

Public Information, Public Learning, and Public Opinion:
Democratic Accountability in Education Policy¹

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Abstract

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Theories of political accountability rest on the assumption that citizens use information about the performance of government to hold public officials accountable, but citizens' utilization of such information is difficult to directly examine. We take advantage of the importance of citizen-driven, performance based accountability for education policy in Tennessee to conduct a survey experiment that identifies the effect of new information, mistaken beliefs, and differing considerations on the evaluation of public officials and policy reforms using 1,500 Tennesseans. We show that despite an emphasis on reporting outcomes for school accountability policies in the state, mistaken beliefs are prevalent and produce overly optimistic assessments of the institutions responsible for statewide education policy. However, individuals' update their assessments of these institutions in an unbiased way when provided with objective performance data. Finally, support for specific policies intended to improve performance is unchanged by the information and more dependent on existing ideological commitments.

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Fundamental to democratic governance is the willingness and ability of citizens to hold elected officials responsible for their actions and decisions. Electoral accountability requires that citizens are responsive to new information and that they appropriately update their opinions on the basis of this information so as to correctly reward and punish elected leaders (Key 1966; Dahl 1989). This task is not without its challenges. Not only must citizens be receptive to new information, but they must also be able to interpret the meaning and relevance of the new information with respect to their existing beliefs.

The assumption that more information produces more accountability underlies the concept of democratic accountability, and public policy reforms are increasingly mandating the reporting of performance information in the hope that it leads to superior outcomes. The connection between information and opinions may be tenuous, however, particularly if there are partisan or ideological disagreements about the interpretation of the information (e.g., Bartels 2002; Lenz 2009). The connection is also difficult to examine empirically because individuals are able to selectively expose themselves to information and choose which information to consume or not (see, for example, Ladd and Lenz 2009).

As a result, there is a robust debate regarding the nature of accountability and whether the public holds public officials responsible for outcomes in seemingly irrational (e.g., Achen and Bartels 2002; Healy, Malhorta, and Mo 2010) or rational (e.g., Malhorta and Kuo 2008) ways (but see Ashworth 2011 for an important reinterpretation of the debate). We contribute to the critical task of assessing the prospects for democratic accountability by examining the impact of information about policy outcomes on citizens' evaluations of both public officials and policy proposals. Given the importance of past performance for future assessments (Woon 2012), we determine whether and how citizens update their

initial beliefs about policy in response to objective information about performance outcomes for an issue that is salient, important, and consequential for the functioning of democracy – public education (Dewey 1916).

While most of the literature on government accountability focuses on voters' responses to economic performance (e.g., Fiorina 1981; Hibbing and Alford 1981; Markus 1992; Rudolph 2003; Stein 1990), the presumed linkage between information and accountability is perhaps clearest in public education reforms in the United States. During the so-called “standards-based accountability movement” of the 1990s, many states began testing students against a set of standards for each grade and subject on an annual basis to create ratings for school performance (Hanushek and Raymond 2005). By 2001, 45 states created and published “report cards” on schools based on student test performance, and 27 of them used an explicit rating system to identify low performers (Figlio and Ladd 2008). The enactment of No Child Left Behind (NCLB) in 2002 applied such a test-based rating system to every school district in the nation.

The primary rationale for publicizing school performance is that such information empowers parents (or the community) to pressure relevant decision-makers—including school staff, local school board members, state officials and others—to increase the performance of less effective schools by finding new resources or using existing resources more efficiently (Dorn 1998; Loeb and Strunk 2007).² This “bottom-up” pressure may take the form of informal communication, moving one’s child elsewhere, or, in the case of elected officials, voting for new representation (Berry and Howell 2007). The implicit

² The incentive for performance may also be elite-driven, but the fact that elite pressure may be sufficient to ensure accountability does not lessen the importance of exploring the extent to which bottom-up accountability is possible.

theory of action behind this bottom-up pressure assumes that citizens absorb school performance information and act upon it. Yet the extent to which relevant information is acquired, which kinds of information citizens respond to, or even whether the information factors into opinion formation in the way that an accountability system requires is largely unknown (but see Chingos et al. 2011 on the latter).

Education is an appropriate and important focus for many reasons. Not only is it a policy where reforms have focused on increasing data collection and dissemination to promote bottom-up accountability, but the primary policy objective in education—increasing student learning—is also clear and uncontested. There are disagreements over how best to achieve increase student performance, or the federal government’s role and some may care about the policy more than others (e.g., parents with children presumably care more about the quality of education services provided, as do homeowners for whom education quality is capitalized into housing values (Black 1999)), but when it comes to evaluating the performance of state governments on statewide educational performance for a given expenditure level, citizens are unlikely to disagree about the need to maximize student performance. The policy outputs of education policy are also directly measurable, comparable, and widely available because of the standardized testing regime and state law and education policies are made by officials who either are elected themselves (in the case of local school boards) or are overseen by elected officials (in the case of the Department of Education) and who are, in principle, responsive to voters (Berkman and Plutzer 2005). Finally, public education is an important and essential public good. Understanding the foundations of education policy an important undertaking for political scientists given the close linkages among education, citizenship, and democracy (Guttman 1987).

To explore the potential for citizen-driven accountability in education policy given the methodological difficulties of estimating the effect of information when citizens selectively expose themselves to information, we conduct a survey experiment of 1,500 randomly selected Tennesseans. We measure their prior beliefs about statewide educational performance and the connection between their beliefs and their opinions about public officials and proposed reforms. We then investigate whether and how they update those opinions in response to objective, non-partisan performance information that—in many cases—challenges their prior beliefs and we characterize whether the effect of information on opinion formation differs by respondent characteristics and the type of performance information that is provided.

Our investigation reveals several important and consequential findings. First, despite a profound government investment in the collection and reporting of performance measures, few citizens have correct beliefs about student performance—even among those for whom the issue is supposedly important. Citizens overestimate actual student performance and they therefore express more approval with those officials who are responsible for education policy than they should given the actual performance of the education system in the state.

Controlling for initial beliefs, we also show that exposure to objective performance information causes citizens to update their opinions about public officials in seemingly rational ways: opinions about officials most responsible for education policy are most affected, and evaluations converge despite initial differences in prior beliefs and interest in education. However, not every piece of information is equally relevant; citizens' opinions are responsive to information about overall student performance, but not to information

about racial disparities in performance. Moreover, learning about student performance affects the evaluation of public officials and public policies differently because the information has no effect on the support for various reforms that are intended to increase student performance. Instead, opinions about public policies are largely driven by ideological considerations (Bullock 2011) and the race of the respondent.

1. The Role of Information in Updating Beliefs

Understanding how objective and verifiable information affects opinions towards public officials and public policies is essential for evaluating the prospects for democratic accountability. A necessary condition for “bottom-up” citizen-initiated accountability is that the opinions of enough citizens must be responsive to new information and experiences to create electoral incentives for elected officials. If citizens ignore new information, or if new information is interpreted in accordance with existing partisan or ideological leanings, then there may be no independent effect of information on opinion formation.

Deriving hypothesized effects requires modeling how individuals process new information and adjust their opinions. Our interest lies in identifying how objective information about policy outcomes affects citizens’ support for policies and institutions. There are many models of cognitive processing, but we seek a suitably broad framework that can accommodate the possibility of null and differential effects given our interests.

To derive and motivate the possible effects of information, we employ a Bayesian model of political learning (Zechman 1979; Achen 1992, Gerber and Green 1999; Bullock 2009). Bayesian learning models can generate predictions ranging from no learning to biased updating depending on the model’s parameters (Achen and Bartels 2006; Bullock

2009).³ By reinterpreting how strong prior beliefs might be and what such beliefs entail, it is possible to accommodate the possibility of partisan bias (e.g., Campbell et. al. 1960; Lodge and Hamill 1986; Rahn 1993; Bartels 2002, Lenz 2009), or spur of the moment processing based upon primed considerations (e.g., McGuire 1969; Zaller 1992). Our aim is to motivate and ground our empirical investigation, not to “test” various cognitive models.

We want to characterize how new information (x) changes individuals’ beliefs.

Suppose that individual i ’s opinion about an issue or public official is denoted by μ (for the purposes of clarity we drop the individual superscript unless the between-individual variation is relevant). Suppose further that prior beliefs can be thought of as being normally distributed with mean μ_P and variance σ_P^2 . That is, absent new information, asking i about her opinion on an issue will result in responses centered at μ_P , but there may be variation due to transient effects (e.g., priming, the ambiguities of how the question is interpreted, or other reasons why the survey response may contain error (Achen 1975; Bartels 1986; Zaller and Feldman 1992)). Opinions may be extremely stable (i.e., σ_P^2 is small), as might be the case if the individual is a highly-educated partisan with very strong beliefs (e.g., Popkin 1994), or extremely variable (i.e., σ_P^2 is large), as might be the case if the individual has no political attitudes and has never thought about the issue before being asked about it in the survey.

