Denver ProComp: Teachers' Attitudes and Behaviors

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There is currently much interest in improving access to high-quality teachers in order to increase student learning and test-score achievement. Financial incentives for teachers, either as part of an alternative teacher compensation program or as a stand-alone bonus, have been championed by policymakers as one way to improve teacher quality (Baratz-Snowden, 2007; Chiat & Miller, 2009). As of yet, however, this enthusiasm has not been grounded in empirical research. On the contrary, several high-profile studies of U.S. alternative teacher compensation programs have found no effect on teacher quality, operationalized as changes in student test-score achievement (Glazerman & Seifullah, 2010; Marsh et al., 2011; Springer et al., 2009a; Springer et al., 2010).

Theoretically, there are two channels through which financial incentives may improve overall teacher quality and effectiveness. First, financial incentives may motivate teachers to change their instructional practices to focus on activities and skills that increase student achievement. Second, financial incentives may attract and retain teachers who excel at the activities to which incentives have been linked and deter teachers who do not. These two parts of the theory of action are often termed "motivation" and "selection" effects, respectively (Lazear, 1986; 2003; Milanowski, 2002; Adams et al., 2009).

Denver's Professional Compensation System for Teachers ("ProComp") is one of the most prominent alternative teacher compensation reforms in the nation. Via a combination of ten financial incentives, ProComp seeks to increase student test-score achievement by motivating teachers to improve their instructional practices and by attracting and retaining high-quality teachers to work in the district. This study examines teacher attitudes and behavior to determine whether motivation and selection effects are present after the implementation of ProComp. Specifically, we explore the extent to which teachers' instructional practices and attrition are

predicted by their attitudes about the efficacy and appropriateness of ProComp. Given that success in ProComp likely influences teachers' attitudes about it, we condition the relationship between attitudes and behaviors on demonstrated prior student test-score achievement gains and previously earned financial incentives. The central questions framing our analysis are as follows:

- 1. What are teachers' attitudes about the efficacy and appropriateness of ProComp?
- 2. Do teachers report changes in their instructional practices as a result of ProComp?
 - a. To what extent are teachers' attitudes about ProComp associated with reported changes in their instructional practices?
- 3. Do teachers report that ProComp is an important consideration when making their career decisions to come to the district?
 - a. To what extent are teachers' attitudes about ProComp associated with attrition?
- 4. How are the relationships between attitudes and behaviors mediated by prior student test-score achievement gains and previously earned financial incentives?

We hypothesize that teachers who have positive attitudes about ProComp are more likely to adjust their instructional behaviors to adhere to the goals of ProComp. Additionally, these positive attitudes may affect teachers' career decisions about whether to join the district and whether to remain in their school or the district the next school year. We suspect teachers who previously earned financial incentives under ProComp and who have demonstrated positive gains in student test-score achievement are more likely to embrace the program.

This research is particularly important in light of a disconnect between broad policy support for alternative teacher compensation programs and the dearth of effects in the empirical research. ProComp is an ideal program to study the theory of action and teachers' responses – or lack thereof – to financial incentives. ProComp is long-established, well-resourced, and

relatively well-understood by educators (Fulbeck, 2011; Wiley, Fulbeck & Subert, 2010). Accordingly, if teachers change their instructional practices in response to financial incentives or consider financial incentives when making their career decisions, we would expect to observe this under ProComp. Furthermore, this study extends the empirical literature by examining the way in which attitudes, prior student test-score achievement gains, and previously earned financial incentives influence teacher behavior with regard to motivation and selection. Findings should be of interest to researchers, policy makers, teachers, and other stakeholders interested in PK-12 public education.

In what follows, we first provide a brief background of Denver's ProComp. Second, we review the research literature on the relationship between teacher attitudes about alternative teacher compensation and teachers' behaviors while participating in such a program. Building on this review, we explain our conceptual framework and present the logic model we developed to frame our study. Third, we describe the participants, data sources, and the analytic approach we employed. We present and interpret our findings in the fourth section. Lastly, we draw conclusions about the relationship between teacher attitudes, instructional practices, and career decisions and discuss several directions for further research.

Background

Denver Public Schools (DPS) is the second largest school district in Colorado, serving approximately 80,000 students in 152 schools with roughly 4,500 teachers. The majority of students who attend DPS are Latino/a, and over 72 percent of DPS students qualify for the federally sponsored free or reduced-price lunch (FRL) program, a commonly used indicator of poverty. Like many large, urban districts, DPS is beset with low test-score achievement and a shortage of high-quality teachers (Council for Great City Schools, 2009).

ProComp has gained national attention as one of the only teacher compensation reforms jointly conceived of and implemented by the district and local teachers' union (Gonring, Teske, & Jupp, 2007). The program received a \$22.6 million Teacher Incentive Fund (TIF) grant and was backed by Denver voters via a 2005 referendum to levy an additional \$25 million in annual taxes to fund the program. Starting January 1, 2006, incumbent teachers could opt into ProComp or continue to be paid based on the DPS single-salary schedule.¹ Teachers who were hired on or after this date were required to participate in ProComp. The ten different financial incentives available to teachers under ProComp fall into general three categories: 1) knowledge and skills-based, 2) performance-based, and 3) market-based.² Incentives range from a low of \$376 for meeting annual student growth objectives, to a high of \$3,379 for earning an advanced degree or specialty license.³

On average, teachers who participate in ProComp earned roughly \$4,700 in financial incentives during the 2009-10 school year. These incentives are in addition to a teacher's base salary, which starts at \$37,551 for a teacher with a bachelor's degree and no prior teaching experience and is \$52,845 for the average teacher in DPS (Denver Public Schools, 2011). There is no limit to the number of incentives a teacher can earn in a single year; however some are specific to subject/grade or school. The comprehensive design of ProComp was championed by President Obama as a model of teacher compensation reform, and a growing number of districts have used ProComp as a guide for developing similar reforms (Meyer, 2008).

Literature Review and Framework

¹ Under single-salary schedules, teachers are paid based on years of teaching experience and post-baccalaureate educational attainment.

² See Appendix A for a table detailing the ten financial incentives available to teachers under ProComp.

³ These figures reflect incentive amounts available to teachers who participated in ProComp during the 2009-10 school year. While most ProComp incentives are annual bonuses, knowledge-based incentives such as earning an advanced degree or specialty license are added to teachers' "base" salaries.

Review of Literature

Although most school districts continue to use a single-salary schedule to determine teacher compensation, many states and districts have recently begun to experiment with alternative compensation systems that include not only performance-based pay but also financial incentives for acquiring new knowledge and skills, teaching particular hard-to-fill subject areas, and working in hard-to-staff schools (Johnson and Papay, 2009; Podgursky and Springer, 2007). Proponents of performance-based compensation argue that the current single-salary schedule does not motivate teachers to improve their teaching practices. Advocates see systems linking pay to performance as a way to reward and motivate educators to improve their instructional practice and as a way to attract and retain high-quality teachers (and to encourage low-quality teachers to exit) (Lazear, 2003; Solmon, 2006).

However, opponents contend that performance-based compensation is not appropriate for education. Murnane and Cohen (1986) argue that the "nature of teaching" does not lend itself to performance-based pay because teaching is a highly personalized, complex, and context-dependent endeavor. Furthermore, isolating an individual teacher's contributions to learning is difficult because multiple individuals contribute to outcomes, which in and of themselves, are difficult to measure in a reliable and valid way. Deci (1971) posits the intrinsic motivation of teachers may be undermined by the use of financial incentives, leading to potentially negative effects, such as less teacher collaboration. Finally, others question whether increasing teacher motivation – assuming this was possible via alternative teacher compensation programs – would even improve educational outcomes (Elmore, 2004; McLaughlin, 1987). The motivation part of the theory of action underlying alternative teacher compensation assumes teachers know how to change to improve student learning and increase student test-score achievement (i.e., an

understanding of the education production function), when prior research suggests that is often not the case (Marsh et al., 2011; Rice, 2001).

