations presented in Table 3 suggests the presence of medium correlations between each of the three outcome measures, and student performance and socioeconomic status. The remaining two control variables, student-teacher ratio and school type, had mixed patterns of relationship with the three outcome measures. Student-teacher ratio had a weak and negative but significant correlation with teacher participation,  $r = -.19$ ,  $p < .05$ ; school type had a medium correlation with teacher morale,  $r = -.37$ ,  $p < .001$ ; and neither variable was correlated with teacher shortage,  $p > .05$ . Of the three outcome variables, only teacher morale and teacher shortage were significantly correlated with school racial composition,  $|r| > .3$ ,  $p < .001$ . Among the predictors, socioeconomic status was highly associated with student performance,  $r = .83$ ,  $p < .001$ , school type,  $r = -.45$ ,  $p < .001$ , and school racial composition,  $r = .54$ ,  $p < .001$ ; and school racial composition was highly associated with student performance,  $r = .54$ ,  $p < .001$ .



Table 2: Descriptive statistics for teacher-centred outcomes, school racial composition, and control variables

Variable		<i>n</i>	Teacher participation		Teacher morale		Teacher shortage	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
School type	Public	128	0.06	0.99	-0.19	1.00	0.01	1.05
	Private	34	-0.22	1.02	0.72	0.57	-0.04	0.79
	Public - Private, $\Delta M$		0.27		-0.91***		0.05	
School racial composition	White majority	103	0.02	1.06	0.25	0.90	-0.24	0.86
	White minority	59	-0.04	0.90	-0.43	1.02	0.41	1.10
	White-majority - White-minority, $\Delta M$		0.06		0.68***		-0.65***	

Variable		<i>n</i>	Student performance		School socioeconomic status		Student-teacher ratio	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
School type	Public	128	-0.12	1.03	-0.23	0.96	0.13	1.07
	Private	34	0.48	0.71	0.88	0.58	-0.50	0.39
	Public - Private, $\Delta M$		-0.60***		-1.12***		0.63***	
School racial composition	White majority	103	0.40	0.50	0.40	0.62	-0.12	1.14
	White minority	59	-0.71	1.24	-0.71	1.14	0.20	0.64
	White-majority - White-minority, $\Delta M$		1.11***		1.11***		-0.32***	

Note. *n* = 162. Teacher participation, morale, shortage, student performance, school socioeconomic status, and student-teacher ratio are standardised variables with *M* = 0, *SD* = 1. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001

Table 3: Correlations among teacher-centered outcomes, school racial composition, and control variables

Variable	Correlation, <i>r</i>						
	1	2	3	4	5	6	7
1. Teacher participation	–						
2. Teacher morale	-.15	–					
3. Teacher shortage	.04	-.33***	–				
4. Student performance	.31***	.35***	-.33***	–			
5. School socioeconomic status	.21**	.32***	-.24**	.83***	–		
6. Student-teacher ratio	-.19*	.10	≈0	-.23**	-.09	–	
7. School type	.11	-.37***	.02	-.24**	-.45***	.26**	–
8. School racial composition	.03	.33***	-.31***	.54***	.54***	-.15	-.22**

Note. *n* = 162. Reported correlation is phi coefficient between school type and school racial composition; point biserial for other correlations involving either school type or school racial composition; and Pearson correlation between continuous variables. Cohen's (1992) cutoffs for *r*: small effect, .1; medium effect, .3; large effect, .5. Reference category is private for school type, and White-minority for school racial composition. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

### Multiple regression results

Results for multiple regression models predicting teacher participation, teacher morale, and teacher shortage are presented in Tables 4, 5, and 6 respectively. Since we have two-way interaction terms included in each model, any significant interaction term should be interpreted first, and the main effect of a variable should only be interpreted when that variable is not included in a significant interaction term. Multiple regression results for teacher participation suggest that the effect of school racial composition on teacher participation depends on school type,  $p < .05$ , and student-teacher ratio,  $p < .05$ ; and the effect of student-teacher ratio on teacher participation depends on school type,  $p < .05$ , and socioeconomic status,  $p < .01$ .

Multiple regression results for teacher morale suggest that the effect of school racial composition on teacher morale depends on student performance,  $p < .01$ . Multiple regression results for teacher shortage suggest that the effect of school racial composition on teacher shortage depends on school type,  $p < .05$ , and student-teacher ratio,  $p < .01$ ; the effect of student performance on teacher shortage depends on school type,  $p < .01$ , socioeconomic status,  $p < .01$ , and student-teacher ratio,  $p < .05$ ; and the effect of school socioeconomic status on teacher shortage depends on student-teacher ratio,  $p < .01$ .