The effect of new information is simply the change in opinion that results. If the effect of new information can be thought of as being normally distributed with a mean of μ_I

³ Other models of political learning would also suggest that opinions are responsive to new information. For example, the “on-line” model of Lodge, Steenberger and Brau (1995) would predict that new information is immediately used to update opinions, and prior beliefs only define the baseline evaluation that is being updated. The survey-response model of Zaller (1992) and MacGuire (1969) predicts that survey responses are responsive if only because exposure to the information will prime that consideration and cause respondents to use the information when constructing a response to the survey question.

and a variance of σ_i^2 , Bayesian updating requires that the opinion of individual i is a combination of prior beliefs and the new data, with the impact of each determined by the relative strength of each. Mathematically, the new (posterior) opinion is:

$$\mu = \mu_p \left(\frac{1/\sigma_p^2}{(1/\sigma_p^2 + 1/\sigma_i^2)} \right) + x \left(\frac{1/\sigma_i^2}{(1/\sigma_p^2 + 1/\sigma_i^2)} \right)$$

with the precision of the new belief being given by $1/\sigma_p^2 + 1/\sigma_i^2$. The effect of the new information is the difference $\mu - \mu_p$.

This seemingly sparse model reveals several possible effects of new information. One possibility is that there is no effect: -- i.e., $\mu - \mu_p = 0$. If the information that is provided is either already known or consistent with existing opinions (e.g., individuals for whom the issue is relevant may possess correct beliefs (Hutchings 2003)), $x = \mu_p$, and there will be no difference because $\mu = \mu_p$.⁴ Existing beliefs may also be so strong so as to make the new information irrelevant. If $1/\sigma_p^2 > 1/\sigma_i^2$ and the difference between these two ratios is large, opinions may be unchanged even if $x \neq \mu_p$ and the difference is large. For example, parents with school-aged children may have strong beliefs based on personal experiences and information about average student performance in the state may not change their opinions about education related issues. Strong partisans or ideologues may be less responsive to new information because their opinions are based largely on partisan or ideological considerations (e.g., Berelson et. al. 1954; Campbell et. al. 1960).⁵

⁴ This possibility highlights the need to control for existing beliefs when evaluating the effect of new information because the new information will obviously only affect those for whom the information is "new."

⁵ For example, Democrats may support educational institutions regardless of the performance of these institutions, or else they may be less supportive in Tennessee because the statewide policies are a result of the Republican-controlled legislature and governorship.

Citizens update their beliefs in response to new information if the new information differs from existing beliefs *and* they are motivated to update existing beliefs (Kuklinski et al. 2001). Individuals are receptive to new information if their existing beliefs are sufficiently imprecise (i.e., σ_p^2 is large), or the implications of the new information are clear (i.e., σ_I^2 is small). Even if the clarity of the relevance of the information is the same across individuals (i.e., σ_I^2 does not vary), if there is variation in the strength of prior beliefs (σ_p^2) or in how dissimilar the new information is from prior beliefs, citizens with stronger or more accurate priors will be less sensitive to new information.

Differences in whether and how individuals update their beliefs may result from both individual (e.g., how important and interested an individual is in education policy), and partisan differences. If, for example, the interpretation of seemingly objective performance measures differs by political orientation (perhaps because of how partisans interpret such data in light of the real or imagined political orientations of public officials responsible for designing and implementing education policy), the contribution of the new information will differ between partisans even if they share a common goal of increased student performance given current expenditure levels.

There may also be important differences in how information affects the evaluation of public officials and public policies. While we lack strong theoretical expectations, it is unknown whether beliefs about policy reforms and beliefs about public officials are updated in similar manner in response to the same information.

2. Identification Strategy: Experimental Design

To examine the possible effects of information on citizen opinions about educational institutions and policy reforms motivated by the Bayesian model of the prior section, we

embed an experiment within a Random Digit Dial survey of 1,500 Tennesseans. While others have looked at how mistaken beliefs correlate with opinions (e.g., Sides and Citrin 2002), we employ an experimental design that identifies the effect of providing information controlling for existing beliefs. This is important because it avoids the complications that may result from differences in individuals' ability to form accurate initial beliefs.

Tennessee provides a useful laboratory for this experiment because their long history with school performance data means that Tennesseans are among the most familiar and comfortable with their usage. Tennessee was a relatively early adopter of the school accountability policies that predated NCLB (Hanushek and Raymond 2005), and, prior to the mandates of NCLB, the state based its accountability policy almost purely on making information available to the public rather than on using student test data for the kinds of administrative interventions favored in other "consequentialist" accountability states (Carnoy and Loeb 2002). The use of student data for school improvement has maintained a high profile in the state in recent years because the state's student data system and accountability models were central to its successful first-round bid in the Obama administration's Race to the Top competition (Tennessee Department of Education n.d.). Student performance data has also figured prominently in discussions surrounding reforms to the state's teacher tenure and evaluation systems.

There is a strong history of local control over education policy in the United States, but many important and consequential policies are set at the state level. In Tennessee, for example, the state legislature has recently passed laws regulating collective bargaining by teachers, the assessment of teachers for tenure, the establishment of charter schools, and various curricular issues. Moreover, many of these laws rely on student performance data.

In 2009-2010, for example, students' high school grades began to be based on statewide tests, and in 2010 the Tennessee state legislature was the first in the country to pass a state law that students' end-of-year grades in grades 3 through 8 can be partially based on standardized tests (Hall 2012). In 2011, a law was passed mandating that 50% of a teacher's annual evaluation must come from the standardized test performance of his or her students (Sher, 2011).

Citizens in Tennessee also expect that the state government is involved in education. According to our sample, 17% think education is the top priority of the Tennessee state government, and 35% name it the second highest priority (only the economy was ranked higher). Given citizens' presumed experience with performance reports, the robust lawmaking activity being undertaken at the state level, and citizen opinion about the role of the state government, it is therefore important and appropriate to evaluate the prospects for accountability at the state level using education policy in Tennessee.

We use a survey experiment to answer several questions that are critical for assessing the prospects for democratic accountability. Given the emphasis on performance standards in education policy in Tennessee, how informed are voters about education performance? How do mistaken beliefs affect citizens' evaluations of elected officials and public policies? How do citizens update their evaluations in response to objective performance information given differences in initial beliefs and the saliency of education issues? Do the effects vary across individuals depending on whether policies or officials are being evaluated or by the type of performance information that is provided?

To answer these questions, we use a survey experiment with five randomly assigned conditions that examines the effect of information that is presumably related to opinions

about educational performance. We focus on two pieces of information: student performance on standardized math tests, and the extent to which student performance on these tests varies by the race of the student. Under No Child Left Behind (NCLB), standardized test scores in math and reading form the basis of school accountability in every school district in the United States.⁶ Within each state, common tests cover the same material for each grade level, so scores have the same meaning across schools and districts. NCLB requires schools to publicly report proficiency levels from these tests both for the school as a whole and for racial and ethnic subgroups in part on the assumption that parents, communities, and other stakeholders can utilize these data to pressure schools to better serve the needs of students (see Figlio and Loeb 2011).

As Table 1 summarizes, in four of the conditions, respondents' beliefs about school performance in Tennessee were measured by asking about student performance on standardized math tests. Half were asked a single question about student performance on end-of-year math exams (the "performance experiment" in conditions 2 and 3), and half were asked this question and a question about the race-related gap in student performance on these tests (the "equity experiment" in conditions 4 and 5).⁷ In two of the four

⁶ We focus on math performance to simplify data collection; in practice, math and reading performance are very highly correlated across schools. NCLB also requires subgroup-level reporting for other groups, including economically disadvantaged students and students with disabilities.

⁷ Respondents were asked to assess the performance of Tennessee's public schools via the question, "Based on state standards, what percent of elementary and middle school students in Tennessee do you think performed at grade level or better on Tennessee's end-of-grade math tests?" Respondents were provided with five possible ranges within which to answer (0-19%, 20-39%, 40-59%, 60-79%, 80-100%). To assess the possible achievement gap between black and white students, we asked: "Now thinking about the performance of white and black elementary and middle school students, historically white students have performed more strongly on state math tests than black students. What do you think was the difference between the percentage of white students and black students who performed at grade level or better on Tennessee's end-of-year math tests?" Respondents were provided with 9 possible ranges within which to answer (No difference in performance, 0-5% more white students than black students were at grade level, 6-10%, 11-15%, 16-20%, 21-25%, 26-30%, 31-35%, More than 35% more white students than black students were at grade level).

conditions, respondents received the treatment of being told the correct answer(s) after they expressed their beliefs concerning performance (condition 3) or both overall performance and the achievement gap between black and white students (condition 5). To identify the impact of the information itself rather than on the impact of the framing of student performance (see, for example Chong and Druckman 2007), the actual performance was reported without commentary.⁸

After the intervention, respondents in conditions 2 through 5 were asked to rate the performance of various public officials involved in setting education policy and what they thought about various educational reforms that have been proposed. Respondents in the remaining group (condition 1) were asked the same the battery of evaluations, but they were not primed to consider performance issues beforehand. This group lies outside both the performance and equity experiments.

