Improving Teaching Quality in Secondary Schools through Professional Development: Evidence from Two RCT's of The My Teaching Partner Program

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Abstract

In the context of education reform, there is an extreme lack of rigorously evaluated teacher-development programs that can produce reliable gains in student achievement. This paper discusses findings from two randomized control trials of the My Teaching Partner-Secondary (MTP-S) program, which is a web-mediated approach focused on improving the quality of teacher-student interactions in the classroom. MTP-S is based upon a validated observational approach to assessing the quality of classroom interactions, the Classroom Assessment Scoring System-Secondary (CLASS-S). The most unique feature of the intervention is that it employs a year-long personalized, video-based, iterative coaching process that allows the teacher and a consultant to focus intensively on review and analysis of observed teacher-student interactions. Both study 1 and study 2 are randomized controlled trials of the My Teaching Partner–Secondary professional development program. In Study 1 (see Allen, Pianta, Gregory, Mikami, & Lun, 2011), there were 78 secondary school teachers and 2237 students across two years. Teachers participated in the intervention in year 1 only. The program produced significant gains in both student engagement and positive peer interactions in year 1. More interestingly, the program produced substantial gains in measured student achievement in year 2, which were mediated by observationally-coded changes to teacher behavior and student engagement (CLASS-S) in the classroom. In Study 2, there were 97 secondary school teachers and 1360 students. For this study, only one year of data is available. The program produced significant gains in CLASS-S dimensions, in some cases with larger effect sizes than in the first study.

Introduction

Whereas tremendous resources have been invested in improving secondary instruction through teacher certification programs or new course materials for the classroom (e.g., Felner, Favazza, Shim, & Brand, 2001; Whitehurst, 2002), the extent to which students are engaged by the social and behavioral interactions that take place between themselves and their teachers within the classroom has received relatively little attention. This omission has occurred despite the knowledge that student engagement in classroom activities fosters their academic achievement (Fredricks, Blumenfeld, & Paris, 2004). Unfortunately, from adolescents' perspectives, interactions with teachers are frequently unsatisfying, unmotivating, and likely to lead to disengagement from schooling (e.g., Archambault, Janosz, Morizot, & Pagani, 2009; Roeser, Eccles, & Sameroff, 2000). Such interactions can reflect little consideration for adolescents' developmental needs given they provide few opportunities for support, autonomy and competency building (Ryan & Deci, 2000). Despite the need to successfully engage adolescents in classrooms, there is a striking lack of empirically-supported professional development programs targeting classroom engagement at the middle and secondary school level.

My Teaching Partner-Secondary (MTP-S)

This paper reports results of two randomized controlled trials of a manualized, web-mediated coaching program—the My Teaching Partner-Secondary program—focused on improving teacher-student interactions in secondary classrooms so as to enhance student engagement and achievement. The program targets a critical mechanism by which teachers influence achievement – the motivational and instructional qualities of their ongoing, daily interactions with students.

MTP-S is conceptualized using mechanisms by which the structure and nature of teacher-student interactions may be linked to student development (Hamre & Pianta, 2010). Notably, this model is content-independent, and is designed to apply equally well to math-science teachers as to those teaching in the humanities or other disciplines. MTP-S is based upon a validated observational approach to assessing the quality of classroom interactions, the Classroom Assessment Scoring System-Secondary (CLASS-S; Pianta, 2008), which provides a means of assessing, describing, and targeting improvements in teacher-student interactions.

The intervention integrates information-based training delivered through an initial half-day workshop, together with a video library containing numerous specific annotated examples of effective teacher-student interaction. The most unique feature of the intervention, however, is that it then employs a year-long personalized, iterative coaching process that allows the teacher and a consultant to focus intensively on review and analysis of observed teacher-student interactions in each teacher's classroom (Mashburn, 2008). *MTP-S* teacher consultants (master teachers, trained in the CLASS-S system and in the intervention protocol) provide direct, individualized, regular, and systematic feedback to teachers based on CLASS-S assessments and scales via a carefully designed web- and phone-conference assessment and feedback process.