Past research on alternative teacher compensation programs and expectancy theory (Vroom, 1964) suggests that teacher buy-in, or acceptance of the program and its criteria, and perceived fairness are key attributes necessary to achieve the desired program goals (Milanowski, 2000). Our review of the literature suggests teachers' attitudes towards alternative teacher compensation programs are generally less favorable when incentives are linked exclusively to student achievement. For example, in their study of alternative teacher compensation in Florida, Jacob and Springer (2008) found only 35 percent of respondents supported the use of standardized student assessments to provide teachers with financial rewards. Findings from a study of the Teacher Advancement Program (TAP) in South Carolina suggested only 18 percent of respondents supported linking standardized student assessments to teacher compensation (Agam, Reifsneider, & Wardell, 2008). This fall, teachers' concerns about making high-stakes decisions (including teacher compensation) based on student test-score achievement contributed to the Chicago Public Schools teacher strike (Sawchuk, 2012).

Results from studies that have examined changes in teachers' instructional practices within the context of an alternative teacher compensation program are mixed. In their study of South Carolina's TAP, Agam, Reifsneider, and Wardell (2008) found 74 percent of teachers reported they altered their teaching after receiving feedback from mentor teachers who evaluated their teaching style. Conversely, 73 percent of teachers surveyed in Texas claimed their participation in the Governor's Educator Excellence Grants (GEEG) program did not change their instructional practices (Springer et al., 2009b). Barnett et al. (2007) also found little

evidence to suggest teacher participation in the Achievement Challenge Pilot Project (ACPP) in Little Rock, Arkansas resulted in changes to teachers' instructional practices.

A recent evaluation of New York City's schoolwide bonus program found no differences in the reported instructional practices or career decisions of teachers who participated in the compensation program, as compared with those in the control group (Marsh et al., 2011). The authors speculate the lack of changes to instructional practices might be due to the limited motivational power of the bonus. They explain, "The vast majority of teachers and [compensation committee] members who received bonuses said that winning the bonus was a nice acknowledgement of their hard work but that it did not influence their performance. In addition, only 39 percent of CC members and 15 percent of teachers reported that not receiving a bonus energized them to improve their practice the subsequent year, and only a very small proportion of both groups actually reported that not receiving the bonus reduced their motivation" (p. xxvi). This finding – that teachers view financial incentives as a reward for their current efforts and behavior rather than as an incentive to exert greater effort or amend their instructional practices – has been found elsewhere as well (see e.g., Fulbeck, 2011, 2012; Kelley, 1998).

In their study of alternative teacher compensation in Florida, Jacob and Springer (2008) found evidence to suggest both teachers' attitudes towards alternative teacher compensation and their instructional practices appeared to be related to teachers' self-efficacy. Teachers who believed in their abilities to create positive change and impact their students were more likely to support alternative teacher compensation programs. Additionally, teachers were more likely to report changes in their instructional practices if they possessed high levels of self-efficacy.

Research also indicates that several factors may mediate the potential motivational effects of alternative teacher compensation programs. First, some bonus programs have been associated with higher teacher stress. In an earlier study to Denver's ProComp, Wiley, Fulbeck and Subert (2010) found that 43 percent of teachers who participated in ProComp reported feeling more pressure and job stress as a result of the program. These undesirable outcomes may cause teachers to question whether the risks are worth the potential benefits (Heneman & Milanowski, 1999).

Second, teachers may be less supportive of an alternative teacher compensation program if they feel it is not being fairly administered, either because they perceive that the goals are not appropriate or that bonuses are not allocated fairly (Heneman & Milanowski, 1999). Consistent with expectancy theory, Kelley and Finnegan (2003) report that perceived fairness of the alternative teacher compensation program was the largest predictor of teachers' belief that individual effort would result in meeting goals. Accordingly, it is important to examine teachers' attitudes about an alternative teacher compensation program may – or may not – motivate changes in behavior.

Empirical research that examines the effect of alternative teacher compensation on teacher mobility and retention is scarce and mixed. For example, researchers found no difference in teacher retention at the district- or school-level as a result of Chicago's TAP program (Glazerman & Seifullah, 2010). Yet, results from the evaluations of alternative teacher compensation programs in Texas have been mixed. The programs allow Texas districts and schools to set their own incentive award amounts. Perhaps not surprisingly, researchers found that there were retention gains among teachers who received large bonuses. However, they also

found sharp decreases in retention associated with smaller incentives and for teachers who did not receive an incentive (Springer et al., 2009a; Springer et al., 2009b).

Researchers studying a bonus program in North Carolina that specifically targeted math, science and special education teachers who worked in high-poverty or low-achieving secondary schools, found the bonus was associated with a 17 percent decrease in mean turnover rates (Clotfelter et al., 2007). The largest effects were observed for experienced teachers. Researchers speculate that the effect may also have been negatively biased because many teachers indicated they did not understand the eligibility criteria of the program.

In Denver, researchers have found small gains in retention (between 2-4%) associated with ProComp (Fulbeck, 2011, 2012; Proctor et al., 2011). Interviews with Denver teachers support these findings. Fulbeck (2011) found that although a few teachers indicated they considered ProComp's financial incentives when making their career decisions, most said they did not consider the incentives to be important factors in such decisions. Rather, teachers indicated that other non-pecuniary factors, such as the principal and student characteristics, were more important considerations in their career decisions. This has been well documented in the research literature (Boyd et al., 2011; Milanowski et al., 2009).

Past research has found mixed evidence of the motivational effects of alternative teacher compensation programs and has indicated that motivation is often mediated by the types of incentives available and teachers' attitudes about the program. Research also indicates alternative teacher compensation programs may not be a major factor in teachers' career decisions. Thus an important preliminary question for this study is whether we observe changes in teachers' behavior after the implementation of ProComp.

Assuming there is variation in reported behaviors under ProComp, we can then explore the relationship between attitudes and behaviors. This will make a substantial contribution to the research literature, given that attitudes and behaviors are often studied in isolation. That is, most research examining teachers' attitudes about alternative teacher compensation is detached from any exploration of subsequent changes in teachers' instructional practices and their career decisions. Furthermore, there is no research – as far as we are aware – that considers prior student achievement gains when examining the relationship between teacher attitudes and instructional behaviors within the context of alternative teacher compensation. This study seeks to mitigate this gap in the research.

Conceptual Framework

The conceptual framework we developed for this study is based in the theory of action that financial incentives may improve overall teacher quality via motivation and selection effects. With regard to motivation effects, we speculate teachers who hold favorable attitudes of ProComp are more likely to respond to financial incentives and change their behavior accordingly. Teachers who believe in the efficacy and appropriateness of ProComp would be more likely to buy into the program and may make greater efforts to adjust their instructional practices to adhere to the goals of ProComp. With regard to selection effects, we hypothesize teachers who hold favorable attitudes of ProComp are more likely to be attracted to and remain in DPS. Moreover, we hypothesize teachers who have previously demonstrated student test-score achievement gains and who have successfully earned financial incentives under ProComp are more likely to hold favorable attitudes towards ProComp and change their behaviors to align with the goals of the program. Finally, if motivation and selection effects are present in Denver,

we also expect a relationship between teachers' instructional practices and career decisions and subsequent test-score achievement gains and earned financial incentives.

Taken together, we posit (a) teacher attitudes, (b) instructional practices and career decisions, and (c) demonstrated success in test-score achievement gains and ProComp have a cyclical relationship. Figure 1 presents the logic model created to further explain these hypothesized relationships.

Figure 1. Logic model of relationships between teacher attitudes, behaviors, achievement gains and earned financial incentives.



Our logic model begins (1) with a consideration of a given teacher's demonstrated success in student test-score achievement gains and earned incentives under ProComp in the previous year (t-1). Again, we believe demonstrated test-score gains and success in ProComp may positively influence teachers' attitudes about the efficacy and appropriateness of ProComp. These attitudes (2) may in turn influence the extent to which a teacher adjusts his or her instructional practices to align more directly with ProComp's goals and may influence a teacher's career decisions about coming to or remaining in DPS. Additionally, there may be direct effect of prior student test-score achievement gains and previously earned financial

incentives on teachers' instructional practices and career decisions (2a). Presumably, teachers who believe in the efficacy and appropriateness of ProComp, who have successfully demonstrated achievement gains, and who have previously earned incentives under ProComp would be more likely to adjust their behaviors to participate in the program and to adhere to its goals (3). Finally, if motivation and selection effects are present in Denver, our logic model predicts teachers' changes to their instructional practices and their career decisions are associated with student test-score achievement gains and earned financial incentives in year t (4). Our study is designed to explore these hypothesized relationships. Specifically, we focus on the relationships between steps 2, 2a, and 3.