Our design identifies several effects of interest. Because asking citizens about student performance may prime considerations that are not commonly used when citizens articulate preferences for education policies or the public officials responsible for education policy (see, for example, the theories of McGuire 1969, Zaller 1992, and Zaller and Feldman 1992), the experimental manipulation may itself affect the evaluation by priming the respondent to think in terms of performance or equity considerations when

⁸ After their response was recorded but before being asked the assessment and policy preference item, for Treatment 3 the interviewer provided the *actual* performance level by reading: “You thought that <fill in based on their answer> of elementary and middle school students in Tennessee last year performed at grade level or better on Tennessee's end-of-grade math tests. The actual percentage of students performing at grade level or better on Tennessee's end-of-grade math tests was 34%.” For treatment 5, the respondents received: “You thought that <fill in with performance response> of elementary and middle school students in Tennessee last year performed at grade level or better on Tennessee's end-of-grade math tests. The actual percentage of students performing at grade level or better on Tennessee's end-of-grade math tests was 34%. You also thought that <fill in with gap response>. Actually, the gap between the performance of white students at grade level and the percentage of black students at grade level on the Tennessee state math tests was 22 percentage points.” The design is similar to the one employed by Cruces, Truglia, and Tetax (2011) to study the effect of knowing the income distribution on preferences towards redistribution.

answering the questions. We can identify the possible priming effect by comparing the responses of condition 1 to condition 2 (and also condition 1 to 4).

Table 1: Experimental Design

	<i>Performance Experiment</i>		<i>Equity Experiment</i>	
Condition 1: No Prime or Correction	Condition 2: Performance Prime (Control)	Condition 3: Performance Prime and Correction (Treatment)	Condition 4: Performance + Equity Prime (Control)	Condition 5: Performance + Equity Prime and Correction (Treatment)
	Performance Question	Performance Question	Performance Question	Performance Question
		Correct Answer Provided	Equity Question	Equity Question
				Correct Answer Provided [Both]
Evaluation Questions	Evaluation Questions	Evaluation Questions	Evaluation Questions	Evaluation Questions
Policy Preference Questions	Policy Preference Questions	Policy Preference Questions	Policy Preference Questions	Policy Preference Questions
N=150	N=330	N=345	N=330	N=345

To identify how the information we provide affects the opinions of otherwise similar individuals, we compare individuals' responses in conditions 2 and 3. The difference in evaluations and opinions reveals whether individuals with otherwise identical characteristics and beliefs about the statewide student performance differ as a result of being exposed to the objective performance information. Because we can condition on prior beliefs, we can identify the effect of the information we provide holding initial beliefs fixed – an obviously important feature given the discussion of section 1. We also examine if the effect varies depending on how important educational issues are to the respondent because the importance of an issue is presumably related to the strength of prior beliefs or

the motivation to update beliefs. Comparing the differences in conditions 2 and 4 reveals how additionally priming racial considerations—and, more specifically, the racial disparity in educational performance—affects opinions. Do opinions change if respondents are thinking not only in terms of overall performance, but also in terms of the relative performance of students by race?

Replicating the comparison for conditions 2 and 3 using conditions 4 and 5 reveals how providing information about student performance and student performance by race affects evaluations. Not only is the comparison between the corrected and uncorrected individuals of interest, but it is also of interest to see how the overall effect of providing these two pieces of information compares to the effect revealed when comparing conditions 2 and 3.

Because the effect of information on the evaluation of public officials may differ from the effect of information on opinions about public policies -- perhaps because different considerations are used to form the evaluations or else the relevance of the information may vary across the evaluation – we replicate all of the analyses to determine if the effect(s) of information depends on whether policies or officials are being evaluated.

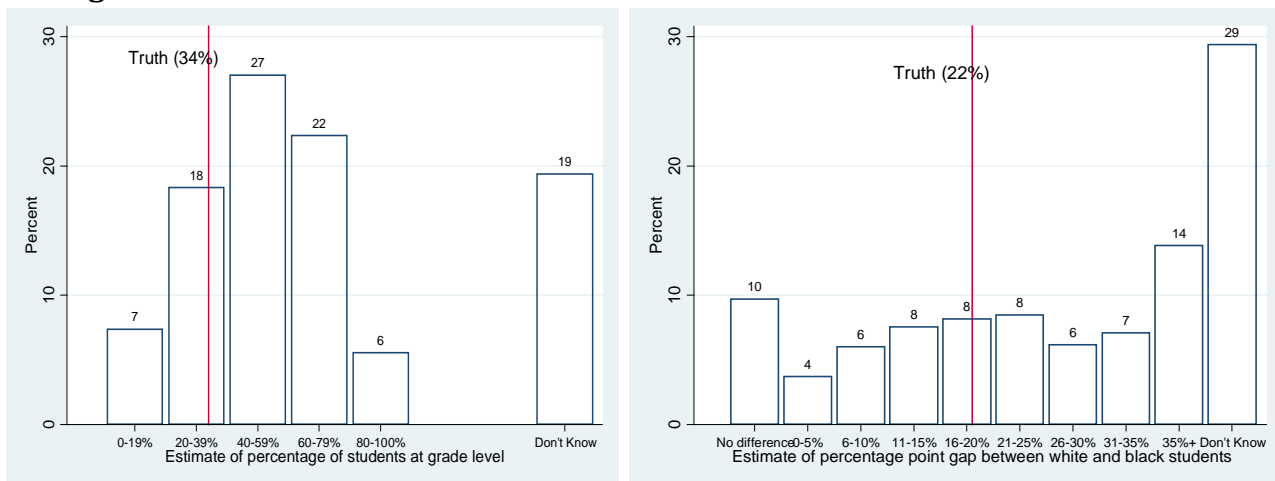
3. The Accuracy of Prior Beliefs about Student Performance

The effect of information presumably depends on both the accuracy and strength of existing beliefs. The first task in identifying the effect of information on citizens' evaluations of public officials and public policy proposals therefore involves assessing the strength and accuracy of existing beliefs (Delli Carpini and Keeter 1996).

We assess citizens' awareness of educational outcomes using two dimensions that are likely relevant for evaluating educational reforms and officials: student performance

and race-related differences in student performance. Figure 1 graphs the distribution of beliefs regarding the percentage of elementary and middle school students who are performing at grade level or better on Tennessee's end-of-grade math tests (left), and the difference between the percentage of white students and black students performing at grade level or better on Tennessee's end-of-year math tests (right).

Figure 1: Distribution of Citizens' Beliefs



Note: The figures provide the distribution of responses using the 1,328 respondents in conditions 2-5 who were asked the overall performance question (left) and the 650 respondents in conditions 4-5 who were asked about possible racial disparities in student performance. The vertical line denotes the true percentage in each instance.

Figure 1 reveals several conclusions. First, as is the case for other issues (e.g., Kuklinski et. al. 2000; Gilens 2001), very few citizens hold accurate beliefs. Despite the amount of attention paid to the issue and the number of policies in Tennessee that use student performance data, only 20% chose the response category containing the true level of student performance (34%), and only 8% chose the category containing the true gap in student performance (22%).⁹ In fact, the nearly uniform distribution of responses to the

⁹ This number was based on the fraction of students in grades kindergarten through eighth grade who scored at level “proficient” or better on the 2009-10 round of statewide standardized tests. State-level data from 2010-11, the most recently completed academic year, were not yet publicly available at the time of the

equity question suggests that the 71% of respondents who chose a response other than “Don’t know” were simply guessing. Second, Figure 1 reveals that citizens are less likely to possess correct beliefs about the race-related gap.

Third, citizens’ beliefs about statewide overall performance are too optimistic; 54% percent of the respondents think student performance is better than it actually is.

However, more respondents also think the racial gap in student performance is larger than it actually is relative to the percentage who think it is smaller than it actually is (36% to 27% respectively).¹⁰

Table 2: Respondents with Correct Information about Student Performance, by Importance of Education to the Respondent

Measure of Importance	% Correct	Difference
All Respondents	18.3%	
Has Children in School	18.6%	0.3%
Does Not Have Children in School	18.2%	(n.s.)
Owns a Home	19.2%	4.1%
Does Not Own a Home	15.8%	(n.s.)
Says Education Should Be State’s Top Priority	20.5%	3.9%
Does Not Say Education Should Be State’s Top Priority	17.6%	(n.s.)

Finally, the inaccuracy of beliefs does not vary according to the importance of education to the respondent. To measure the salience of the issue and, presumably, the strength of prior beliefs regarding education issues, we use three measures: whether the respondent believes education should be the top priority of the Tennessee state

survey, so respondents could not know statewide results from those tests. When those results were released in January 2012, they showed that for the 2010-11 school year, 41% of tested elementary and middle school students attained grade-level proficiency or better in mathematics, a 7 percentage point increase.

¹⁰ If we examine the distribution of knowledge among the 424 respondents in conditions 4 and 5 who answered both the performance and the racial disparity question with a response other than “don’t know,” the responses exhibit a slightly negative correlated (Spearman’s $r = -0.15, p < 0.01$) -- the higher a respondent thought the overall performance of the state was, the smaller the racial difference in performance was thought to be. Interestingly, black and white respondents provided qualitatively similar assessments of the black-white gap ($\chi^2_9 = 5.8, p = 0.76$).

government,¹¹ whether the individual has children that attend public school, and whether the respondent owns their home or has a mortgage (see Figlio and Lucas 2004). Individuals with these characteristics may have stronger prior beliefs on education issues because of personal experiences (e.g., how well their child is doing in their local public school), but Table 2 reveals that they are no more likely to know about statewide performance.

The prevalence and nature of the inaccurate beliefs documented in Figure 1 and Table 2 has important consequences for democratic accountability because there may be less pressure for accountability than there ought to be. Citizens' evaluations of public officials and opinions on educational policy are likely based on overly optimistic and incorrect beliefs about the actual level of student performance in the state, even among those who care about education policy the most. Even though Tennesseans' awareness of policy performance is likely higher than usual given the history of basing education policy on measures of student performance, it is not obvious that citizens possess the requisite information to make informed assessments. Despite the prevailing inaccuracy of prior beliefs, however, conclusions about the prospects for democratic accountability depend on critically on whether citizens' opinions respond to learning about student performance.