Table 4: Results for multiple regression model predicting teacher participation from school racial composition and control variables

Parameter	B	SE (B)	t	p	95% CI	
					LL	UL
Intercept	0.95	0.58	1.65	.102	-0.19	2.09
School type	-0.62	0.62	-1.00	.317	-1.84	0.60
Student performance	0.84	0.48	1.74	.085	-0.12	1.80
School socioeconomic status, <i>SES</i>	-0.31	0.58	-0.53	.598	-1.46	0.85
Student-teacher ratio, <i>ST</i>	1.40	0.56	2.51	.013	0.29	2.50
School racial composition, <i>SRC</i>	-1.43	0.55	-2.61	.010	-2.52	-0.35
Interactions						
School type x <i>SES</i>	0.71	0.56	1.26	.211	-0.41	1.82
School type x <i>ST</i>	-1.32	0.55	-2.38	.019	-2.41	-0.22
School type x Student performance	-0.39	0.50	-0.77	.440	-1.38	0.61
<i>ST</i> x <i>SES</i>	-0.57	0.20	-2.89	.005	-0.95	-0.18
Student performance x <i>SES</i>	0.14	0.08	1.82	.071	-0.01	0.30
Student performance x <i>ST</i>	0.12	0.17	0.74	.460	-0.21	0.45
<i>SRC</i> x School type	1.24	0.62	1.98	.049	0.00	2.48
<i>SRC</i> x <i>SES</i>	0.44	0.39	1.13	.260	-0.33	1.21
<i>SRC</i> x <i>ST</i>	-0.65	0.26	-2.49	.014	-1.16	-0.13
<i>SRC</i> x School student	-0.57	0.36	-1.58	.116	-1.29	0.14

*Note.*  $n = 162$ . Teacher participation, morale, shortage, student performance, school socioeconomic status, and student-teacher ratio are standardised variables with  $M = 0$ ,  $SD = 1$ . *LL* = lower limit. *UL* = upper limit. *SES* = school socioeconomic status. *ST* = student-teacher ratio. *SRC* = school racial composition.  $R^2 = .471$ . Adjusted  $R^2 = .409$ . Cohen's (1992) cutoffs for  $R^2$ : small effect, .02; medium effect, .13; large effect, .26. Reference category is private for School type, and White-minority for school racial composition.

Table 5: Results for multiple regression model predicting teacher morale from school racial composition and control variables

Parameter	B	SE (B)	t	p	95% CI	
					LL	UL
Intercept	-0.02	0.55	-0.03	.976	-1.10	1.06
School type	-0.36	0.59	-0.61	.540	-1.52	0.80
Student performance	0.20	0.46	0.44	.662	-0.71	1.11
School socioeconomic status, <i>SES</i>	0.33	0.55	0.59	.556	-0.77	1.42
Student-teacher ratio, <i>ST</i>	-0.14	0.53	-0.26	.796	-1.19	0.91
School racial composition, <i>SRC</i>	1.10	0.52	2.11	.037	0.07	2.13
Interactions						
School type x <i>SES</i>	-0.74	0.53	-1.38	.171	-1.79	0.32
School type x <i>ST</i>	0.23	0.53	0.44	.661	-0.81	1.27
School type x Student performance	0.80	0.48	1.67	.097	-0.15	1.74
<i>ST</i> x <i>SES</i>	0.11	0.19	0.60	.552	-0.26	0.48
Student performance x <i>SES</i>	0.11	0.07	1.50	.136	-0.04	0.26
Student performance x <i>ST</i>	-0.31	0.16	-1.96	.052	-0.62	0.00
<i>SRC</i> x School type	-0.67	0.59	-1.12	.264	-1.84	0.51
<i>SRC</i> x <i>SES</i>	-0.24	0.37	-0.66	.509	-0.97	0.49
<i>SRC</i> x <i>ST</i>	0.23	0.25	0.92	.359	-0.26	0.72
<i>SRC</i> x Student performance	-1.06	0.34	-3.08	.003	-1.74	-0.38

Note.  $n = 162$ . Teacher participation, morale, shortage, student performance, school socioeconomic status, and student-teacher ratio are standardised variables with  $M = 0$ ,  $SD = 1$ . *LL* = lower limit. *UL* = upper limit. *SES* = school socioeconomic status. *ST* = student-teacher ratio. *SRC* = school racial composition.  $R^2 = .532$ . Adjusted  $R^2 = .478$ . Cohen's (1992) cutoffs for  $R^2$ : small effect, .02; medium effect, .13; large effect, .26. Reference category is private for school type, and White-minority for school racial composition.