Data and Methodology

The data we examine are primarily from teacher surveys administered to DPS teachers in the spring of the school year. As only DPS teachers who are members of the Denver Classroom Teachers' Association (DCTA) Bargaining Unit are eligible to participate in ProComp, the sample of teachers who received the survey was constrained to include only DCTA teachers. This reduced the sample from approximately 4,500 teachers to roughly 3,900 teachers. Only teachers employed by DPS at the time of survey administration were included in the sample. Response rates on the teacher surveys were moderate: between 52-55 percent responded each year.

Participants

This study explores reported changes in teachers' instructional practices and teacher attrition within the context of ProComp. Utilizing 8240 survey responses over three years,⁴ we limited most analyses to include only teachers who were ProComp participants (N = 5698

⁴ These 8240 responses include N = 4378 teachers: N = 1776 who responded to just one year of the survey, N = 1342 who responded to two years, and N = 1260 who responded to all three years.

responses from N = 3144 teachers). Retention, achievement, incentive, and demographic data

were then linked to these teachers. Table 1 describes the characteristics of our sample.

Teacher characteristics	2007-08	2008-09	2009-10
ProComp Status			
ProComp participant	58.7%	73.1%	77.1%
Non-ProComp	41.3%	26.9%	22.9%
•			
ProComp entry type			
Voluntary	60.3%	56.9%	45.8%
Compulsory	39.7%	43.1%	54.2%
School disadvantage			
Non-Hard-to-Serve school	85.0%	55.8%	57.1%
Hard-to-Serve school	15.0%	44.2%	42.9%
School type			
Elementary	52.0%	53.9%	56.7%
Secondary	38.4%	35.0%	34.9%
Other	9.6%	11.1%	8.4%
Gender			
Female	77.0%	79.3%	79.8%
Male	23.0%	20.7%	20.2%
Race/Ethnicity			
Minority	19.0%	78.7%	79.0%
Non-Minority	81.0%	21.3%	21.0%
Education			
Bachelor's Degree	73.3%	59.9%	58.8%
Master's and above	26.7%	40.1%	41.2%
Years of experience			
0-3 years of experience	26.0%	28.9%	29.0%
4+ years of experience	74.0%	71.1%	71.0%

 Table 1. Demographic characteristics of respondents.

Although the sample was fairly evenly split between teachers who voluntarily entered ProComp and those who were required to enter because of their hire date, respondents were more likely to be White (non-Latino) and female, relative to all teachers employed in DPS. Additionally, respondents were more likely to be tenured, elementary/K-8 school teachers, who had attained a Master's or other advanced degree. For analyses that rely on previously demonstrated test-score achievement gains, the sample is further restricted; achievement data is available only for teachers in tested subjects and grades. Analyses that include measures of test-score achievement are estimated from a severely constrained sample of N=1658 records for N=807 teachers. Despite the smaller sample however, the distribution across the demographic characteristics presented in Table 1 is similar.

Data Sources

We draw on four data sources: 1) teacher survey data; 2) teacher retention data; 3) student math test-score achievement data; and 4) data indicating the financial incentives teachers' earned under ProComp. Survey and retention data are available from 2007-08, 2008-09 and 2009-10 school years. In order to examine the relationships between attitudes – mediated by prior student test-score achievement gains and previously earned financial incentives – and behaviors (see Figure 1), we link these data to achievement and incentive data in years 2006-07, 2007-08 and 2008-09.⁵

The survey data include items about teachers' attitudes, instructional practices, and career decisions related to recruitment and retention (see Appendix E for survey items). Most questions are Likert items where respondents are asked to rate the extent to which they agree with a given statement. Skip patterns were used throughout the survey to ensure respondents received only relevant items specific to their ProComp status, job location/position, and previously earned financial incentives.

Teacher retention is defined by reviewing human resource data to determine whether teachers remained in the same school from one year to the next. Retention is limited to include only those who had a choice to remain at their school the next year. As such, teachers who were

⁵ Unfortunately, achievement data is only available for 2007-08 and 2008-09.

terminated, who retired, or who left involuntarily due to a reduction in teaching were not coded as "departing."

Student test-score achievement data were generated by the Colorado Department of Education, using the Colorado Growth Model. The Colorado Growth Model (CGM) is a normative measure of change in student test-score achievement over time that relies on quantile regression. The model estimates a student growth percentile for each student in a sample, which provides an estimate of student growth relative to that student's "academic peers," or students with similar score trajectories. For the analyses presented here, we aggregate individual student growth percentiles to teachers, and focus primarily the state summative assessment in mathematics.

Data on financial incentives teachers earned under ProComp are recorded annually by DPS. The district provided us with data on the total number of incentives earned by each teacher in a given year. Though lacking detail on the specific incentives earned, this measure provides us with a sense for who earned more in financial incentives⁶ under ProComp in a given year. *Analytic Approach*

Our examination of the relationship between attitudes and behaviors under ProComp is divided into three methodological strands. First, we describe teachers' responses to relevant survey items for each year. Second, we employ factor analysis to create mean composite index scores for the eight attitude items and the three instructional practice items. We compare mean index scores, considering teacher characteristics, to get a better sense of the relationship between attitudes and behaviors for a variety of different types of teachers. Third, we model ProComp teachers' behaviors (separately for instructional practices and attrition) on reported attitudes, prior student math test-score achievement, and total number of previously earned financial

⁶ See Appendix A for details on ProComp financial incentives, including dollar amounts awarded for each incentive.

incentives. In this strand we employ ordinary least squares (OLS) regression models and linear probability models to determine, among the data available, whether attitudes, prior student test-score achievement, and the number of previously earned incentives influence instructional practices and teacher attrition.

Using a composite index score of changes to instructional practices and attrition separately as the two behavior outcomes of interest, the basic model can be formally specified as:

$$Behavior_{it} = \beta_0 + \beta_1 Attitudes_{it} + \beta_2 Achievement_{it-1} + \beta_3 Incentives_{it-1} + \beta_4 X_{it} + \varepsilon_{it}$$

where the outcome *Behavior*_{it} is either 1) the composite index score of teachers' reported changes to their instructional practices or, 2) teacher attrition for teacher *i* in time *t*; *Attitudes*_{it} is the composite index score of teachers' attitudes about the efficacy and appropriateness of ProComp for teacher *i* in time *t*; *Achievement*_{it-1} is a measure of student math test-score achievement, aggregated to the teacher-level for teacher *i* in time *t*-1; *Incentives*_{it-1} is the number of financial incentives earned by teacher *i* in time *t*-1; X_{ii} is a series of covariates that includes teacher and school characteristics; and ε_{ii} is the random disturbance term.

Findings

In what follows, we present results describing and estimating the effect of attitudes about ProComp on behaviors under ProComp. Results from descriptive analyses of means for individual survey items are presented first. Next, we present the factor analysis we employed to create index composite scores for attitude and instructional practice items. Lastly, we present results from regression analyses that estimate the effect of attitudes on behaviors. We briefly discuss the relationship between attitudes and behaviors and then address three issues: 1) how prior math test-score achievement and the number of previously earned financial incentives affect teachers' behaviors; 2) how teacher and school characteristics relate to teachers'

behaviors; and 3) whether and how these effects vary for elementary and secondary teachers.

Descriptive Analyses using Item Means

Item means describing teachers' attitudes about ProComp and reported changes in their

instructional practices as a result of ProComp are presented in Table 2.

Table 2. Descriptive statistics for key variables.