4. Estimating the Effect of Objective Information About Outcomes

Having shown that citizens often misperceive—by large margins—the performance of the public education system on commonly used metrics, we now assess: (1) whether misperceptions about performance and opinions are indeed linked, (2) whether correcting citizens' misperceptions via provision of performance information leads to changes in

¹¹ This question was asked well before the experimental treatments so as to not confound the effects or be confounded by the treatments.

policy opinions, and (3) whether opinions are differentially responsive to different types of performance information (i.e., overall performance vs. black-white gaps).

We investigate these questions for two types of opinions. First, we examine citizens' evaluations of three key education institutions: Tennessee schools as a whole, the Tennessee Department of Education, and the local school board. Can citizens' update their opinions about the institutions responsible for implementing public policy in a manner that is consistent with their capacity to hold officials accountable either at the ballot box or through the exercise of public pressure? We also examine the effect of information on the support for six policy reforms that are aimed at increasing student performance. Insofar as support for educational reforms depend on citizens' awareness of unsatisfactory student performance, does changing beliefs about student performance also change beliefs about the efficacy of pursuing various proposed reforms?

4.1. The Effect on Evaluations of Educational Institutions

We begin by assessing whether the act of simply asking about student performance primes considerations and influences evaluations. There is no evidence of priming because the evaluations of those who are asked only the evaluation questions are statistically indistinguishable from those who are asked about student performance before being asked about the evaluations. The smallest p-value from conducting a t-test of the differences in the evaluations between respondents in Condition 1 and respondents who were asked about overall student performance in Condition 2 is .55.¹² Comparing the average responses of Conditions 1 and 4 also reveals no evidence of priming despite the fact that

¹² The difference in average evaluations for "schools in Tennessee" is -.06 (with a standard error of .10), for "the Tennessee Department of Education" the difference is .04 (.11), and for "your local school board" the difference is -.05 (.12).

respondents in Condition 4 are asked to think about both overall performance and race-related differences.¹³

To test the association between performance information and evaluations of education institutions, we estimate a series of ordered probits of the form:

$$\Pr(\square_{\square\square} = \{\square, \square, \square, \square, \square\}) = \square_0 + \square_1 \square\square\square\square\square\square\square + \square_2 \square_{\square} + \square_{\square}\square + \square_{\square}$$

(1)

The dependent variable in equation (1) is the grade respondent *i* gives to institution *g*, using a survey question that asks every respondent to assign a grade of A, B, C, D or F to “public schools in Tennessee,” “the Tennessee Department of Education,” and “your local public school board.” While the assumptions of the ordered probit are most appropriate given the nature of the data being analyzed, we also replicate all of the results after translating the grades into their GPA equivalents (i.e., A=4, B=3, C=2, D=1, F=0) and running an OLS. The substantive results are unchanged and reported in the Appendix.

We first compare conditions 2 and 3. Subjects in these conditions, were asked to assess the performance of Tennessee schools after providing their estimate of the percentage of elementary and middle school students performing at grade level or better according to state standardized tests. As Figure 1 revealed, respondents were asked to provide an estimate using a series of twenty percentage point ranges (i.e., 0-19%, 20-39%, and so forth) and we measure prior beliefs using a series of indicator variables (i.e., the interval containing subject *i*'s estimate (including “I don’t know”) is set to 1 and all other intervals are set to 0 with the 0-19% interval being the omitted category).

¹³ The smallest p-value for the hypothesis test of no difference is .14, followed by .42 and .66.

Because all respondents in Condition 3 were told the correct answer, the treatment variable T_i is set to 1 if subject i is in Condition 3 and 0 if in Condition 2. The row-vector X_i for individual i contains the control variables used to improve the estimates' precision. These include indicators for: female, black, Democrat, Republican, having a college education, having children in school, and owning a home. They also include a linear (three-item) ideology scale, age, age squared, and the number of years residing in Tennessee, plus a six-category measure of respondent income.¹⁴ β_2 in equation (1) estimates the average effect of being told the true performance level, and the coefficient vector β_1 measures the association between the prior beliefs of i and the grade i assigns to institution g .

The odd-numbered columns of Table 3 display the results of estimating equation (1) via ordered probit.¹⁵ Several important conclusions are evident. First, respondents' evaluations of both Tennessee schools in general and the Tennessee Department of Education are increasing in their beliefs about statewide student math performance as expected. The better an individual thinks that performance is, the higher grade that was given; the group that overestimated student performance the most (i.e., a performance guess of 80-100% performing at grade level) also gave the highest average grade to the educational institution. However, this pattern is least true for evaluations of the local school board (Model 5). As expected given the murkier connection between statewide performance and the efficacy of one's local board, beliefs about statewide performance are largely uncorrelated with evaluations of local school boards.

¹⁴ Table A1 in the appendix reports the full results.

¹⁵ Control variables are omitted from the tables for expositional reasons. Most are statistically indistinguishable from zero across models, with a few notable exceptions. First, being a Democrat positively predicts the evaluation of all three institutions, as does having a child in school. African Americans and homeowners evaluate the local school board significantly worse, though neither race nor homeownership is significant for the other two dependent variables.

Second, the average effect of receiving the informational update containing the true student performance level is negative and statistically distinguishable from zero at conventional levels for all three institutions. Moreover, the magnitude of the effect is sensibly ordered: the effects are largest for the evaluation of “schools in Tennessee” (Model 1) and the Tennessee Department of Education (Model 3) which are most responsible and relevant for statewide performance, but there is little effect of learning about statewide performance on citizens’ evaluations of local school boards (Model 5).

Table 3: The Effect of Prior Beliefs about Performance on Evaluations of Education Relevant Institutions

	<i>Grade for:</i>	Tennessee Schools		TN Dept. of Ed.		Local School Board	
		(1)	(2)	(3)	(4)	(5)	(6)
Performance guess:							
20-39%		0.147 (0.204)	0.157 (0.279)	0.151 (0.209)	0.222 (0.287)	0.156 (0.207)	-0.191 (0.280)
40-59%		0.244 (0.196)	0.313 (0.275)	0.339* (0.201)	0.380 (0.282)	0.187 (0.198)	0.027 (0.274)
60-79%		0.470** (0.200)	0.879*** (0.284)	0.652*** (0.205)	0.868*** (0.292)	0.557*** (0.203)	0.177 (0.284)
80-100%		0.908*** (0.280)	1.403*** (0.378)	1.353*** (0.281)	1.837*** (0.386)	0.312 (0.274)	0.341 (0.369)
Don't Know		0.238 (0.223)	0.201 (0.308)	0.479** (0.232)	0.327 (0.318)	0.443** (0.224)	0.021 (0.306)
Received performance update		-0.55*** (0.098)	-0.299 (0.344)	-0.37*** (0.098)	-0.224 (0.353)	-0.249** (0.097)	-0.822** (0.354)
Received performance update x Performance guess:							
20-39%			0.021 (0.403)		-0.127 (0.415)		0.773* (0.415)
40-59%			-0.143 (0.388)		-0.081 (0.397)		0.383 (0.396)
60-79%			-0.754* (0.396)		-0.391 (0.404)		0.779* (0.405)
80-100%			-1.127** (0.559)		-1.020* (0.554)		-0.081 (0.549)
Don't Know			0.117 (0.435)		0.368 (0.446)		0.909** (0.443)
Observations		511	511	499	499	500	500

Pseudo R-squared	0.061	0.072	0.075	0.082	0.041	0.047
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*Ordered probit coefficients shown. Models also condition on control variables. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.*

These results assume that the effect of information does not depend on prior beliefs, but if the performance update treatment affects institutional evaluations via adjustment of respondents' posterior beliefs as the framework provided in section 1 suggests, the treatment effect should be greatest among the respondents who most overestimate student performance. To test this hypothesis, we control for a possible interaction between prior beliefs and treatment status using the specification given by equation (2):

$$Pr(\beta_{ijk} = \{\beta_1, \beta_2, \beta_3, \beta_4, \beta_5\}) = \beta_0 + \beta_1 \beta_{ijk} + \beta_2 \beta_{ijk} + \beta_3 (\beta_{ijk} \times \beta_{ijk}) + \beta_4 \beta_{ijk} + \beta_5 \beta_{ijk} \quad (2)$$

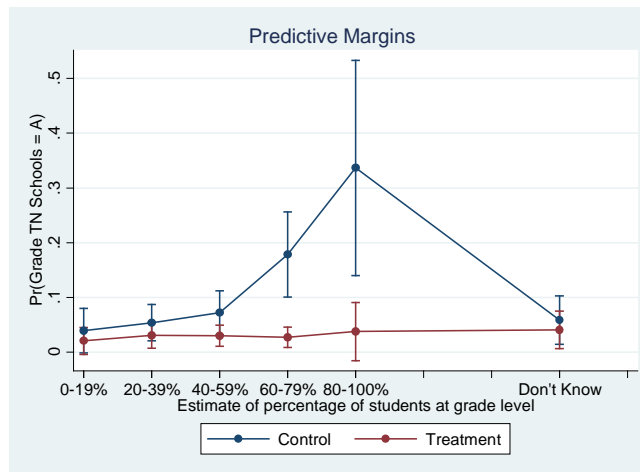
The even-numbered columns of Table 3 report the results of estimating equation (2) by ordered probit. Several important refinements emerge.