Method

Study 1 Participants and Settings

The 87 participating teachers taught in 12 different schools in Virginia. About 61% of participants taught in middle schools and the remaining 39% of participants taught in high schools. Participants' years of teaching experience ranged widely, with an average of 8 years of experience. The sample was composed of a majority of Caucasian female teachers.

Study 2 Participants and Settings

Teacher participants came from five middle and highs schools in a mid-sized city in the southeastern region of the US. The schools ranged in the percentages of low income students (20-40% qualified for free and reduced priced meals, FRPM).The schools also ranged in African American student enrollment given they comprised 40% to 79% of the student body depending on the school.

In August of 2010, 95 teachers from with the five schools were randomly assigned to the MTP-S intervention versus control condition. Thirteen teachers were not included in the current research given their students did not return consents to obtain their school records. Intervention teachers received a one-day introductory workshop, followed by bi-weekly coaching cycles, all targeting a focal course for each teacher (the lowest academic level regular course they taught for which standardized course-mastery tests were given). The intervention continued for a second year, but the current research presents data collected from the first year only. Control teachers also identified their lowest academic level class from which we gathered data. Otherwise the control teachers were exposed only to business-as-usual in-service training. Teachers collected student consent forms in their focal classroom. Participating students were racial and ethnically diverse (59% African American, 30% White, 8% Hispanic, and 3% Asian).

Procedures and Intervention

Subsequent to Institutional Review Board approval, a project team presented the MTP-S intervention and research to teachers in each school district. Teachers were asked to voluntarily consent for participation.

Participating teachers received a modest monetary compensation for completing surveys and professional development credit for their participation, as issued by their school district.

Parents of students in target classrooms were asked to provide informed consent and students were asked to provide assent if they were willing to voluntarily participate in the study.

As part of the randomization procedure, participating teachers were first grouped by district, school type (i.e., middle/high school), and their classroom subject (i.e., math/science, social studies/English). Teachers within each of the stratified groups were then randomly assigned to the intervention or control group. The control group received "business-as-usual" professional development. Intervention and control teachers did not significantly differ on a range of sociodemographic characteristics (e.g., gender, race, years of teaching experience). Their focal classrooms also did not significantly differ on a range of characteristics (e.g., student baseline achievement level, racial composition, block versus traditional scheduling). Intervention and control teachers were also equivalent in the fall, at the start of the school year, on student behavioral engagement and dimensions of the CLASS-S.

Intervention teachers were oriented to MTP-S coaching through a one-day workshop prior to the start of the first school year of the intervention. The workshop introduced teachers to principles of adolescent motivation and social interaction most relevant to their teaching, gave them a chance to discuss application of these principles to their classrooms, and introduced them to the MTP-S system of coaching.

The control teachers were asked to submit videotapes of six different instructional lessons across the school year. For research coding, intervention teacher tapes were selected so as to be synchronous in time with the submission of control teacher tapes. All teachers followed a standard protocol for taping, such as where to place the camera and the length of time to record (40-60 minutes of instruction).

The intervention teachers were asked to submit videotapes of instructional lessons every two weeks across the school year so that they could engage in a "coaching cycle," with each cycle extending across a two-week period. The intervention teachers mailed videotapes to one of the two coaches, who were both experts in teaching and adolescent development. Receipt of the videotapes initiated an interactive dialogue (based on the video recording) between the teacher and the coach, based on a structured set of five steps: 1) For each coaching cycle, the consultant edits the videotaped instruction into at least two short clips that highlight one or more dimensions of the CLASS-S. The "nice work" clip helps the teachers see how their behaviors in a particular exchange with students elucidate the principles of one of the dimensions of the CLASS-S. The "consider this" clip helps a teacher observe another set of interactions with students, which typically reflects a CLASS-S dimension upon which the teacher needs to improve. 2) The coach sends the clips back to the teacher along with a "nice work" written prompt and a "consider this" written prompt, in which the coach clearly describes the observed teacher behavior in CLASS-S terms, along with how the teacher behavior directly affects student responses. 3) The teacher reviews the clips and responds in writing to the prompts. 4) The teacher and the coach meet via telephone or computer for a conference to discuss the clips, written prompts, and responses. In addition to providing support, the coach also develops an action plan for improvement with the teacher and goals for the next cycle including which dimensions of the CLASS-S to consider in subsequent instruction. 5) The coach summarizes the conference in writing including the action plan, which could include strategies to implement new behaviors reflective of a CLASS-S dimension in their upcoming instruction. An excerpted example of a coach's written conference summary and goals for the next cycle is as follows:

Your first clip demonstrated how you give students the opportunity to play an integral

> role in class activities, which is an important facet of *Regard for Adolescent Perspectives*…Because you have given your students opportunities for leadership and autonomy throughout the year, they are able to take on a high level of responsibility for their own learning. In the next clip, you helped students apply their thinking to a real world situation, which helped them gain a better understanding of chemical reactions that they would see during the lab. We also discussed how clear it is that the students enjoy working with one another…which reflects the *Positive Climate* in the class. Next time, we will work on *Instructional Learning Formats* (using a variety of modalities, strategies, techniques, and materials). Please watch the video exemplars from the MTP-S website on this CLASS-S dimension.

Measures

Teacher and classroom characteristics. Teachers completed a demographic survey at the beginning of the study in which they provided information on their years of teaching experience, their age, gender, and race/ethnicity. They also reported on a range of classroom characteristics including total number of students enrolled (i.e., class size), as well as the gender and racial/ethnic student composition of the classroom. In addition, school records were obtained for consented students. Records showed each student's eligibility for free and reduced priced meals) and each student's score on the prior year's Standard of Learning (SOL) end-of-course exam in a subject similar to the MTP-S focal course. The SOL exams have been shown to have good test-retest reliability and concurrent validity with other accepted achievement tests (Hambleton, Crocker, Cruse, Dodd, Plake, & Poggio, 2000). The students' SOL scores were aggregated in each classroom to provide an indicator of baseline achievement level at the start of the semester.

Observed teacher behavior and student engagement. A team of advanced undergraduate and graduate student coders (kept unaware of intervention or control condition) were trained in a two day workshop on the CLASS-S system. Coders learned to rate CLASS-S dimensions along a 1-7 scale, with a 1 or 2 indicating low quality; 3, 4, or 5 indicating mid-range quality; and 6 or 7 indicating high quality. At the end of the workshop, each coder passed a reliability test, in which

they scored within 1 point of the master coded tapes on 80% of scores, across five video segments. The master coders had extensive knowledge of the CLASS-S instrument. Additionally, team members met regularly during the year to jointly code master tapes in order to prevent drift and increase coding agreement.

For the purposes of this study, analyses used coding of one 40-60 minute videorecording of instruction from the first eight weeks of teachers' fall courses and one from the last weeks of their instruction in the spring. Each teacher's videotaped instruction was divided into two 20-minute segments. Each segment was assigned randomly to two coders (2 segments X 2 coders per segment = 4 sets of CLASS-S scores). For the fall and spring, their four scores were then averaged to maximize the reliability of observation scores (Raudenbush, Martinez, Bloom, Zhu, & Lin, 2008).

A recent validity study using the same sample showed five dimensions of the CLASS-S were predictive of higher student achievement test scores at the end of the year, explaining 4 to 8% of the residual variance in these scores after accounting for the substantial effects of prior-year scores and relevant student and classroom characteristics (Allen et al., 2010). Given the validity results, we used only the five validated teacher behavior dimensions from the CLASS-S in the analyses. The dimensions used in these analyses include a) three dimensions of the Emotional Support domain—*Positive Climate* (respectful/warm communications, shared positive affect), *Teacher Sensitivity* (teacher responsiveness to student needs), *Regard for Adolescent Perspective* (opportunities for students' active, leadership roles and exposure to relevant course content), b) one dimension from the Classroom Organizational domain— *Instructional Learning Formats* (varied use of instructional modalities and strategies), and c) one dimension from the

Instructional Support domain— *Analysis and Problem Solving* (engagement in higher order thinking skills and novel application of knowledge; see Table 1).