	2007-08	2008-09	2009-10
	Mean	Mean	Mean
	(SD)	(SD)	(SD)
Attitudinal items	N = 1529	N = 1710	N = 2292
ProComp can motivate participants to improve instructional	3.22	3.41	3.50
practices.	(1.08)	(1.01)	(0.98)
ProComp can ultimately improve student achievement.	3.03	3.21	3.21
	(1.08)	(1.05)	(1.04)
ProComp will ultimately help DPS attract and retain qualified	2.88	3.09	3.21
teachers.	(1.18)	(1.13)	(1.12)
ProComp is aligned with the goals of our school district.	3.44	3.54	3.53
	(0.94)	(0.86)	(0.88)
ProComp is aligned with my goals as an educator.	3.37	3.45	3.46
	(1.09)	(1.03)	(1.04)
ProComp is a fair program.	3.06	3.12	3.16
	(1.10)	(1.08)	(1.08)
ProComp will improve teacher collaboration in DPS.	2.87	3.00	3.03
	(1.09)	(1.06)	(1.05)
I feel more pressure and job stress as a result of ProComp.	3.23	3.24	3.11
	(1.21)	(1.21)	(1.13)
Instructional practice items			
ProComp has led me to	N = 1276	N = 1747	-
Change the content of what I teach	2.53	2.64	-
	(1.31)	(1.37)	
Change the way I teach (e.g. by using different teaching methods)	2.76	2.90	-
	(1.29)	(1.35)	
Focus my teaching more on raising student achievement	3.08	3.23	-
	(1.32)	(1.36)	
Retention			
Number (%) of teachers who depart	509	310	407
	(18.7%)	(12.3%)	(13.6%)
Achievement			
Mean percent of students with math SGPs over 55	50.15	49.75	50.17
	(20.15)	(18.62)	(20.00)
Financial incentives			
Mean number of incentives earned	3.79	4.50	4.10
	(1.67)	(1.63)	(1.60)

Note: Attitudinal and instructional practice items are on a 5-point Likert scale, where 5 = Strongly Agree and 1= Strongly Disagree.

In general, respondents report attitudes that are somewhat above neutral (3) about ProComp. However, teachers' are slightly negative about the potential for ProComp to improve teacher collaboration in DPS and teachers report feeling more pressure and job stress as a result of ProComp. For the most part, teachers do not report changing the content of what they teach or the way they teach as a result of ProComp. On the other hand, respondents indicate they do focus more on raising student achievement. Means for attitude and instructional practice means generally increase over time.

There are at least two reasons why we might observe this upward trend in attitudes and reported changes in teachers' instructional practices. First, teachers may feel more positively about ProComp as they have more experience with it, understand it more, and reap the benefits of the program vis-à-vis earning financial incentives. These improved attitudes may inspire teachers to change their instructional practices as well. Second, the composition of teachers who work in DPS may change over time. That is, teachers who oppose ProComp may leave the district to pursue employment in another district or private school or may retire. New teachers who enter the district to fill these vacancies presumably hold favorable attitudes about ProComp and alternative teacher compensation more generally. That is, the upward trend in attitudes and instructional practices may suggest the existence of a selection effect in DPS. Given that we do not limit our sample to just teachers who responded to the survey in all three years (i.e., a purely longitudinal sample), selection effects are the most plausible explanation for these increases.

Teachers respond most positively to items about the alignment of ProComp with the goals of the district and their goals as an educator, and the ability of ProComp to motivate changes in teachers' instructional practices. Importantly, this suggests teachers may buy into the possibility that ProComp can motivate teachers to change their instructional practices which may

yield increased student test-score achievement (i.e., a motivation effect). However, teachers do not actually report changing their instructional practices. According to the survey data, the potential for ProComp to change teachers' instructional practices appears mostly unrealized in Denver.

Furthermore, teachers are generally neutral about whether ProComp will ultimately help DPS attract and retain qualified teachers. Teachers do not appear to buy into the possibility that ProComp will alter the composition of the overall teacher workforce in DPS through recruitment and retention. Teachers also report neutral beliefs about the extent to which ProComp will improve teacher collaboration in DPS and whether ProComp is fair. Given research that suggests perceived fairness is necessary for teacher buy in to alternative compensation programs (Heneman & Milanowski, 1999; Milanowski, 2000; Kelley & Finnegan, 2003), both motivation and selection effects of ProComp may be limited.

To provide a sense for the degree to which teachers consider ProComp when making their career decisions, frequency distributions on relevant survey items are presented in Table 3. Table 3. *Descriptive statistics for ProComp teachers' career decisions*.

	2007-08	2008-09	2009-10
	Frequency (%)	Frequency (%)	Frequency (%)
	N=1574	N=1823	N=2301
What influence did ProComp have on your decision to join DPS?			
No influence.	380 (58.2%)	465 (60.2%)	686 (62.5%)
Little influence; I made my decision for other reasons.	131 (20.1%)	182 (23.5%)	241 (21.9%)
Negative influence, but I decided to join DPS anyway.	95 (14.5%)	57 (7.4%)	51 (4.6%)
Positive influence. ProComp is one of the reasons I decided to join DPS.	31 (4.7%)	59 (7.6%)	103 (9.4%)
If you had a choice, would you have opted into ProComp?			
Yes	327 (50.1%)	494 (64.7%)	760 (70.0%)
No	326 (49.9%)	269 (35.3%)	325 (30.0%)
What are your current plans for the next school year?			
To continue teaching in this school.	-	1386 (83.8%)	1917 (85.0%)
Applying for or have accepted another teaching position in DPS.	-	112 (6.8%)	127 (5.6%)
Applying for or have accepted an administrative position in DPS.	-	30 (1.8%)	20 (0.9%)
Applying for or have accepted a position in another school district.	-	15 (0.9%)	36 (1.6%)
I plan to retire.	-	69 (4.2%)	15 (0.7%)
I do not plan to teach next year.	-	0	20 (0.9%)
Unsure at this time.	-	0	58 (2.6%)
Other, please specify.	-	0	63 (2.8%)

Most respondents indicate that ProComp had little-to-no influence on their decision to join DPS. Of course, these survey data are from teachers who chose to work in DPS after ProComp had been implemented for at least two years. Importantly, survey respondents had already selected into the district regardless of, because of, or unaware of ProComp. Teachers who were adamantly against ProComp are not likely to choose to work for DPS and thus are not in our sample. Nevertheless, most respondents who were required to join ProComp indicate they would have joined voluntarily, if given the choice. The percent of respondents who indicated they would have voluntarily joined ProComp rose quickly over the three years of study, from roughly 50 percent to 70 percent. As only newly hired teachers responded to this survey item, the rapid increase in affirmative responses is again suggestive of a selection effect: each year, newly hired teachers in DPS have more favorable attitudes about ProComp. As suggested by the descriptive statistics presented in Table 2, a large majority of teachers indicate they plan to remain teaching in the same school the next school year.

Descriptive Analyses using Mean Composite Index Scores

Teachers' responses to both attitude and instructional practice items are strongly correlated (see Appendix B for item correlations). Prompted by these strong correlations, we perform exploratory factor analysis. Using principal components extraction, we create two standard normal composite scores: ATTITUDE and INSTRUCTIONAL PRACTICES (see Appendix C and Appendix D for details). Attitude items and instructional practice items each loaded strongly onto a single factor that explains the majority of the variation in responses to these two item strands (roughly 70 percent and 80 percent, respectively). This suggests the nature of respondents' attitudes about the efficacy and appropriateness of ProComp is mostly consistent across a variety of items. That is, respondents with positive views of ProComp tend to respond

positively across all attitude items while respondents with negative views of ProComp generally tend to respond negatively across all attitude items. Additionally, respondents who are amendable to changing their instructional behaviors are likely to report doing so in multiple ways.

Composite scores also allow us to readily determine the extent to which teachers' attitudes about ProComp are associated with reported changes in their instructional practices. Correlations of attitudes and instructional practices indices are nearly identical across years and strongly correlated, for social science research: r = 0.470 in 2007-08; r = 0.472 in 2008-09; and r = 0.473 across both years. Generally, the more positive their attitudes, the more likely respondents are to report changes in their instructional practices.

When we compare mean attitudes between teachers who stayed at the same school and those who departed, we see generally see more positive attitudes among teachers who stayed: 0.266 vs. 0.153 in 2007-08; 0.163 vs. 0.084 in 2008-09; and 0.024 vs. 0.076 in 2009-10. It is interesting to note this pattern is reversed in 2009-10, with teachers who depart reporting slightly more favorable attitudes than those who stayed, although this difference is not statistically significant.

Inferential Analyses using Mean Composite Index Scores

We begin our inferential analyses of the relationship between teachers' attitudes and behaviors by focusing on teachers' reported changes to their instructional practices. The estimated coefficients from three specifications of the competing OLS regression model of instructional practices are presented in Table 4 separately for: 1) all ProComp teachers; 2) elementary ProComp teachers; and 3) secondary ProComp teachers.