First, columns 2 and 4 reveal that the negative effect of the performance update is driven by the substantially lower performance evaluations given to Tennessee schools and the Tennessee Department of Education by those respondents who most overestimate student performance. Figure 2 graphs the substantive magnitude of this effect on the probability of assigning a grade of A. Margins are shown separately for those in the treatment and control groups, with the vertical bracketed lines corresponding to 95% confidence intervals. (The effects are substantively similar using the probability of assigning a B or higher, and Figure A1 in the Appendix replicates the results using OLS.)

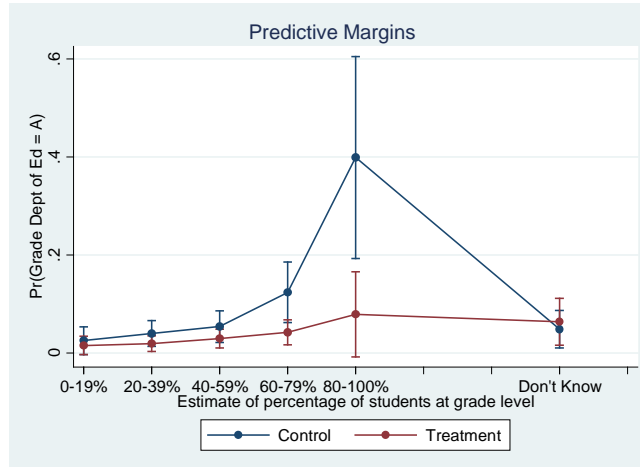
Figures 2a and 2b reveal that the provision of objective performance information similarly affects citizens' evaluations of Tennessee schools and the Tennessee Department of Education are very similar. In both cases, the blue line (control group) shows that, in the

absence of information updating, respondents who severely overestimate student performance are much more inclined to assign a high grade to institutional performance. Among those given the information update in the treatment group (red line), however, respondents have a roughly equal (and low) probability of assigning the highest grade regardless of their prior beliefs. Because respondents are equally and identically likely to assign a grade of “A” regardless of the initial beliefs after they are told the actual level of performance, the evaluations appear to be based on a common assessment presumably driven by the information rather than prior belief or individual characteristics such as ideology.

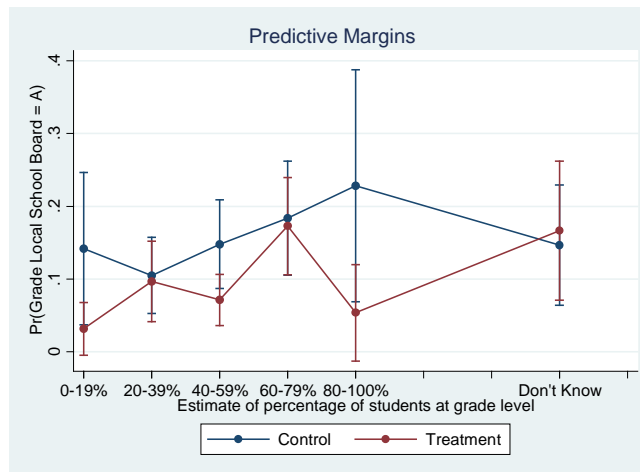
Figure 2: The Effect of Prior Beliefs on the Effect of Information



2a: Probability of Assigning Tennessee Schools a Grade of A



2b: Probability of Assigning the Tennessee Department of Education a Grade of A



2c: Probability of Assigning the Local School Board a Grade of A

Figure 2c reveals an important contrast by showing that the information has almost no effect on citizens' evaluations of local school boards. This null effect is consistent with the expectation that evaluations of local school boards are not affected by information about statewide performance because statewide performance is largely irrelevant for assessing the performance of the school board. It would be normatively troubling to find that citizens' evaluations are sensitive to irrelevant information.

4.2. The Effect of Issue Salience on the Estimated Effect

As section 1 reveals, the effect of information depends on the inaccuracy of existing beliefs and the strength of prior beliefs. Although section 2 reveals that those who care more about education are no more likely to hold correct beliefs, the effect of new information may still depend on the strength of existing opinions. For example, parents of school-aged children can access numerous sources of information—including their day-to-day interaction with their children’s schools—about school performance on a variety of dimensions (not just student achievement) that may allow them to form stronger prior beliefs about how well schools in the state are performing. If so, we might expect parents’ evaluations to be less responsive to the information we provide in our treatment than those of a non-parent. Alternatively, they may care more about the issue and be more willing to update their beliefs when exposed to new information.

To determine whether the impact of education on individuals’ institutional evaluations are more or less responsive to information varies depending on the importance of education to the individual we re-estimate equation (1) while including interactions between a measure of issue salience and the performance assessment indicators and the treatment indicator. Table A1 in the appendix reveals that regardless of the measure we use to measure the importance of education to the individual—having a child in school, owning a home, and naming education as the top priority for state government—the effect does not obviously vary by saliency. The effect of the treatment and the association between prior belief and evaluations does not depend on whether the respondent is a parent of a school-aged child or whether they rank education as the state’s most important priority. There is some evidence, however, that homeowners are not as negatively impacted by the performance update as non-homeowners when evaluating

Tennessee schools and the Department of Education. At most, there is weak and inconsistent evidence regarding whether the importance of the issue affects the impact of information on citizens' evaluations of government performance in education.

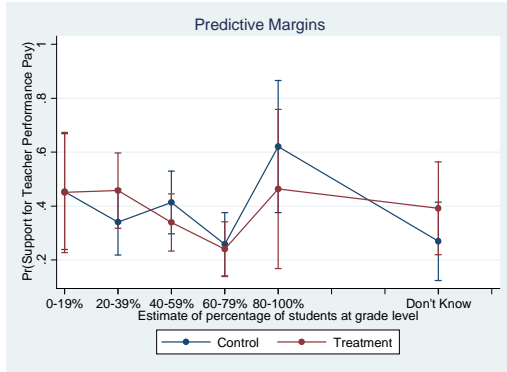
4.3. The Effect on Support for Policy Reforms

In addition to the effect that objective information about outcomes may have on the evaluations of the institutions responsible for implementing public policies, it is also of interest to explore how the same information affects citizens' opinions towards reforms that have been considered to improve educational performance. Ostensibly, citizens' support for policy initiatives is driven by perceptions that they are possible solutions to unhappiness with the status quo. If so, does learning about the status quo change opinions about the efficacy of specific public policies? More specifically, does learning that student performance is lower than expected increase citizens' support for education reforms, or are policy opinions driven by considerations that are less sensitive to updated information about the status quo performance (e.g., ideological commitments)?

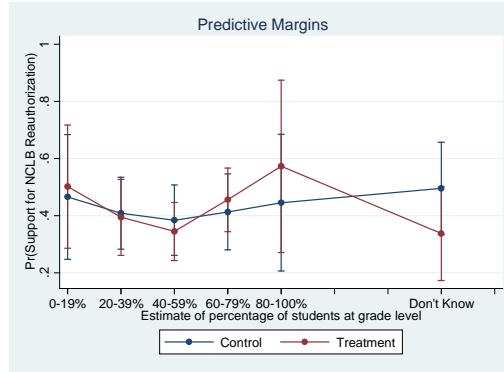
We explore the relationship between information and support for educational reforms using six policies that have been discussed: test-based performance pay for teachers, No Child Left Behind, governmental provision of pre-kindergarten programs, public vouchers for private school attendance, charter schooling, and differential pay for teachers to work in low-income schools. As the description of our research design in Table 1 reveals, respondents were asked whether or not they support each of these policies after being asked the evaluation questions analyzed in section 4.1 using the questions listed in Appendix B. The effect of information was identified by re-estimating equations (1) and (2) to predict the support for each policy separately using probit models.

Figure 3: Beliefs about Student Performance and Support for Education Policy Reform with and without Informational Updating