Table 6: Results for multiple regression model predicting teacher shortage from school racial composition and control variables

Parameter	B	SE (B)	t	p	95% CI	
					LL	UL
Intercept	0.38	0.64	0.59	.556	-0.89	1.65
School type	-0.21	0.69	-0.31	.758	-1.58	1.15
Student performance	0.70	0.54	1.31	.194	-0.36	1.77
School socioeconomic status, <i>SES</i>	-0.19	0.65	-0.29	.776	-1.48	1.10
Student-teacher ratio, <i>ST</i>	0.03	0.62	0.05	.957	-1.20	1.27
School racial composition, <i>SRC</i>	-1.43	0.61	-2.33	.021	-2.64	-0.21
Interactions						
School type x <i>SES</i>	0.15	0.63	0.25	.807	-1.09	1.40
School type x <i>ST</i>	0.46	0.62	0.75	.458	-0.76	1.68
School type x Student performance	-1.53	0.56	-2.72	.007	-2.64	-0.42
<i>ST</i> x <i>SES</i>	-0.69	0.22	-3.13	.002	-1.12	-0.25
Student performance x <i>SES</i>	-0.31	0.09	-3.53	.001	-0.48	-0.14
Student performance x <i>ST</i>	0.43	0.19	2.31	.022	0.06	0.80
<i>SRC</i> x School type	1.41	0.70	2.03	.045	0.03	2.79
<i>SRC</i> x <i>SES</i>	0.70	0.43	1.62	.108	-0.16	1.56
<i>SRC</i> x <i>ST</i>	-0.82	0.29	-2.83	.005	-1.40	-0.25
<i>SRC</i> x Student performance	-0.37	0.41	-0.90	.368	-1.17	0.44

Note.  $n = 162$ . Teacher participation, morale, shortage, student performance, school socioeconomic status, and student-teacher ratio are standardised variables with  $M = 0$ ,  $SD = 1$ . *LL* = lower limit. *UL* = upper limit. *SES* = school socioeconomic status. *ST* = student-teacher ratio. *SRC* = school

racial composition.  $R^2 = .401$ . Adjusted  $R^2 = .331$ . Cohen's (1992) cutoffs for  $R^2$ : small effect, .02; medium effect, .13; large effect, .26. Reference category is private for School type, and White-minority for School racial composition.

In order to contain the number of interactions we have plotted only those interactions that involved our primary independent variable, school racial composition, in Figures 1-5. These plots show (1) significant difference in mean teacher participation between private White-majority and private White-minority schools; (2) significant positive effect of student-teacher ratio on teacher participation, with the effect being larger for White-minority schools; (3) significant negative effect of student performance on teacher morale in White-majority schools; (4) significant difference in mean teacher shortage between private White-majority and private White-minority schools; and (5) significant negative effect of student-teacher ratio on teacher shortage in White-majority schools.

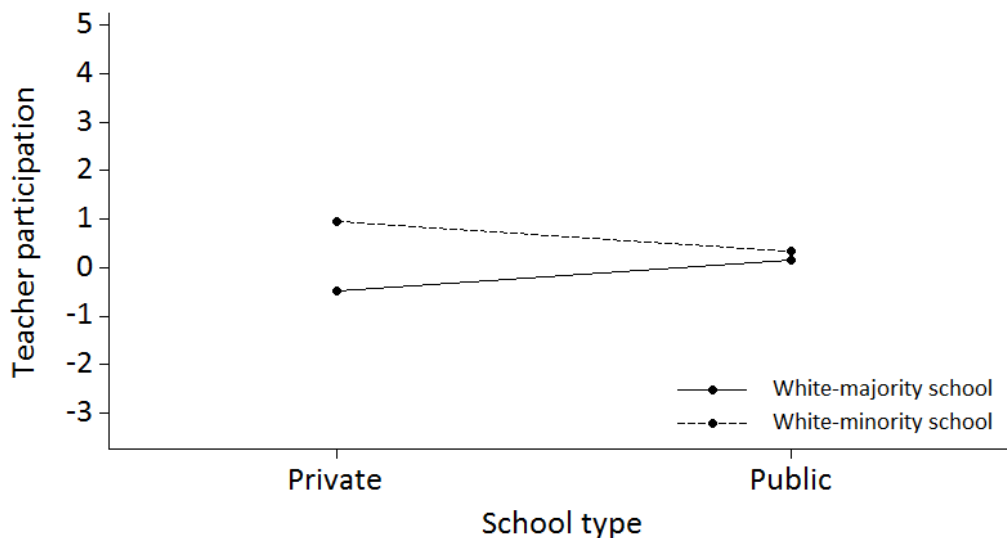


Figure 1: Effect of school type on teacher participation with separate lines for White-majority (solid line) and White-minority schools (dashed line).