The first specification (Model A) includes only the main effects for attitudes. The second model (Model B) also includes prior math test-score achievement and previously earned financial incentives. In the third specification (Model C), we add teacher and school characteristics that may impact teacher behavior in order to more accurately estimate the effect of attitudes on instructional practices.

Table 4. Coefficient estimates from models of teachers' 2009 reported changes in

	<u>All P</u>	roComp Tea	<u>chers</u>	<u>Elementa</u>	Elementary ProComp Teachers		Secondar	Secondary ProComp Teac	
	Model A	Model B	Model C	Model A	Model B	Model C	Model A	Model B	Model C
Attitude score	0.516***	0.518***	0.524***	0.522***	0.551***	0.556***	0.457***	0.462***	0.352***
	(0.024)	(0.048)	(0.076)	(0.033)	(0.062)	(0.077)	(0.040)	(0.082)	(0.101)
Prior math		0.030	0.237		-0.033	-0.033		0.189	0.343
		(0.163)	(0.324)		(0.195)	(0.233)		(0.318)	(0.339)
Prior bonus		-0.058*	-0.052		-0.071	-0.071		-0.038	-0.097
		(0.031)	(0.049)		(0.040)	(0.051)		(0.050)	(0.060)
Female			0.132			0.188			-0.488*
			(0.184)			(0.194)			(0.193)
Minority			0.417*			0.400*			-0.103
			(0.188)			(0.184)			(0.290)
Years exp.			-0.012			-0.012			-0.028*
			(0.010)			(0.010)			(0.013)
Master's degree			0.016			0.104			-0.169
			(0.150)			(0.153)			(0.201)
HTS			-0.088			-0.097			0.027
			(0.194)			(0.193)			(0.283)
FRL			0.001			0.002			0.003
			(0.004)			(0.003)			(0.006)
R-squared	0.225	0.276	0.314	0.226	0.304	0.346	0.190	0.226	0.364

instructional practices.

* p < 0.05; ** p < 0.01; *** p < 0.001

On average we find that teachers' attitudes about the efficacy and appropriateness of ProComp are positively related to instructional behaviors. Specifically, estimates from Model C (column 3 of Table 4) suggest for every one unit increase in mean attitude score, teachers' reported changes to their instructional practices increase by roughly half a standard deviation (0.524). This estimated effect is both practically and statistically significant.

In Model C, we also observe a small positive non-significant relationship between prior math test-score achievement and instructional practices: For a one unit change in the percent of students above the 55th percentile for student growth (i.e., moving from 0 to 100 percent), teachers' reported changes to their instructional practices are estimated to increase by roughly a quarter of a standard deviation. This positive coefficient is hypothesized in our logic model (see Figure 1), though the large standard error for this coefficient suggests the effect of prior achievement on instructional practices may not be statistically different from zero.

On the other hand, the coefficient estimate for the number of previously earned financial incentives is slightly negative and non-significant. As with estimates for prior achievement, the large standard error suggests that the effect of the number of previously earned financial incentives may not be statistically different than zero. Despite this, the negative coefficient estimate is surprising as it runs counter to the relationship we hypothesized in our logic model: This suggests that for each additional incentive earned in the previous year, teachers are *less* likely to report changes to their instructional practices. This may be true if earning financial incentives under ProComp is a formal validation of a teacher's knowledge, skills, effectiveness, and effort. Teachers may be less likely to change their instructional practices if they have received validation (and the accompanying financial compensation) from ProComp and the district that their practices are successful.

Teacher and school characteristics generally have small, non-significant impacts on teachers' reported changes in their instructional practices. Teachers who are female, of a racial/ethnic minority, and who hold a Master's degree all report greater changes in their instructional practices, on average. Interestingly, the coefficient estimate for minority is substantial in magnitude (0.417) and statistically significant, suggesting minority teachers may be more amenable to changing their instructional practices to achieve the goals of ProComp. Teachers with more years of teaching experience and who work in HTS schools report fewer

changes in their instructional practices, while the percent of students eligible to receive FRL in the school does not appear to affect teachers' reported changes in their instructional practices.

Separate estimates for elementary teachers and secondary teachers are presented in Table 4, columns 4 - 6 and 7 - 9, respectively. The estimated effect of attitudes on reported changes in teachers' instructional practices is greater for elementary teachers than it is for secondary teachers. Surprisingly, the coefficient for prior math test-score achievement is slightly negative for elementary teachers but positive and larger in magnitude for secondary teachers.⁷ Estimated effects of the number of previously earned financial incentives are small and negative for both elementary and secondary teachers.

Results of linear probability regression models used to estimate the relationship between teachers' attitudes and attrition are presented in Table 5.

	All ProComp Teachers		Elementa	Elementary ProComp Teachers			Secondary ProComp Teachers		
	Model A	Model B	Model C	Model A	Model B	Model C	Model A	Model B	Model C
Attitude	-0.015	-0.061**	-0.071**	0.004	-0.064*	-0.078*	-0.036	-0.042	-0.056
score	(0.014)	(0.023)	(0.025)	(0.019)	(0.033)	(0.077)	(0.019)	(0.031)	(0.037)
Prior math		0.002	0.070		-0.001	0.047		0.082	0.108
		(0.078)	(0.084)		(0.102)	(0.104)		(0.121)	(0.147)
Prior bonus		-0.060***	-0.069***		-0.040	-0.043		-0.077***	-0.101***
		(0.015)	(0.016)		(0.022)	(0.023)		(0.019)	(0.022)
Female			0.005			0.050			-0.048
			(0.053)			(0.087)			(0.071)
Minority			-0.048			-0.053			-0.087
			(0.064)			(0.082)			(0.107)
Years exp.			-0.009**			-0.004			-0.015**
			(0.003)			(0.004)			(0.005)
Master's			0.063			0.022			0.127
degree			(0.050)			(0.068)			(0.074)
HTS			0.188**			0.258**			0.087
			(0.066)			(0.086)			(0.105)
FRL			0.000			-0.001			0.000
			(0.001)			(0.002)			(0.002)
R-squared	0.001	0.101	0.183	0.000	0.056	0.156	0.008	0.181	0.340

Table 5. Coefficient estimates from models of teachers' 2009 attrition.

* p < 0.05; ** p < 0.01; *** p < 0.001

⁷ It is not immediately clear why, though we suspect these effects may be related to the differences in subject-area specialization for secondary teachers. There is something qualitatively different about an elementary teacher who teaches a math lesson – along with lessons in other subjects – and a secondary teacher who only teaches math courses. These qualitative differences may affect the extent to which teachers' attitudes relate to reported changes in their instructional practices.

Teachers' attitudes about ProComp appear to have a much weaker effect on attrition than on reported changes in teachers' instructional practices. Specifically, Model C (column 3 of Table 5) suggests that for every one unit increase in mean attitude score, attrition decreases by roughly 0.07 of a standard deviation. While this estimated effect is statistically significant, the magnitude of the effect is so small that it is not practically meaningful.

As before, we observe positive coefficients for prior math test-score achievement and negative coefficients for the number of previously earned financial incentives. These estimates are practically quite small, though the latter is statistically significant. In fact, even when we include teacher and school characteristics in the model, we generally do not observe substantial estimated effects for attrition. The exception is for HTS schools: teachers who work in these schools are roughly 19 percent more likely to leave their school than teachers who work in non-HTS schools.

Estimated effects of the competing linear probability models are similar for both elementary and secondary teachers. However, the effect of the number of previously earned financial incentives is larger and statistically significant for secondary teachers but not elementary teachers. On the other hand, attitudes are a statistically significant predictor of attrition for elementary teachers but not secondary teachers, though the estimated effect is practically negligible. The large positive effect of working in a HTS school seems to be driven by elementary rather than secondary teachers.

Discussion

This study examines teacher attitudes and behavior to determine the extent to which motivation and selection affects are present in DPS after the implementation of ProComp. Results suggest teachers' attitudes about ProComp are generally neutral, though they are

becoming more favorable over time. Teachers agree that ProComp can motivate participants to improve their instructional practices though generally do not report actually changing their own instructional practices as a result of ProComp. Teachers' attitudes about ProComp appear to have a positive relationship with teachers' reported changes in their instructional practices: teachers who report more favorable attitudes are also more likely to indicate they have amended their instructional practices to adhere to the goals of ProComp.