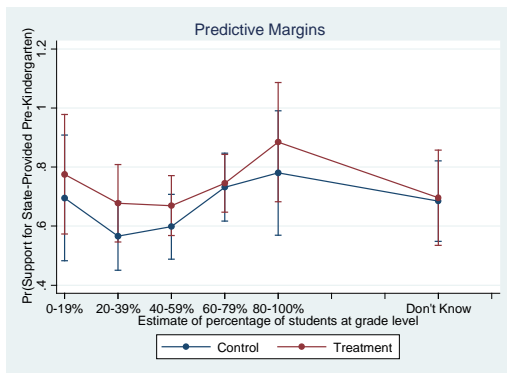
3a: Teacher Performance Pay



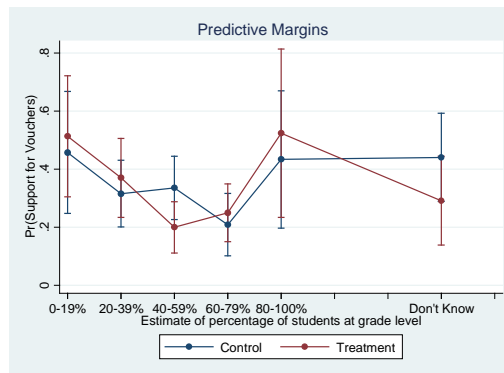
3b: No Child Left Behind



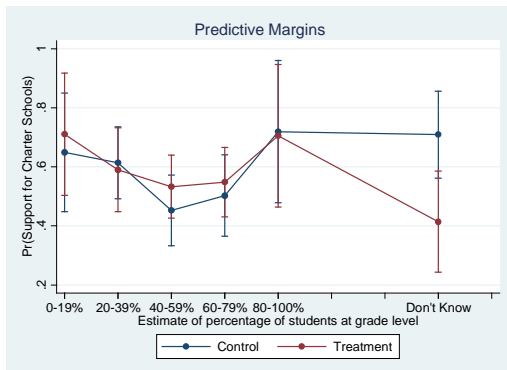
3c: State-Provided Pre-Kindergarten



3d: Private School Vouchers



3e: Charter Schools



3f: Higher Pay for Teachers in Low-Income Schools

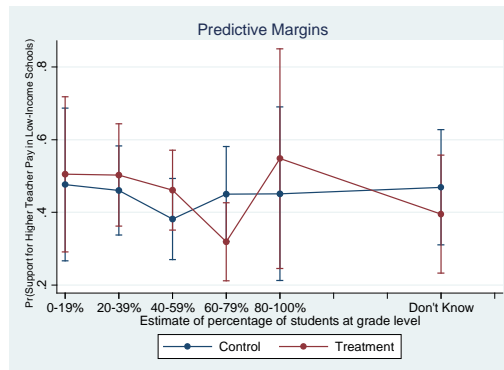


Figure 3 summarizes the effect of information on policy opinions by graphing the predicted probabilities of supporting each reform for otherwise typical and identical

individuals in the treatment and control groups and allowing the effect of information to vary by prior beliefs about student performance (equation 2).¹⁶ The six panels reveal that the effect of information is quite different from the effects evident in prior sections

First, there is not a decreasing (or increasing) association between a respondent's prior beliefs about student performance in the status quo—shown on the x-axis—and the likelihood of supporting *any* of the examined reforms. There is slight evidence of a U-shaped relationship (i.e., respondents in the 40-59% or 60-79% categories having statistically significantly lower likelihoods of support than categories on the ends) for three of the six policies (performance pay, vouchers, and charter schools), but the reason for this relationship is unclear.

Second, providing correct information about the status quo has no effect on the probability that a citizen supports any of the policies. Regardless of prior beliefs, receiving information about actual student performance has any impact whatsoever on the support for some of the reforms that have been proposed to increase student performance.

What may explain the pervasive null effect of information on the support for proposed reforms? Recall that the Bayesian learning model described in section 1 predicts that new information will not affect opinions formation if prior beliefs are strong. Although citizens possess inaccurate beliefs about student performance (section 3) and are seemingly willing to update them when called upon to evaluate educational institutions (section 4.1), it is possible that opinions about public policies are more strongly held because they are closely tied to the individuals' ideology and partisanship. If partisan or

¹⁶ Estimating the specification of equation (1) reveals substantively identical effects. Given the number of tables needed to display the 12 regression specifications, the results are available from the authors upon request.

ideological beliefs drive policy preferences, or if there are partisan and ideological disagreements about the efficacy of the various policies (and their costs), correcting mistaken beliefs about student performance may be insufficient to change opinions about the policies themselves (Rahn 1993). The null results of information evident in Figure 3 are consistent with policy evaluations being driven by partisan and ideological considerations (Campbell et. al. 1960; Jacoby 1998; Green, Palmquist and Schickler 2002; Highton and Kam 2011).

Examining the covariates of these models reveals evidence consistent with this explanation. Two factors—political ideology and race—are the only consistent predictors of respondents’ policy opinions across the various specifications. The joint test that the ideology and party variables are statistically indistinguishable from zero can be rejected at the 0.05 level in four of the six models (performance pay and NCLB are the exceptions). Perhaps because of the racial gap in student performance, black respondents are more supportive of five of the six proposed reforms (differentiated pay for teachers in low-income schools is the exception). The fact that party and race appears to drive policy opinions and that policy opinions are unresponsive to learning about the true status quo suggests that citizen-initiated reforms are unlikely to emerge as a consequence of citizens becoming better informed about the current state of education in the state and coalescing around particular reforms that are intended to increase performance. Instead, consistent with the work of Noel (2012), the suggestive conclusion is that opinions about policies are likely driven by partisan and ideological elites.

4.4. The Effect of Information About Race-Related Performance Differences

So far, we have considered the effect of providing performance information about overall level of student performance. In reality, citizens may be responsive to information about other types of performance and citizens may respond differently to different types of information. In education policy, for example, a significant amount of research and public debate surrounds not just overall student performance, but also the achievement gaps between students with different backgrounds, particularly with respect to race (Hochschild and Shen 2012). Closing the achievement gap between white students and black students—often estimated to be a standard deviation or more on standardized tests (Fryer and Levitt 2004)—is a demonstrably important goal in education and a central aim of many education reform efforts. In evaluating the performance of education institutions or making decisions about their support for particular education policy changes, do citizens' perceptions about the relative performance of white and black students inform their evaluations?

To characterize the effect of the information, we use conditions 4 and 5 in our survey experiment (see Table 1). Subjects in these conditions were given the overall performance prompt asking them to estimate the percentage of elementary and middle school students testing at grade level in math (performance prompt), but they were also asked to estimate the difference in this percentage for white and black students (equity prompt). Respondents in condition 4 serve as the control group and they were then asked the same institutional evaluation and policy support questions analyzed above without being told the actual performance information. In Condition 5 (treatment), respondents were given an information update containing the true percentages for overall performance (34%) and the percentage gap between white and black students (22 percentage points) before being asked the follow-up opinion questions.

Table 4 reports the associations between prior beliefs about overall performance and race-related performance differences and institutional evaluations. The coefficients for prior beliefs about overall performance reported in the top half of Table 4 reveal that institutional evaluations increase the more a respondent overestimates overall student performance. This pattern is entirely consistent with the results of Table 3 in section 4.1 discussed earlier. In contrast, the coefficients for prior beliefs regarding the race-related achievement gap show no clear pattern and most are indistinguishable from the reference group of those who believe that there is no difference in performance.¹⁷ All else equal, individuals who think that there is no difference in student achievement and those who think that the performance gap is more than 35% provide the same grade to educational institutions. This suggests that whereas evaluations of education officials may depend on beliefs about overall student performance, these results suggest that evaluations are not based on beliefs about race-related differences in student performance.

Table 4: Prior Beliefs about Equity Do Not Predict Evaluations of Institutions

<i>Grade for:</i>	Tennessee Schools	TN Dept. of Ed.	Local School Board
	(1)	(2)	(3)
Performance guess:			
20-39%	-0.04 (0.21)	0.12 (0.21)	0.32 (0.21)
40-59%	0.10 (0.20)	-0.01 (0.20)	0.48** (0.20)
60-79%	0.29 (0.21)	0.17 (0.21)	0.72*** (0.21)
80-100%	1.19*** (0.29)	0.88*** (0.29)	0.90*** (0.29)
Don't Know	0.30	0.29	0.50**

¹⁷ A comparable set of probit models run for the six policy opinion variables also show scant evidence of a pattern between prior beliefs about equity and opinions.

	(0.23)	(0.23)	(0.23)
Equity guess:			
1-5%	-0.01 (0.30)	0.32 (0.32)	0.19 (0.30)
6-10%	-0.10 (0.25)	0.01 (0.26)	-0.17 (0.25)
11-15%	-0.11 (0.22)	0.02 (0.23)	-0.20 (0.22)
16-20%	-0.27 (0.23)	-0.32 (0.23)	-0.03 (0.22)
21-25%	-0.02 (0.22)	0.01 (0.23)	0.08 (0.22)
26-30%	-0.05 (0.24)	-0.26 (0.25)	0.03 (0.24)
31-35%	-0.25 (0.23)	-0.30 (0.24)	-0.41* (0.23)
35%+	-0.10 (0.20)	-0.30 (0.21)	-0.16 (0.20)
Don't Know	-0.48** (0.19)	-0.34* (0.19)	-0.18 (0.19)
Received performance and equity update	-0.20** (0.10)	-0.04 (0.10)	0.03 (0.10)
Observations	509	504	507
Pseudo R-squared	0.051	0.042	0.037

*Ordered probit coefficients shown. "No difference" is the omitted category for the equity guess. Models also condition on control variables. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

To identify whether priming or updating information about race-based achievement differences affects citizens' opinions, we pool data from all subjects in conditions 2 through 5 and examine their institutional evaluations. We estimate a version of equation (1) that controls for prior beliefs about student performance and includes indicators for which condition the respondent was assigned (condition 2 -- the control group for the overall performance experiment -- is the excluded category). The coefficient on each indicator tells

us the average change in the response that is attributable to random assignment to that condition relative to the excluded category.¹⁸

There are several comparisons of interest. A significant coefficient on condition 4 (the control group for the equity experiment) would suggest that receiving the equity *prime* (i.e., the question about race-related differences, but not the update) in addition to the overall performance prime affects opinions because the only difference between conditions 2 and 4 is that condition 4 respondents were also asked to think about the black-white test score gap (and neither group was given updated information). A significant difference between the coefficients for conditions 4 and 5 would suggest that receiving the actual information about student performance update changes opinion relative to simply being asked about performance and equity (without being told the actual performance). Lastly, a significant difference between conditions 3 and 5 (the two treatment groups) would suggest that receiving information about the achievement gap *in addition* to receiving information about overall performance changes the average response.