The reliability of the coding was tested using intraclass correlations coefficients (ICCs), which were in the good to excellent range (ranging from .64 to .78), based on Cicchetti and Sparrow's (1981) standards for interpreting ICCs. Other metrics of assessing reliability showed the coding was acceptable. Interrater agreement was acceptable—codes based on the same observations were within 1 point of each other 80.5% of the time.

Data Analytic Plan

Given that teachers were nested within 12 schools, we first calculated the ICCs to ascertain the amount of between-school variance. We found that the average between-school variance across the five CLASS-S dimensions and student behavioral engagement was minimal (M = 3.0%), however, we nevertheless used multilevel models (MLM; classrooms at level 1 nested within schools at level 2) to control for any potential school-level effects on the classroom-level outcomes (Raudenbush & Bryk, 2002). There were no predictors at level 2, and our focus was on the significance of the level 1 predictor (classroom having MTP versus control group status) on the level 1 outcome (classroom average of observed student engagement). Given there were two coaches in MTP-S, we tested whether teachers' intervention effects depended on which coach they were assigned. The effects did not depend on the assigned coach.

We undertook "intent-to-treat" analyses, which prioritize the randomization process and ignore non-adherence–a degree of which is to be expected in all intervention studies (Hollis & Campbell, 1999). In other words, we compared all teachers randomly assigned to each condition, without excluding those who did not meet expected levels of participation. This analytic approach incorporates teachers with variable levels of participation in the intervention, as

incomplete or imperfect adherence is likely to occur in "real world" program implementation. Importantly, there were no statistically significant differences found between the intervention and the control group on teacher characteristics, classroom characteristics, or observed interaction dimensions at the start of the school year, when the intervention began. Whereas "intent-to-treat" analyses were the focus of our analyses, we also recognize that the fidelity of implementation varied across teachers. Given this variation, we tested whether number of completed coaching cycles moderated the effects of the intervention on student engagement.

Given the missing data, we used full-information maximum likelihood (FIML) methods through Mplus version 6 software (Muthén & Muthén 2007), which enabled us to conduct analyses with a more complete dataset. Assumptions that missingness was random and not based on characteristics of the teacher were met—we found no statistical differences on the fall ratings of engagement and the CLASS-S dimensions for teachers who did or did not submit video in the spring. This finding suggests that the probability of missing data in the spring was not a function of the values of the data in the fall. In addition, for ease of interpretation of the interaction term estimates, all variables in the MLMs were standardized with a mean of zero and a standard deviation of one for all analyses (Aiken & West, 1991). During preliminary analyses and examination of the descriptives, we tested possible moderation of the intervention effect by entering a series of interaction terms into the MLMs (Aiken & West, 1991). In this manner, we tested whether the effects of the intervention depended on teacher or classroom characteristics.

In Study 1 only, for the CLASS-S dimensions with significant intervention effects, we then tested whether they were mediators of the change in engagement. We tested the significance of this indirect path using the MODEL INDIRECT option in Mplus. To estimate the confidence interval of this indirect effect, we used bootstrapping procedures to determine the proper

confidence band around the indirect point estimate (MacKinnon, Fairchild, & Fritz, 2007; Preacher, Zyphur, & Zhang, 2010).

Results

Study 1

Analyses used hierarchical linear models to account for the nesting of students within teachers' classrooms. To assess the main effect of the intervention, we examined differences in end of year student achievement test scores for the intervention vs. the control group, after first accounting for predictions from achievement test scores from the prior year and teacher and student demographic characteristics. Results indicate a non-significant effect of intervention on end of year test scores in the intervention year, but a significant positive effect in the post-intervention year (Figure 1). Students in the MTP-S intervention condition had a significant net gain relative to the control group of .22 standard deviations. This equated to an average increase in student achievement from the 50^{th} to the 59^{th} percentile if moved from the control to intervention condition. Notably, 29% of the students who received failing grades on the achievement tests in the control group were within .22 SD of passing, suggesting the potential for MTP-S to produce as much as a 29% reduction in failure rates if its effects distribute evenly across the academic range of students.