ProComp appears to have a negligible effect on teachers' career decisions. A majority of newly hired teachers indicate ProComp was not a factor in their decision to work in DPS, despite indicating they would have joined the program voluntarily if given the choice. Most teachers plan to remain teaching at their same school the following school year. For those that do not, attitudes about ProComp are a weak predictor of their departures. In general, models of teacher attrition tested herein did not account for much of the variation in teacher attrition, suggesting there are many important factors that were omitted from our model specifications (e.g., the economic recession, time trends, leader, peer, and student effects, etc.). In addition to controlling for some of the factors omitted in analyses we present here, our future research will also explore results from alternate models of attrition that employ discrete-time hazard analysis.

The relationship between teachers' attitudes and behaviors may be mediated by prior student test-score achievement gains and the number of previously earned financial incentives, though not necessarily in the ways we hypothesized. While prior test-score achievement gains appear to have a positive (but not statistically significant) relationship with teachers' reported changes to their instructional practices and attrition, the estimated effect of previously earned financial incentives is negative (and not a statistically significant predictor of changes to teachers' instructional practices). That is, teachers who had greater demonstrated math test-score

achievement gains were more likely to report changes to their instructional practices as a result of ProComp and also more likely to leave, possibly to pursue employment outside of the teaching profession (Ingersoll & Perda, 2009). On the other hand, teachers who earned more financial incentives in the previous year were less likely to leave, though there does not appear to be a significant difference in reported changes to their instructional practices. This suggests teachers who have received incentives for demonstrated tasks, skills, and outcomes may take the "if it ain't broke, don't fix it" approach to their instructional practices. These results also suggest there may be small, significant effects of ProComp on teacher retention.⁸

Results presented here do not suggest ProComp has yielded motivation effects in DPS. However, the composition of the teacher workforce does appear to be shifting, suggestive of a selection effect, despite the fact that teachers do not indicate ProComp has an effect on their career decisions. Such selection effects appear to be the most plausible way in which alternative teacher compensation programs may yield improved teacher effectiveness and increased student test-score achievement. Given that selection effects likely take longer to appear than motivation effects after the implementation of an alternative teacher compensation plan, this may explain – in part⁹ – why researchers have yet to find effects associated with these programs (Fulbeck, 2011; Glazerman & Seifullah, 2010; Marsh et al., 2011; Springer et al., 2009a; Springer et al., 2010). Finally, this study contributes to the empirical literature by examining the way in which attitudes, prior student test-score achievement gains, and previously earned financial incentives influence teacher behavior with regard to motivation and selection

⁸ While suggestive, these results are purely descriptive. To determine the extent to which ProComp affects teacher retention, additional analyses are needed that employ a control group to estimate the effect. The lead author of this paper is currently working on just such a study.

⁹ Increasingly, there is also evidence that teachers view financial incentives as a *reward* for previously demonstrated tasks, skills, and outcomes rather than an *incentive* to change (again, assuming teachers know how to change to improve student learning and increase student test-score achievement) (Fulbeck, 2011; Marsh et al., 2011).

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	High Growth School	Teachers in schools designated as a "High Growth School" on the DPS School Performance Framework.	Paid based on performance during the prior school year.	Non-Base Building	6.4%	\$2,403.26	Yes	Paid lump sum in the year following assessment
Growth	Top Performing Schools	Teachers in schools designated as a "Top Performing School" based on Performance Framework.	Paid based on performance during the prior school year.	Non-Base Building	6.4%	\$2,403.26	Yes	Paid lump sum in the year following assessment
Student	Exceeds CSAP Expectations	Teachers whose assigned students growth in CSAP scores exceed district expectations.	Paid based on assigned student CSAP growth percentiles. Paid based on results from pror school year.	Non-Base Building	6.4%	\$2,403.26	Yes	Paid lump sum in the year following assessment
	Student Growth Objectives	Incentive paid for meeting student growth objectives.	Base building when 2 SGOs are met, non base-building when only 1 SGO is met during prior school year ⁴	Base Building ⁴	1%	\$376.00	Yes	1 objective: Paid lump sum. 2 objectives: Paid in monthly installments
centives	Hard to Staff Assignment	Designed to attract leadners to roles with high vaccancy rise and high turnover.	Teachers Currently serving in designated "Hard-Lo-Staff" positions.	Non-Base Building	6.4%	\$2403 (\$200.27 per mo) x (# of assignments held)	Yes	Monthly installment upon completion of service each month
Market In	Hard to Serve School	Designed to attract teachers to schots with a high free and reduced lunch percentage.	Teachers currently serving in schools designated 'Hard-lo-Serve'.	Non-Base Building	6.4%	\$2,403 \$200.27/mo	Yes	Monthly installment upon completion of service each month
sional Evaluation	Non-Probationary	Increases based on a satisfactory evaluation.	Payable only to Payable only to formal evaluation during servicedit years 1-14.	Base Building	3% every three years	\$1,127	Yes	Prorated over 12 months. If unsatisfactory delayed at least 1 yr
Comprehensive Profe	Probationary	Increases for new teachers based on a satisfactory evaluation.	Requires Satisfactory Evaluation: if unsatisfactory, ineligible for CPE increase.	Base Building	1% every year	\$376	Yes	Prorated over 12 months. If unsatisfactory delayed at least 1 yr
	Tuition and Student Loan Reimbursement	Reimbursement for fution or for outstanding student loans.	Paid upon receipt of evidence of payment for and satisfactory completion of coursework: \$4,000 lifetime account: no more than \$1,000 per tyear.	Non-Base Building	NIA	Actual expense up to \$1000lyr, \$4000 lifetime	No ³	Up to \$1000 per year upon submission of proper documents
wledge and Skills	Advanced Degree and License	Compensation for Controlate Degree or Advanced Licenses or Certificates.	Paid upon receipt of documentation that the license or certifications active and current.	Base Building	9% per degree or license. Eligible once every 3 yrs	\$3,380	Yes	Monthly installments upon submission of proper documents
Kno	Professional Development Unit	Providing ongoing professional development – lead to the needs of our students – is a central strategy to help you expand your solits, improve student performance, and advance your career with the district.	Base building for 1st PDU earmed in 14 or fewer years of service. 2nd PDU earmed is barked and paid based on years of service at payout. (14 or liess is base building, >14 is non-base building) ¹	Base Building ²	2%	\$751	Yes	Monthly installments upon submission of proper documents
Component of Index \$37,551	Element	Description of Element	Eligibility and Payout	Affect on Base Salary	Percent of Index	Dollar Amount	Builds pension and highest average salary	Payment Type and Frequency

Appendix A: ProComp Financial Incentives (2008-Present)

Appendix B: Composite Scores for Attitude and Instructional Practices

To create composite scores for attitude and instructional practice items, we employed a principal component extraction analysis (non-rotated) separately for all three years separately. Analyses suggest there is great consistency across years. The variance explained is similar (71.0%, 69.0%, and 68.6% respectively). The item, "ProComp can ultimately improve student achievement" loads most strongly on the attitude factor each year; the item, "ProComp is fair" consistently has weakest correlation to the extracted component, but it is still strongly related overall. Table B-1 presents correlations of attitude items from the 2008 survey. Table B-1. *Correlations of 2008 attitude items*.