## Discussion

Our review of the literature suggests that teacher-centred factors such as participation in decision making, teacher morale, and shortage of teaching staff, can affect school performance. In this study we examined how these factors differ between White-majority and White-minority schools both before and after controlling for school characteristics such as school type, mean socioeconomic status, student-teacher ratio etc. Our results indicate significant differences in teacher morale and shortage of teaching staff between White-majority and White-minority schools, with these differences persisting even after controlling for basic school characteristics. Our results have several implications.

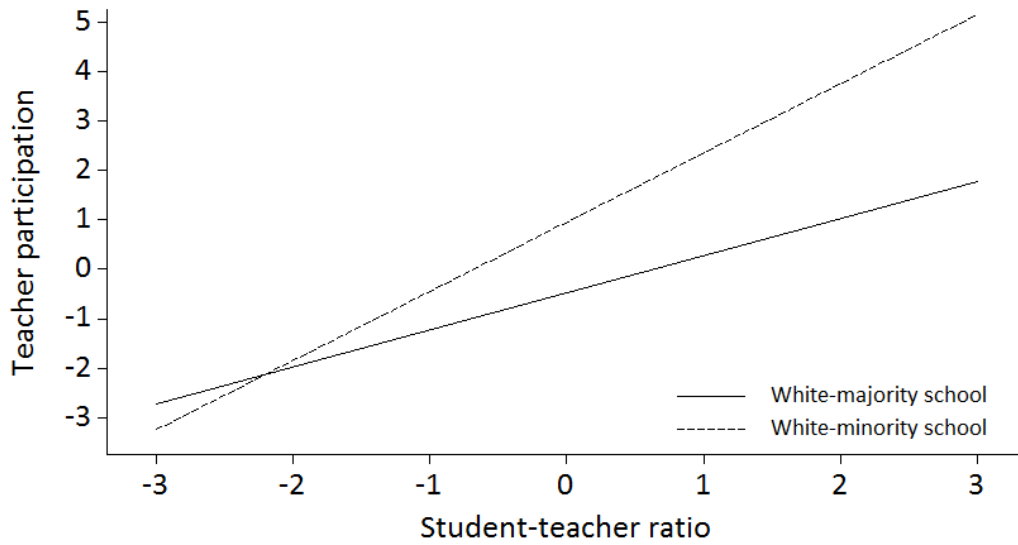


Figure 2: Effect of student-teacher ratio on teacher participation with separate lines for White-majority (solid line) and White-minority schools (dashed line).

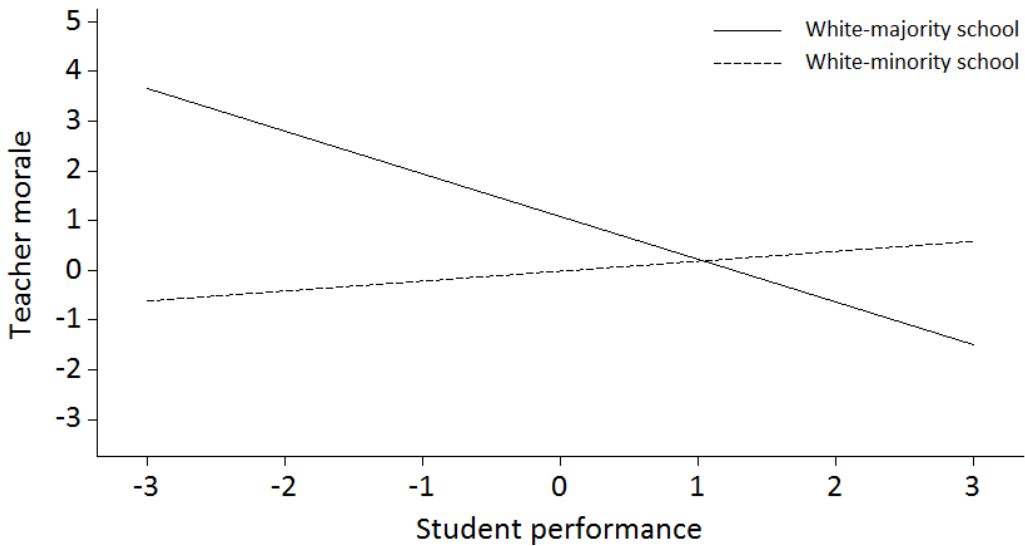


Figure 3: Effect of student performance on teacher morale with separate lines for White-majority (solid line) and White-minority schools (dashed line).