The teacher-student interaction qualities targeted by the intervention were reliably coded from videotapes by independent coders. The potential mediating role of these qualities was assessed via a Multilevel Structural Equation Modeling (MSEM) framework (Preacher, Zyphur, & Zhang, 2010), which revealed a significant indirect effect of the intervention via changes in teacher-student interactions, consistent with a mediating role for these interactions (Figure 2).

Analyses then examined whether effects of the program might differ across subject matter were considered in two ways: first, in terms of a broad English/History/Social Studies vs. Math/Science breakdown, and then via a more specific breakdown of subjects into 4 groups: English, History/Social Studies, Math, and Science. Results consistently revealed no interaction of the intervention with subject matter area (all *p*'s > .10). This indicates that there was no evidence that the intervention was any more or less effective depending upon the subject matter of the class in which it was implemented. Similarly, analyses also found no evidence of differential intervention effects for teachers who did vs. did not switch to a new content area in the second year of the intervention (all *p*'s > .10). Thus, it did not appear to make any difference to intervention effectiveness in the post-intervention year, if teachers were or were not teaching the same course content as they had taught when receiving the intervention in the intervention year. Finally, no moderating effects of characteristics of students or characteristics of their teachers or classrooms on the findings reported above were observed.

Study 2

Multilevel models were tested to determine whether the intervention had varying effects on teachers depending on classroom and teacher characteristics as well as block/traditional status of teachers and number of coaching cycles completed. Putting interaction terms into MLMs to test the possible moderation, we found that the intervention effects did not differ depending on any of the classroom characteristics (e.g., baseline achievement, grade level), teacher characteristics (e.g., years of teaching experience), whether a teacher had a semester or full year schedule (i.e., block versus traditional) or the number of completed cycles. Thus, with the exception of the percent of low income students, classroom and teacher characteristics are not reported or discussed further.

Results from the MLMs predicting change in CLASS-S scores show that teacher participation in the MTP-S intervention was associated with increases in several CLASS-S dimensions, just as it was in Study 1 (see Table 1). These dimensions included *Student Engagement* (β = .21), *Regards for Adolescent Perspectives* (β = .29), *Instructional Learning Formats* (β = .26), *Analysis and Problem Solving* (β = .28) across the school year. These effects held when accounting for the percentage of low income students in the classroom.

Discussion

These results provide some of the best evidence to date that a developmentally-informed intervention can alter the nature of teacher-student interaction in secondary school classrooms to produce student achievement gains (Seidman, 2006). The MTP-S program not only led to observable changes in teacher behavior that had been previously linked to student achievement, it led to gains in student achievement that could be reliably observed in the year *following* the intervention, with a new class of students that had not been the focus of intervention efforts. Notably, in spite of the obvious importance of secondary school success for students and evidence of the ongoing struggles of secondary schools (Hess, 2010), this intervention appears to be one of the only, if not the only, program to demonstrate efficacy in improving teacher effectiveness and student achievement at this level when evaluated in a randomized controlled trial. That the impacts of the MTP-S approach were equally strong across content areas suggests both the value of teacher-student interactions for youth development as well as the potential for this approach as a whole-school model for improving teaching and learning.

Mediation analyses that followed up upon the primary study findings yielded results consistent with the interpretation that the operative mechanism of the intervention was indeed the specific qualities of teacher-student interaction that were the primary focus of the intervention.

These qualities of teacher-student interaction were the direct targets of the intervention; they were predicted by participation in the intervention; and an indirect effect of the intervention on student achievement via these observed qualities was found in analyses.