				Correlations					
		Question 10:							
		ProComp can		Question 10:				Question 10: I	
		motivate	Question 10:	ProComp will	Question 10:	Question 10:	Question 10:	feel more	
		participants to	ProComp can	help DPS attract	ProComp will	ProComp is	ProComp is	pressure and	
		improve	ultimately	and retain	improve teacher	aligned with the	aligned with my	job stress as a	Question 10:
		teaching	improve student	qualified	collaboration at	goals of our	goals as an	result of	ProComp is a
		practices.	achievement.	teachers.	DPS.	school district.	educator.	ProComp.	fair program.
Question 10: ProComp can	Pearson Correlation	1	.805	.682**	.685	.598	.667	096	.614
motivate participants to	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
improve teaching practices.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp can	Pearson Correlation	.805	1	.705	.712	.614	.703	125	.648
ultimately improve student	Sig. (2-tailed)	.000	ļ	.000	.000	.000	.000	.000	.000
achievement.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp will	Pearson Correlation	.682**	.705	1	.708	.590**	.648**	178	.680**
help DPS attract and retain	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
qualified teachers.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp will	Pearson Correlation	.685	.712	.708	1	.613	.653	118	.636
improve teacher	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
collaboration at DPS.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp is	Pearson Correlation	.598	.614	.590	.613	1	.700	105	.574
aligned with the goals of our	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
school district.	N	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp is	Pearson Correlation	.667**	.703	.648**	.653	.700	1	149	.656
aligned with my goals as an	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
educator.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: I feel more	Pearson Correlation	096**	125	178	118	105	149	1	198
pressure and job stress as a	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
result of ProComp.	Ν	2605	2605	2605	2605	2605	2605	2605	2605
Question 10: ProComp is a	Pearson Correlation	.614	.648	.680**	.636	.574	.656	198	1
fair program.	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	Ν	2605	2605	2605	2605	2605	2605	2605	2605

**. Correlation is significant at the 0.01 level (2-tailed).

All items significantly are correlated to all other items and have correlations above .500 except for the item "I feel more pressure and job stress as a result of ProComp." Ultimately, we decided

to exclude this item from the attitude factor. Although correlations are significant, they are considerably smaller than those for other attitude items and thus, this item may not meaningfully impact the attitude factor.

Table B-2 presents correlations of instructional practice items from the 2008 survey.Table B-2. Correlations of 2008 instructional practice items.

			Question 5: Change the way	Question 5: Focus my
		Question 5:	I teach (e.g. by	teaching more
		Change the	using different	on raising
		content of what	teaching	student
		I teach	methods)	achievement
Question 5: Change the	Pearson Correlation	1	.799**	.644**
content of what I teach	Sig. (2-tailed)		.000	.000
	Ν	625	625	625
Question 5: Change the way	Pearson Correlation	.799**	1	.738**
I teach (e.g. by using	Sig. (2-tailed)	.000		.000
different teaching methods)	Ν	625	694	694
Question 5: Focus my	Pearson Correlation	.644**	.738**	1
teaching more on raising	Sig. (2-tailed)	.000	.000	
student achievement	Ν	625	694	694

**. Correlation is significant at the 0.01 level (2-tailed).

As with attitude items, we generated correlation matrices of instructional practice items for 2008 and 2009, finding them to be very similar. All instructional practice items are strongly correlated with one another. Again, analyses suggest there is great consistency across years. The variance explained is similar (80.6 and 81.3% respectively). The item, "ProComp has led me to change the way I teach" loads most strongly on the instructional practice factor each year; the item, "ProComp has led me to focus my teaching more on raising student achievement" consistently has weakest correlation to the extracted component, but it is still strongly related overall.

Appendix C: Principal Components Analysis, Attitude Items

Table C-1.

	Mean	SD	Ν
ProComp can motivate participants to improve teaching practices.	2.94	1.133	2605
ProComp can ultimately improve student achievement.	2.74	1.127	2605
ProComp will help DPS attract and retain qualified teachers.	2.62	1.174	2605
ProComp will improve teacher collaboration at DPS.	2.59	1.113	2605
ProComp is aligned with the goals of our school district.	3.21	1.003	2605
ProComp is aligned with my goals as an educator.	3.02	1.177	2605
ProComp is a fair program.	2.73	1.142	2605

Table C-2.

2008	Commun	alities

	Initial	Extraction
ProComp can motivate participants to improve teaching practices.	1.000	.737
ProComp can ultimately improve student achievement.	1.000	.779
ProComp will help DPS attract and retain qualified teachers.	1.000	.724
ProComp will improve teacher collaboration at DPS.	1.000	.722
ProComp is aligned with the goals of our school district.	1.000	.625
ProComp is aligned with my goals as an educator.	1.000	.726
ProComp is a fair program.	1.000	.661

Table C-3.

2008 Total Variance Explained

Component	Initial Eigenvalues Extraction Sums of Squared Loa			ed Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.974	71.054	71.054	4.974	71.054	71.054
2	.500	7.141	78.194			
3	.434	6.199	84.394			
4	.349	4.983	89.377			
5	.283	4.047	93.424			
6	.270	3.858	97.282			
7	.190	2.718	100.000			





Table C-4. 2008 Component Matrix

	Component
	1
ProComp can motivate participants to improve teaching practices.	.859
ProComp can ultimately improve student achievement.	.883
ProComp will help DPS attract and retain qualified teachers.	.851
ProComp will improve teacher collaboration at DPS.	.850
ProComp is aligned with the goals of our school district.	.790
ProComp is aligned with my goals as an educator.	.852
ProComp is a fair program.	.813

Table C-5. 2009 Descriptive Statistics

	Mean	SD	Ν
ProComp can motivate participants to improve teaching practices.	3.23	1.078	2297
ProComp can ultimately improve student achievement.	3.00	1.112	2297
ProComp will help DPS attract and retain qualified teachers.	2.89	1.173	2297
ProComp will improve teacher collaboration at DPS.	2.82	1.110	2297
ProComp is aligned with the goals of our school district.	3.40	.939	2297
ProComp is aligned with my goals as an educator.	3.23	1.130	2297
ProComp is a fair program.	2.89	1.142	2297

Table C-6. 2009 Communalities

2007 Communications		
	Initial	Extraction
ProComp can motivate participants to improve teaching practices.	1.000	.713
ProComp can ultimately improve student achievement.	1.000	.743
ProComp will help DPS attract and retain qualified teachers.	1.000	.703
ProComp will improve teacher collaboration at DPS.	1.000	.718
ProComp is aligned with the goals of our school district.	1.000	.641
ProComp is aligned with my goals as an educator.	1.000	.707
ProComp is a fair program.	1.000	.609

Extraction Method: Principal Component Analysis.

Table C-7.2009 Total Variance Explained

Component]	Initial Eigenvalu	es	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.835	69.068	69.068	4.835	69.068	69.068
2	.518	7.396	76.463			
3	.501	7.159	83.623			
4	.373	5.323	88.946			
5	.304	4.346	93.292			
6	.274	3.919	97.211			
7	.195	2.789	100.000			

Figure C-2. 2009 Scree Plot



Table C-8. 2009 Component Matrix

	Component
	1
ProComp can motivate participants to improve teaching practices.	.845
ProComp can ultimately improve student achievement.	.862
ProComp will help DPS attract and retain qualified teachers.	.838
ProComp will improve teacher collaboration at DPS.	.848
ProComp is aligned with the goals of our school district.	.801
ProComp is aligned with my goals as an educator.	.841
ProComp is a fair program.	.780

Table C-9. 2010 Descriptive Statistics

	Mean	SD	Ν
ProComp can motivate participants to improve teaching practices.	2.91	6.561	2984
ProComp can ultimately improve student achievement.	2.63	6.548	2984
ProComp will help DPS attract and retain qualified teachers.	2.42	7.985	2984
ProComp will improve teacher collaboration at DPS.	2.30	7.744	2984
ProComp is aligned with the goals of our school district.	2.74	8.408	2984
ProComp is aligned with my goals as an educator.	2.58	8.419	2984
ProComp is a fair program.	2.33	8.188	2984

Table C-10. 2010 Communalities

2010 Community		
	Initial	Extraction
ProComp can motivate participants to improve teaching practices.	1.000	.834
ProComp can ultimately improve student achievement.	1.000	.813
ProComp will help DPS attract and retain qualified teachers.	1.000	.742
ProComp will improve teacher collaboration at DPS.	1.000	.774
ProComp is aligned with the goals of our school district.	1.000	.687
ProComp is aligned with my goals as an educator.	1.000	.578
ProComp is a fair program.	1.000	.372

Extraction Method: Principal Component Analysis.

Table C-11.