Table 5 summarizes the main results (Table A2 in the appendix contains the full results). Interestingly, respondents in condition 4 and who were primed to think about the achievement gap (but not updated) gave more negative institutional evaluations in two of the three models; the coefficient is negative but not significant at conventional levels in the third. Comparing the coefficients for Conditions 4 and 5 reveals that the coefficients are statistically distinguishable only for evaluations of all Tennessee schools. The effect of

¹⁸ Determining if information about overall performance and equity differentially affect opinion formation at different points in the distribution of prior beliefs is more complicated because respondents are simultaneously updated on two dimensions at once. Recoding respondents as having prior beliefs that underestimated, overestimated, or correctly assessed the true performance of the Tennessee education system on both the overall performance and the equity dimension and estimating models predicting institutional evaluations along with treatment interactions reveals no statistically significant results.

being informed about actual student performance only matters for evaluations of Tennessee schools. This result is surprising given the effect of Condition 3 in Table 5 (and the results of section 4.2) that show that receiving only the overall performance update negatively affects institutional evaluations.

Table 5: Equity Prime, Equity Information Update, and Institutional Evaluations

<i>Grade for:</i>	Tennessee Schools	TN Dept. of Ed.	Local School Board
	(1)	(2)	(3)
Condition 3: Received Overall Performance Prime and Update	-0.54*** (0.10)	-0.33*** (0.10)	-0.26*** (0.10)
Condition 4: Received Performance and Equity Prime	-0.11 (0.09)	-0.17* (0.09)	-0.17* (0.09)
Condition 5: Received Performance and Equity Prime and Update	-0.30*** (0.09)	-0.24** (0.10)	-0.14 (0.09)
<i>p</i> -value from test of equality of coefficients for Conditions 4 and 5	0.04	0.42	0.70
<i>p</i> -value from test of equality of coefficients for Conditions 3 and 5	0.01	0.35	0.18
Observations	1031	1013	1018
Pseudo R-squared	0.047	0.048	0.028
<i>Ordered probit coefficients shown. Models run on pooled sample from Conditions 2 through 5. Models also condition on performance guess and control variables. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.</i>			

Moreover, in only one model—again, for all Tennessee schools—does receiving an informational update about overall performance and equity result in a different response from being updated about overall performance alone. Somewhat surprisingly, the coefficient for condition 5 is *smaller*, meaning that receiving additional information about

the race-related achievement gap reduces the impact of being updated about overall performance.

We also replicate the analysis of section 4.3 for the six proposed policy because advocates for each reform have argued that they are a potential means of addressing achievement gaps (although the connection is more explicit in some policies than others). As was the case in section 4.3, Table A3 in the appendix reveals that (1) prior beliefs about the achievement gap are not clearly related to support for policy reforms, and (2) receiving updated information has no effect.¹⁹

Overall, the effect of being updated on both overall student performance and the racial achievement gap is largely consistent with the effects of being informed only about overall performance. While the absence of an effect of being updated about race-related performance differences is interesting, it is impossible to determine from these data whether this absence is because citizens' opinions regarding education policy are not influenced by such concerns or because providing two pieces of information caused respondents to discount the second piece of information to decrease their cognitive processing costs.

5. Discussion and Conclusion

Assessing citizens' responsiveness to new information is critical for determining the prospects for democratic accountability. Unless citizens change their opinions and beliefs

¹⁹ The results of Table 2 in the Appendix also shows some evidence that equity information may be important for opinion formation for some policies. First, whereas receiving information about overall performance only (Condition 3) is unrelated to support for any of the policies, for two of them—charter schools and vouchers—respondents are more likely to express support when given the information update containing information about both performance and equity (the coefficients for Conditions 4 and 5 are statistically different from one another). Moreover, for two of the policies—vouchers and charter schools—we can reject the null hypothesis that Conditions 3 and 5 are the same. In both cases, the coefficient for Condition 5 is more positive, suggesting that receiving information about equity (and performance) increases support for the policy relative to receiving only information about performance.

in response to new information, it is hard to imagine how votes cast at the ballot box could reflect an informed assessment of public officials' performance and create the correct incentives for elected officials. To form accurate beliefs based on outcomes requires that citizens be able to appropriately update their existing beliefs in response to new information. If citizens update their beliefs in biased ways based on prior beliefs and partisan leanings, or if they fail to update beliefs, the prospects for democratic accountability may be dim. This is perhaps particularly important for issues like education where the stakes are high and many reforms either implicitly or explicitly depend on public pressure to improve performance.

Exploring the prospects for accountability in education policy is important not only for what it reveals about accountability, but also because of what it reveals about education policy – an issue that is arguably among the most important issues that state government deal with and which has wide-ranging consequences on many aspects of society.

We explore the accuracy, receptivity and influence of citizen beliefs on education policy and the institutions responsible for implementing statewide education policy using a survey experiment in a state that places more emphasis than most on outcome-based assessments that are designed to empower citizens to make informed decisions. The experimental design we employ allows us to evade the severe inferential difficulties that can result from citizens' selective exposure to information, and it allows us to identify the effect of information conditional on prior beliefs. Moreover, we can examine the effects of information about status quo performance related to overall performance and the race-related achievement gap on both the evaluations of the institutions responsible for implementing education policy and citizens' support for various proposed reforms.

Our results suggest mixed implications from the perspective of democratic accountability. Despite Tennessee's emphasis on reporting educational outcomes and the number of existing policies use such assessment information, most citizens overestimate student performance and therefore hold overly favorable assessments of the institutions responsible for education policy. However, we also find that citizens' assessments respond in seemingly rational ways to performance-related information; not only are assessments driven by the actual level of student performance rather than partisan or ideological predispositions, but the institutions that are most closely associated with statewide performance are most affected by information about statewide performance.

In contrast, citizens' opinions about policies designed to improve educational performance are unresponsive to learning about student performance in the status quo. Learning that educational performance is worse than expected does not cause any change in the support for various policies aimed to increase student performance. Moreover, in contrast with how educational institutions such as the state's Department of Education are evaluated, citizens' opinions about education policies are driven primarily by ideological and partisan affiliations.

These results suggest that policy change on educational issues (and maybe more broadly) is unlikely to emerge because of a groundswell of citizen support for a particular policy as a consequence of learning about statewide educational performance. Citizens may update their evaluations of public institutions upon learning more about student performance, but this does not make them any more willing to support educational reforms that have been proposed to increase student performance. Citizen-initiated reforms caused by dissatisfaction with the status quo and the a coalescing around particular policy reforms

therefore seems unlikely unless it is also driven by partisan or ideological affinities. The public may punish officials for their part in education policy, but there is little evidence they will also come to change their policy opinions. Changing the support for particular reforms therefore appears to depend on the actions of partisan and ideological leaders.

Despite the important implications that we are able to identify for democratic accountability and education policy because of the research design we employ, our conclusions must be tempered by the consequences of the fact that elected officials are responsible for many policies affecting many different issue areas. Even if citizens' evaluations are responsive to learning about the status quo performance, that is only the first step of what is required for policy-performance based accountability. For example, our experimental design allows us to cleanly identify the effect of learning about various dimensions of student performance and the possibility of priming, but we cannot determine whether the effects are transient or long-lasting (but see, for example, Chong and Druckman 2010). As a result, even if citizens become aware of policy outcomes, they may forget it over time as new issues and concerns arise. If so, when and how the performance results are communicated may be critical.

Accountability is also made difficult because of the many considerations that may affect whether or not to cast a vote for or against an official. The multidimensional nature of the evaluations means that even if citizens are completely informed and unsatisfied with educational performance, if they are content with other issues, they may be reluctant to punish elected officials and create electoral consequences for a lack of performances. As a result, even if voters are correctly informed and they are able to hold elected officials responsible for unacceptable performance in an issue area, they may choose not to do so

because of the performance on other issues. If so, assessing accountability becomes exceptionally difficult given the many possible dimensions of interest to citizens.