The finding that improved teacher-student interactions predicted improved student achievement regardless of the content area of instruction suggests the unique value of a focus on teacher-student interactions apart from the specific content of knowledge being transmitted by teachers. This is in keeping with the fundamental theoretical assumption underlying the intervention: that increasing the extent to which interactions in secondary school classrooms are tailored to adolescents' developmental stage and needs will enhance both student engagement and achievement. This perspective explicitly recognizes that while the primary task of the secondary school classroom is cognitive, the classroom itself is also a social setting, its participants are exquisitely socially-attuned, and social interactional characteristics of the setting are likely to influence the behavior of its members. Said differently, these results suggest that although it is obviously necessary to know math to teach math, in secondary school classrooms teaching math *skillfully* also involves successfully relating to and interacting with students so as to enhance their academic motivation and engagement (Battistich, Watson, Solomon, Lewis, Schaps, 1999).

A related perspective on the mechanisms by which MTP-S operates appears in the finding that its effects on student achievement can also be viewed as related to its effects on observed student engagement in the classroom (Pianta, Hamre, & Allen, 2011). A key feature of secondary education, too often overlooked, is that unlike education in the primary grades, one cannot assume that adolescent students arrive at school with an intrinsic desire to please adult authority figures (Allen, 2009). On the contrary, autonomy struggles are a well-documented

element of adolescent social development that can undermine teacher-student relationships unless handled sensitively (Allen, Hauser, & Bell, 1994). Further, while students in primary grades can readily see how the ability to read, write and perform basic arithmetic operations are used in the adult world, the links between the secondary school curriculum and daily adult life likely appear far more tenuous in adolescence. MTP-S explicitly targets the resulting motivational challenge and this study provides support for the notion that this is a promising route for starting to tackle the otherwise seemingly intractable problem of adolescent underachievement in secondary school.

As expected, the effects of the intervention on teacher-student interactions at the end of the intervention year did not translate into gains in student achievement until the post-intervention year. Although this result lends a cautionary note to these findings, it is consistent with the idea that student gains in achievement would occur only after students had actually experienced enhanced teacher-student interactions over a substantial portion of the academic year. That these effects on teachers carried into the next year is a key feature supporting the conclusion that these effects were in fact driven by enduring teacher change and not limited to intervention class or child effects (Ladd, 2008). Notably, there was no ongoing MTP-S consultation with teachers in the post-intervention year, and 30% of the teachers were teaching different content material than in the first year, thus providing further evidence that the impact of the intervention transcends the distinctions among the various academic content areas in which it is offered. A critical implication of this finding is that the changes brought about in the first year of the project were sufficiently enduring and generalizable to effect student achievement in the following year, with a new class of students. In effect, the intervention appears to have altered an enduring property of the teacher's classroom as a behavior setting (Seidman, 2006).

My Teaching Partner - Secondary is empirically supported and appears to be cost-effective. In terms of total teacher time, the intervention required approximately 20 hours of in-service training, spread across 13 months. The full cost for the teacher-consultants and video equipment was $3,700 per teacher over this period. Given that effects in Study 1 on student test scores were found in the next-year classroom, which was not the target of the intervention, we assume that effects might generalize across a teacher's entire course load (typically 5 or more classes of 20 to 25 students each), thus reducing the per student costs to under $40 per student for a nine percentile upward bump in academic performance.

Summary

The current paper contributes new knowledge about the efficacy of a teacher professional development program in increasing teaching quality, classroom engagement, and student achievement in secondary schools. It is among the few randomized control trials to rigorously test whether ongoing, personalized coaching and feedback affect student outcomes. Findings showed that intervention teachers, compared to controls, had somewhat higher teaching quality and observed engagement at the end of the school year, relative to the beginning of the school year. Further, the findings suggest that these increases are related to greater student achievement the following year. Noteworthy is that the findings held for a sample of diverse classrooms which varied considerably on class size, poverty, racial and ethnic composition, and fall achievement level.