2010 Total Variance Explained

Component	Initial Eigenvalues			Extractio	n Sums of Squar	ed Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.800	68.576	68.576	4.800	68.576	68.576
2	.692	9.882	78.458			
3	.489	6.984	85.442			
4	.335	4.788	90.230			
5	.277	3.958	94.188			
6	.243	3.473	97.661			
7	.164	2.339	100.000			

Figure C-3. 2010 Scree Plot



Table C-12. 2010 Component Matrix

	Component
	1
ProComp can motivate participants to improve teaching practices.	.913
ProComp can ultimately improve student achievement.	.902
ProComp will help DPS attract and retain qualified teachers.	.861
ProComp will improve teacher collaboration at DPS.	.880
ProComp is aligned with the goals of our school district.	.829
ProComp is aligned with my goals as an educator.	.760
ProComp is a fair program.	.610

Appendix D: Principal Components Analysis - Behavior Questions

Table D-1. 2008 Descriptive Statistics

	Mean	SD	Ν
Question 5: Change the content of what I teach	2.55	1.388	625
Question 5: Change the way I teach	2.76	1.353	625
Question 5: Focus my teaching more on raising student achievement	3.08	1.370	625

Table D-2. 2008 Communalities

	Initial	Extraction
Question 5: Change the content of what I teach	1.000	.786
Question 5: Change the way I teach	1.000	.881
Question 5: Focus my teaching more on raising student achievement	1.000	.751

Table D-3. 2008 Total Variance Explained

Component	Initial Eigenvalues			Extractio	n Sums of Squar	ed Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.418	80.600	80.600	2.418	80.600	80.600
2	.397	13.321	93.832			
3	.185	6.168	100.000			

Figure D-1. 2008 Scree Plot



Table D-4. 2008 Component Matrix

	Component	
	1	
Question 5: Change the content of what I teach	.887	
Question 5: Change the way I teach	.938	
Question 5: Focus my teaching more on raising student achievement	.867	

Table D-5. 2009 Descriptive Statistics

	Mean	SD	Ν
Question 2: Change the content of what I teach	2.64	1.368	1879
Question 2: Change the way I teach	2.89	1.355	1879
Question 2: Focus my teaching more on raising student achievement	3.21	1.366	1879

Table D-6. 2009 Communalities

	Initial	Extraction
Question 2: Change the content of what I teach	1.000	.797
Question 2: Change the way I teach	1.000	.881
Question 2: Focus my teaching more on raising student achievement	1.000	.760

Table D-7. Total Variance Explained

Component	Initial Eigenvalues			Initial Eigenvalues Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.438	81.256	81.256	2.438	81.256	81.256
2	.378	12.614	93.871			
3	.184	6.129	100.000			

Extraction Method: Principal Component Analysis.

Figure D-2. 2009 Scree Plot



Table D-8. 2009 Component Matrix^a

	Component	
	1	
Question 2: Change the content of what I teach	.893	
Question 2: Change the way I teach	.938	
Question 2: Focus my teaching more on raising student achievement	.872	

Attitudinal Questions	2010	2009	2008
Pro Comp can motivate participants to improve instructional practices.	gen07	gen07	gen06
ProComp can ultimately improve student achievement.	gen08	gen08	gen07
Dro Composite halo DDS attract and rotain qualified too shore	~~~00	~~~00	~~~0 ⁰
ProComp is aligned with the goals of our school district	gen09	gen09	genuo
ProComp is aligned with my goals as an educator	gen11	gen11	gen10
ProComp is a fair program	gen12	gen12	gen11
Financial incentives in DroComp will lead to improved instructional practice	gen14	gen14	gen13
Financial incentives in ProComp will lead to improved instructional practice.	gen16	gen16	n/a
Procomp provides me with a more focused way to think about my work.	gen17	gen17	n/a
ProComp will improve teacher collaboration in DPS.	gen10	gen10	gen09
I feel more pressure and job stress as a result of ProComp.	gen13	gen13	gen12
ProComp helps to create a positive work environment.	gen15	gen15	n/a
Behavior Questions	2010	2009	2008
Question 2: Change the content of what I teach	n/a	gen01	gen01
Question 2: Change the way I teach (e.g. by using different teaching methods)	n/a	gen02	gen02
Question 2: Focus my teaching more on raising student achievement	n/a	gen03	gen03
Career Decision/Recruitment Question	2010	2009	2008
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS?	2010 dem03	2009 dem03	2008 dem03
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of	2010 dem03	2009 dem03	2008 dem03
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired?	2010 dem03 comp20	2009 dem03 n/a	2008 dem03 n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp	2010 dem03 comp20	2009 dem03 n/a	2008 dem03 n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS?	2010 dem03 comp20 dem04	2009 dem03 n/a dem04	2008 dem03 n/a dem04
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Batantian Questions	2010 dem03 comp20 dem04	2009 dem03 n/a dem04	2008 dem03 n/a dem04
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions	2010 dem03 comp20 dem04 2010	2009 dem03 n/a dem04 2009	2008 dem03 n/a dem04 2008
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year?	2010 dem03 comp20 dem04 2010 sat01	2009 dem03 n/a dem04 2009 sat01	2008 dem03 n/a dem04 2008 n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: Utile the stackert memory better	2010 dem03 comp20 dem04 2010 sat01	2009 dem03 n/a dem04 2009 sat01	2008 dem03 n/a dem04 2008 n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population.	2010 dem03 comp20 dem04 2010 sat01 sat02	2009 dem03 n/a dem04 2009 sat01 sat02	2008 dem03 n/a dem04 2008 n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues.	2010 dem03 comp20 dem04 2010 sat01 sat02 sat03	2009 dem03 n/a dem04 2009 sat01 sat02 sat03*	2008 dem03 n/a dem04 2008 n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay.	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat04	2009 dem03 n/a dem04 2009 sat01 sat02 sat02 sat03* n/a	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay. My salary will increase substantially under the master salary schedule.	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat04 sat04 sat05	2009 dem03 n/a dem04 2009 sat01 sat02 sat03* n/a n/a	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay. My salary will increase substantially under the master salary schedule. I have the potential to earn significant incentives under ProComp	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat04 sat05 sat06	2009 dem03 n/a dem04 2009 sat01 sat01 sat02 sat03* n/a n/a n/a	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a n/a n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay. My salary will increase substantially under the master salary schedule. I have the potential to earn significant incentives under ProComp I feel effective.	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat03 sat04 sat05 sat06 sat07	2009 dem03 n/a dem04 2009 sat01 sat02 sat03* n/a n/a n/a n/a sat07	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay. My salary will increase substantially under the master salary schedule. I have the potential to earn significant incentives under ProComp I feel effective. I have a good relationship with my principal/supervisor.	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat04 sat05 sat06 sat07 sat08	2009 dem03 n/a dem04 2009 sat01 sat01 sat02 sat03* n/a n/a n/a sat07 sat07 sat08*	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a
Career Decision/Recruitment Question What influence did ProComp have on your decision to join DPS? Which of the following statements best describes your understanding of ProComp when you were hired? Had you been given a choice would you have been likely to opt into ProComp upon joining DPS? Retention Questions What are your current plans for the next school year? IF STAYING: I like the student population. I enjoy working with my colleagues. The DPS/PERA retirement program makes it beneficial for me to stay. My salary will increase substantially under the master salary schedule. I have the potential to earn significant incentives under ProComp I feel effective. I have a good relationship with my principal/supervisor. I enjoy working in DPS.	2010 dem03 comp20 dem04 2010 sat01 sat01 sat02 sat03 sat04 sat03 sat04 sat05 sat06 sat07 sat08 sat09	2009 dem03 n/a dem04 2009 sat01 sat02 sat03* n/a n/a n/a n/a sat07 sat08* sat09*	2008 dem03 n/a dem04 2008 n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a

Appendix E: Items by construct & year

I like the master salary schedule	n/a	sat05	n/a
I like ProComp	n/a	sat05	n/a
IF LEAVING:			
Dissatisfaction with the student population	sat11	sat11	n/a
Dissatisfaction with my colleagues	sat12	sat12	n/a
I'm unlikely to earn significant incentives under ProComp.	sat19	n/a	n/a
I don't feel sufficiently effective	sat14	sat14	n/a
Dissatisfaction with my principal/supervisor	sat15	sat15	n/a
Dissatisfaction with working in DPS	sat16	sat16	n/a
My contract for next year was not renewed	sat17	n/a	n/a
I do not like ProComp	n/a	sat13	n/a