First, the persistence of White-majority versus White-minority differences in principals' perceptions of teacher participation, teacher morale, and teacher shortage suggests that there is a race-related angle to such observed differences. If these differences were a consequence of variation in school characteristics such as school type (private, public), socioeconomic status, student performance metrics, and school size, then they would have

disappeared after we controlled for such characteristics. Thus, two schools that are otherwise equal in all other respects would still differ in mean teacher participation, morale, and shortage because one has a majority of White students and the other has a majority of non-White students.

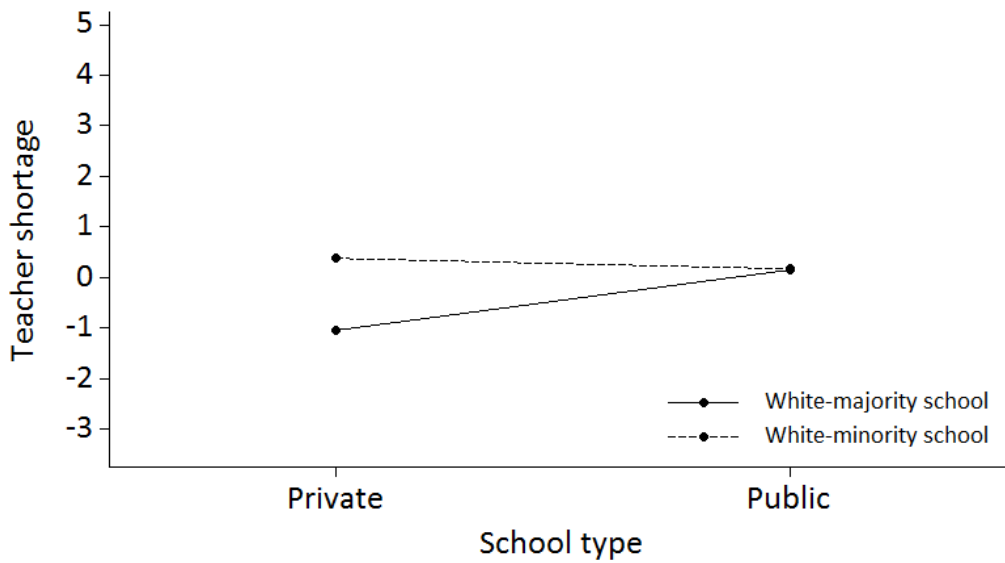


Figure 4. Effect of school type on teacher shortage with separate lines for White-majority (solid line) and White-minority schools (dashed line).

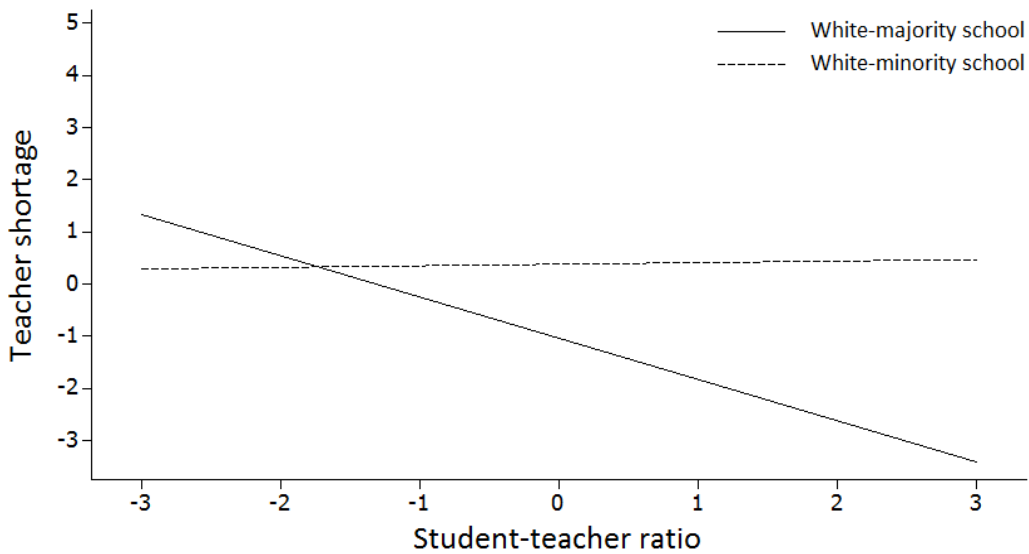


Figure 5. Effect of student-teacher ratio on teacher shortage with separate lines for White-majority (solid line) and White-minority schools (dashed line).