References

Allen, J. P., Hauser, S. T., Bell, K. L., & O'Connor, T. G. (1994). Longitudinal assessment of autonomy and relatedness in adolescent-family interactions as predictors of adolescent ego development and self-esteem. *Child Development, 65*(1), 179-194. doi: 10.1111/j.1467-8624.1994.tb00743.x

Archambault, I., Janosz, M., Morizot, J., & Pagani, L. (2009). Adolescent behavioral, affective, and cognitive engagement in school: Relationship to dropout. *Journal of School Health, 79,* 409- 415. doi: 10.1111/j.1746-1561.2009.00428.x

Battistich, V., Watson, M., Solomon, D., Lewis, C., & Schaps, E. (1999). Beyond the three R's: A broader agenda for school reform. *The Elementary School Journal, 99*, 415-432. doi:10.1086/461933

Blumenfeld, P. C., & Meece, J. L. (1988). Task factors, teacher behavior, and students' involvement and use of learning strategies in science. *The Elementary School Journal, 88*, 235-250. doi:10.1086/461536

Cicchetti, D. V., & Sparrow, S. A. (1981). Developing criteria for establishing interrater reliability of specific items: Applications to assessment of adaptive behavior. *American Journal of Mental Deficiency, 86*, 127-137.

Domitrovich, C. E., & Greenberg, M. T. (2004). Introduction to the special issue: Preventive interventions with young children: Building on the foundation of early intervention programs. *Early Education and Development, 15*, 365-370. doi:10.1207/s15566935eed1504_1

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., et al. (1993). Development during adolescence: The impact of stage-environment fit on young

adolescents' experiences in schools and in families. *American Psychologist, 48*, 90-101. doi:10.1037/10254-034

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*, 59-109. doi: 10.3102/00346543074001059

Hamre. B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*, 625–638. doi:10.1111/1467-8624.00301

Hamre, B. K., & Pianta, R. C. (2010). Classroom environments and developmental processes: Conceptualization and measurement. In J. Meece & J. Eccles (Eds.). *Handbook of research on schools, schooling, and human development* (pp. 25-41). New York: Routledge.

Hollis S, & Campbell F. (1999). What is meant by intention to treat analysis? Survey of published randomized controlled trials. *British Medical Journal, 319*, 670-674.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593-614.

Muthén LK, & Muthén B. (2001). *Mplus: Statistical Analysis with Latent Variables, User's Guide*. Los Angeles: Muthén & Muthén.

Pianta, R. (2005). Standardized observation and professional development: A focus on individualized implementation and practices. In M. Zaslow and I. Martinez-Beck (Eds.), *Critical issues in early childhood professional development* (pp. 231-254). Baltimore, Paul H. Brookes Publishing.

Pianta, R. C., Funk, G., Hamre, B., Deal, S., Wasserman, J., Stuhlman, M., Hadden, D. S., Downer, J., Hall, A., et al. (2010). *MyTeachingPartner-Secondary consultancy manual*. Unpublished manuscript, University of Virginia, Charlottesville, VA.

Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher, 38,* 109-119. doi: 10.3102/0013189X09332374

Pianta, R. C., Hamre, B, & Allen, J. (2010). Teacher-Student Relationships and Engagement: Conceptualizing, Measuring, and Improving the Capacity of Classroom Interactions. Manuscript submitted for publication.

Pianta, R. C., Hamre, B., Hayes, N., Mintz, S., & LaParo, K. M. (2008). Classroom Assessment Scoring System - Secondary (CLASS-S). University of Virginia.

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, *15*, 209-233.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Newbury Park, CA: Sage.

Raudenbush, S. W., Martinez, A., Bloom, H., Zhu, P. & Lin, F. (2008). *An Eight-step paradigm for studying the reliability of group-level measures.* Report from the William T. Grant Foundation, Retrieved from http://www.wtgrantfoundation.org/publications_and_reports/featured_reports

Roeser, R. W., & Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal, 100*, 443-471. doi:10.1086/499650

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. doi:10.1037//0003-066X.55.1.68

Table 1

Relation of the My Teaching Partner Intervention to End-of-Year Dimensions of the CLASS

	Predicting End-of-Year Dimensions of the CLASS			
	Engagement	RAP	ILF	AP
	β	*β*	*β*	*β*
Step 1:				
% Low Income	-.08	-.12	-.22*	-.08
Step 2:				
Fall Classroom Variable	.38**	.43**	.39**	.14
Step 3:				
Intervention (1) Control (0)	.21*	.29**	.26**	.28**

Note. *$p < .05$. **$p < .01$. RAP = Regard for Adolescent Perspective, ILF = Instructional Learning Formats, AP = Analysis and Problem Solving.