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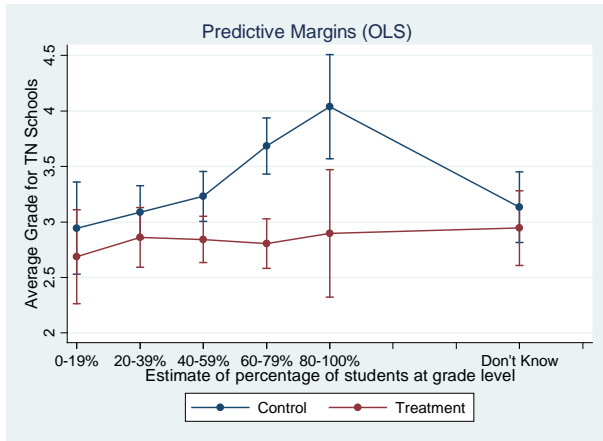
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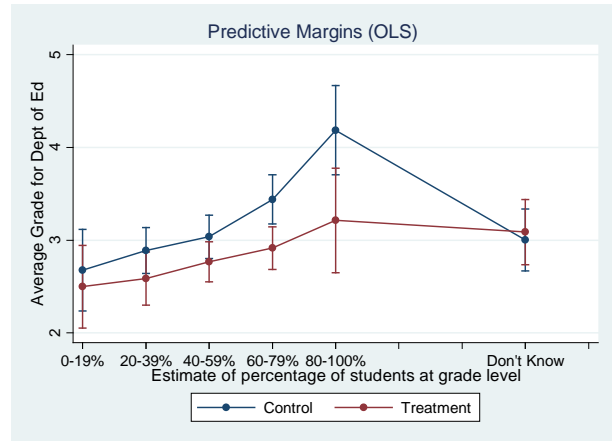
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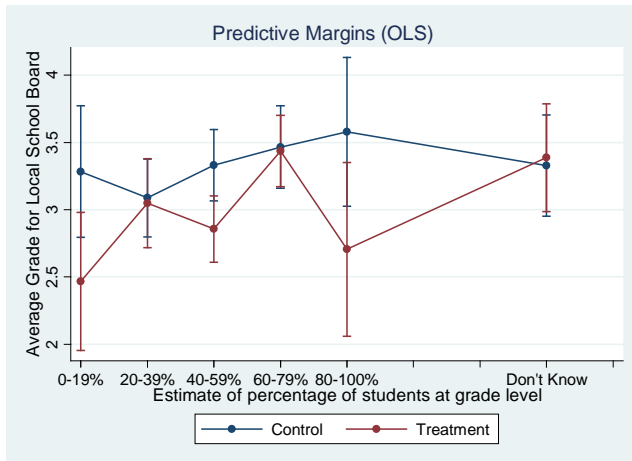
Appendix Figure A1: Re-Estimating the Effect of Updating Prior Beliefs on Citizens' Evaluations of Educational Institutions (Ordinary Least Squares)



A1a: Average Grade Assigned to Tennessee Schools



A1b: Average Grade Assigned to Tennessee Department of Education



A1c: Average Grade Assigned to Local School Board

The panels of Appendix Figure 1 show the predictive margins for the treatment and control groups in the performance experiment for Tennessee schools, the Tennessee Department of Education, and the local school board, respectively. These margins are calculated by re-estimating equation 1 using ordinary least squares (OLS) instead of ordered probit estimation, which was used in the main text. Comparing this figure to Figure 2, which illustrates the margins of the probability of assigning a grade of A to each institution derived from the ordered probit estimates, shows very similar patterns.

Appendix Table A1: Issue Importance as a Moderator between Information and Evaluations of Institutions

<i>Issue Importance Measure:</i>	<i>Grade for:</i> Tennessee Schools			TN Dept. of Ed.			Local School Board		
	Children in School	Home-owner	Says Education Should Be Top Priority	Children in School	Home-owner	Says Education Should Be Top Priority	Children in School	Home-owner	Says Education Should Be Top Priority
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Performance guess:									
20-39%	0.002 (0.234)	0.395 (0.442)	0.262 (0.224)	-0.096 (0.242)	0.446 (0.452)	0.255 (0.231)	0.028 (0.237)	0.136 (0.452)	0.346 (0.229)
40-59%	0.157 (0.227)	-0.502 (0.416)	0.369* (0.216)	0.278 (0.234)	-0.233 (0.414)	0.436* (0.223)	-0.008 (0.226)	-0.039 (0.434)	0.364* (0.220)
60-79%	0.359 (0.232)	0.185 (0.391)	0.487** (0.220)	0.567** (0.240)	0.561 (0.394)	0.762*** (0.227)	0.505** (0.234)	0.324 (0.412)	0.736*** (0.225)
80-100%	0.674* (0.408)	-0.171 (0.506)	0.908*** (0.300)	1.586*** (0.403)	0.524 (0.501)	1.590*** (0.304)	0.543 (0.386)	-0.314 (0.520)	0.692** (0.295)
Don't Know	0.080 (0.249)	-0.449 (0.455)	0.313 (0.243)	0.276 (0.259)	-0.007 (0.478)	0.546** (0.254)	0.219 (0.247)	-0.082 (0.473)	0.525** (0.245)
Received performance update	-0.551*** (0.121)	-0.922*** (0.238)	-0.565*** (0.108)	-0.296** (0.121)	-0.897*** (0.244)	-0.368*** (0.108)	-0.202* (0.121)	-0.533** (0.246)	-0.284*** (0.107)
Importance Measure	-0.242 (0.430)	-0.829** (0.407)	0.219 (0.471)	-0.186 (0.435)	-0.824** (0.413)	0.298 (0.473)	-0.305 (0.452)	-0.900** (0.420)	0.658 (0.480)
Importance Measure x Received performance update	-0.023 (0.206)	0.449* (0.260)	0.113 (0.251)	-0.257 (0.208)	0.635** (0.267)	-0.024 (0.254)	-0.117 (0.205)	0.347 (0.268)	0.152 (0.255)
Importance Measure x Performance guess:									
20-39%	0.626 (0.472)	-0.167 (0.498)	-0.623 (0.531)	0.922* (0.480)	-0.240 (0.510)	-0.451 (0.541)	0.640 (0.495)	0.087 (0.508)	-0.888* (0.540)

40-59%	0.454 (0.453)	0.957** (0.473)	-0.688 (0.509)	0.332 (0.459)	0.737 (0.475)	-0.475 (0.512)	0.795* (0.475)	0.319 (0.488)	-0.908* (0.514)
60-79%	0.521 (0.463)	0.447 (0.455)	-0.080 (0.517)	0.451 (0.469)	0.199 (0.460)	-0.532 (0.520)	0.442 (0.486)	0.346 (0.473)	-0.885* (0.523)
80-100%	0.709 (0.610)	1.604*** (0.609)	0.147 (0.830)	-0.008 (0.605)	1.272** (0.603)	-1.854** (0.817)	0.047 (0.610)	0.904 (0.613)	-7.089 (82.107)
Don't Know	0.803 (0.548)	0.937* (0.522)	-0.436 (0.602)	1.101** (0.554)	0.685 (0.549)	-0.294 (0.593)	1.250** (0.570)	0.691 (0.537)	-0.276 (0.614)
Observations	511	511	510	499	499	498	500	500	499
Pseudo R-squared	0.063	0.075	0.066	0.084	0.088	0.080	0.047	0.045	0.055

*Ordered probit coefficients shown. Models also condition on control variables. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

Appendix Table A2: Equity Prime, Equity Information Update, and Support for Education Policy Reform

<i>Support for:</i>	Teacher Performance Pay	No Child Left Behind	State-Provided Pre-Kindergarten	Private School Vouchers	Charter Schools	Higher Pay for Teachers in Low-Income Schools
	(1)	(2)	(3)	(4)	(5)	(6)
Condition 3: Received Overall Performance Prime and Update	0.01 (0.12)	-0.07 (0.12)	0.18 (0.13)	-0.10 (0.12)	-0.04 (0.12)	-0.02 (0.12)
Condition 4: Received Performance and Equity Prime	-0.00 (0.12)	-0.08 (0.12)	0.01 (0.12)	0.05 (0.12)	-0.21* (0.12)	-0.11 (0.12)
Condition 5: Received Performance and Equity Prime and Update	-0.07 (0.12)	-0.01 (0.12)	0.09 (0.12)	0.13 (0.12)	0.17 (0.12)	0.13 (0.12)
Performance guess:						
20-39%	-0.22 (0.18)	-0.16 (0.18)	-0.10 (0.20)	-0.41** (0.17)	-0.09 (0.18)	0.09 (0.17)
40-59%	-0.15 (0.17)	-0.10 (0.17)	-0.07 (0.19)	-0.54*** (0.17)	-0.26 (0.18)	-0.12 (0.17)
60-79%	-0.28 (0.18)	0.04 (0.18)	-0.06 (0.19)	-0.63*** (0.17)	-0.30* (0.18)	-0.04 (0.17)
80-100%	0.13 (0.24)	0.14 (0.25)	0.19 (0.28)	-0.45* (0.24)	-0.10 (0.24)	-0.15 (0.24)
Don't Know	-0.12 (0.19)	0.01 (0.19)	-0.11 (0.21)	-0.35* (0.19)	-0.09 (0.19)	-0.12 (0.19)
<i>p</i> -value from test of equality of coefficients for Conditions 4 and 5	0.55	0.55	0.53	0.48	0.002	0.04
<i>p</i> -value from test of equality of coefficients for Conditions 3 and 5	0.49	0.58	0.45	0.06	0.08	0.21
Observations	980	966	994	1028	963	1009
Pseudo R-squared	0.045	0.090	0.113	0.074	0.070	0.056

*Ordered probit coefficients shown. Models run on pooled sample from Conditions 2 through 5. Models also condition on control variables. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.*

Appendix B: Policy Questions

Should teachers whose students do well on tests get paid more than teachers whose students do poorly on those tests?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9

Congress may vote on whether or not to reauthorize the No Child Left Behind Act in the next few months. Do you think Congress should reauthorize No Child Left Behind in a form close to its current one?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9

Should the state of Tennessee spend more money to expand its voluntary pre-K program?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9

Should the state of Tennessee provide publicly-funded tuition vouchers for families to send their children to private schools?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9

Should Tennessee have more charter schools, which are independently-run public schools that operate under fewer restrictions than traditional public schools?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9

Should Tennessee pay higher salaries to teachers who work in schools with large low-income populations?

- Yes..... 1
- No 2
- Don't know 8
- Decline to Answer 9