Second, we note that with all else held constant and on average, White-majority and White-minority schools differ in principals' perceptions of teacher participation and teacher shortage among private schools only. In public schools, these differences are trivial. Among private schools, White-minority schools tend to have higher teacher participation than White-majority schools. On the other hand, among the same group of private schools White-majority schools tend to report on average smaller teacher shortage as compared to White-minority schools. Although we have not examined interdependencies among outcome variables in this study, it is possible that the two observations are related. For instance, when a school is characterised by higher teacher participation in decision making processes, teachers are likely to voice any concerns about school resources (such as shortage of qualified teaching staff) thus reinforcing such perceptions in the school principal. On the other hand, when teachers are less participative in school decision making processes, concerns such as teacher shortage are likely to remain relatively unreinforced in the school principal. Our empirical results show evidence of this in public schools where teacher participation is not different in White-majority and White-minority schools, and perhaps as a result of that the principals' perceptions about teacher shortage are also not very different in these schools. We obtained  $R^2$  values of 47%, 53%, and 40% respectively for regression models predicting teacher participation, teacher morale, and teacher shortage. These values are indicative of large effect sizes (Cohen, 1992) and adequate goodness of fit.

Third, our results indicate that an increase in student-teacher ratio is associated with improvement in teacher participation in a school's decision making processes and associated with a decrease in teacher shortage. The former observation makes intuitive sense because as the number of students per teacher increases, teachers become relatively indispensable and as a result their involvement in decision making processes becomes easier. This phenomenon can be explained in context of the laws of supply and demand. When the quantity supplied of teachers in a school is small relative to quantity demanded, their reward (in this case participation) increases. We note that although this phenomenon occurs in both White-majority and White-minority schools, the effect is greater in the latter group. Compared to the effect of student-teacher ratio on teacher participation, the observed effect of student-teacher ratio on teacher shortage is less intuitive but can be explained in context of the earlier suggested relationship between teacher participation and teacher shortage, especially so because we observe this effect in White-majority schools only. As student-teacher ratio in these schools starts increasing, at some point it would pass a threshold value that indicates teacher shortage. At this point we would expect the teachers to convey signals of such shortage to the school principal. However, we note that White-majority schools are characterised by low teacher participation. As a result, fewer such signals will reach the school principal to whom a large teaching load absorbed by a small teaching staff may be indicative of a staffing policy that is working very well.

Although our study revealed several significant results, caution should be exercised when generalising these results to populations that are very different from that considered in our study. There is good reason to believe that factors such as teacher participation, morale, and shortage have a two way relationship with student performance. For example,

variation in teacher morale may cause variation in student performance, and in turn variation in student performance may lead to a variation in morale. We justify inclusion of student performance as a control variable in our models of teacher-centred factors on the grounds that although this variable is of no direct interest in this study, its presence ensures that our models do not suffer from omitted variable bias. We further note that the measures of teacher participation, teacher morale, and teacher shortage are based on responses obtained from school principals, and may be different from teachers' perceptions of these measures. Since these measures are based on self-reported data, our statistical results and conclusions based on those results are accurate only to the extent that such data were reported accurately.

Principals who believe that higher teacher participation, higher teacher morale, and lower teacher shortage may cast their school in a positive light may have (whether consciously or subconsciously) over-estimated teacher participation and morale and under-estimated teacher shortage. Such concerns are legitimate but represent limitations of the source dataset rather than our method, and thus their rectification falls outside the scope of this study. We encourage future researchers to replicate our study in other populations (such as other school levels, countries etc.), and where possible, examine the agreement in perceptions of teacher participation, morale, and shortage by comparing school principals' responses with those obtained directly from the teachers. In addition to empirical analysis, it may be useful to conduct qualitative studies that are case study-based (for example, see Hoppey & McLeskey, 2013) or that focus on small samples (for an example, see Genao, 2016) in order to gain in-depth insight into principals' perspectives on teacher participation, shortage, and morale.

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