Figure 1

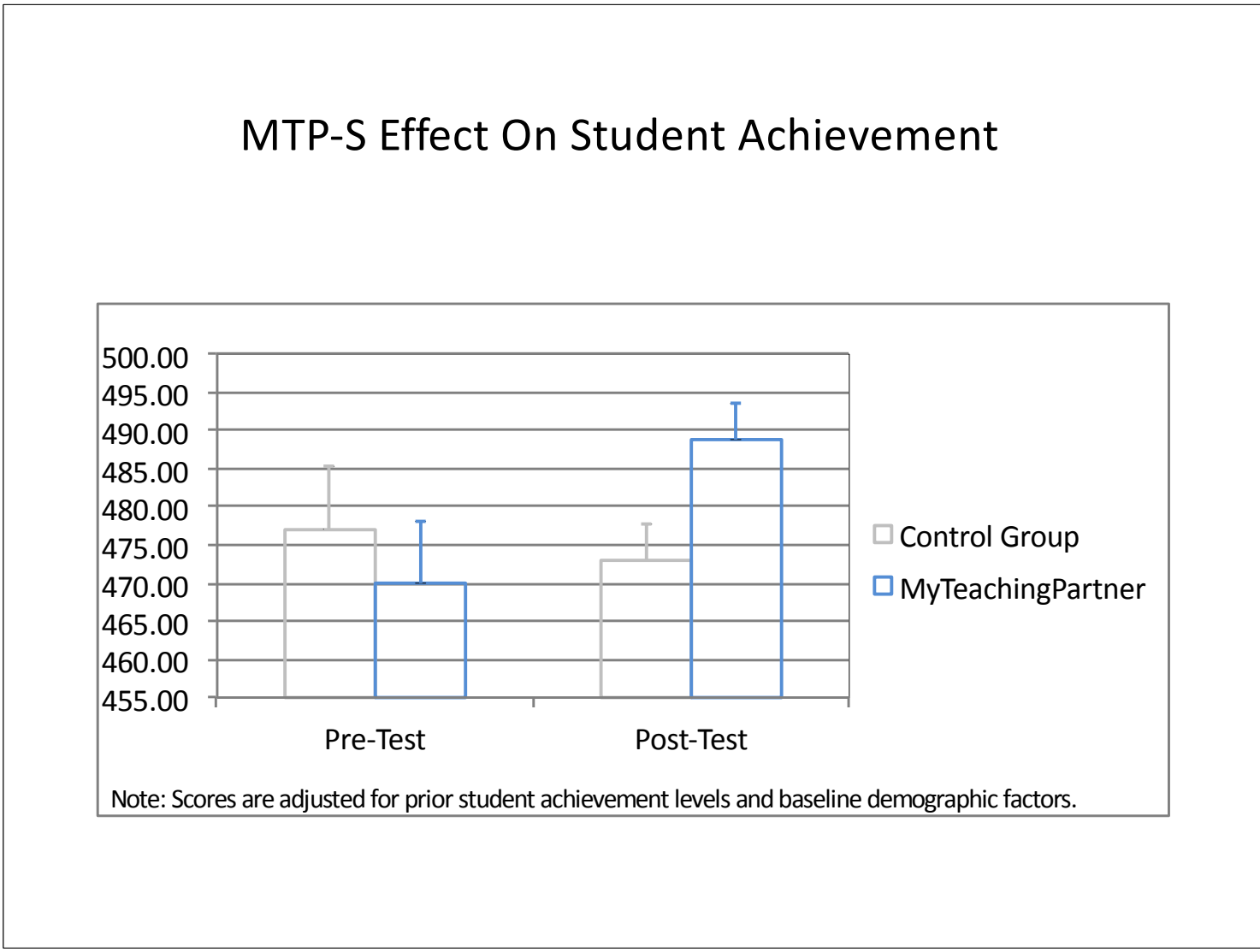
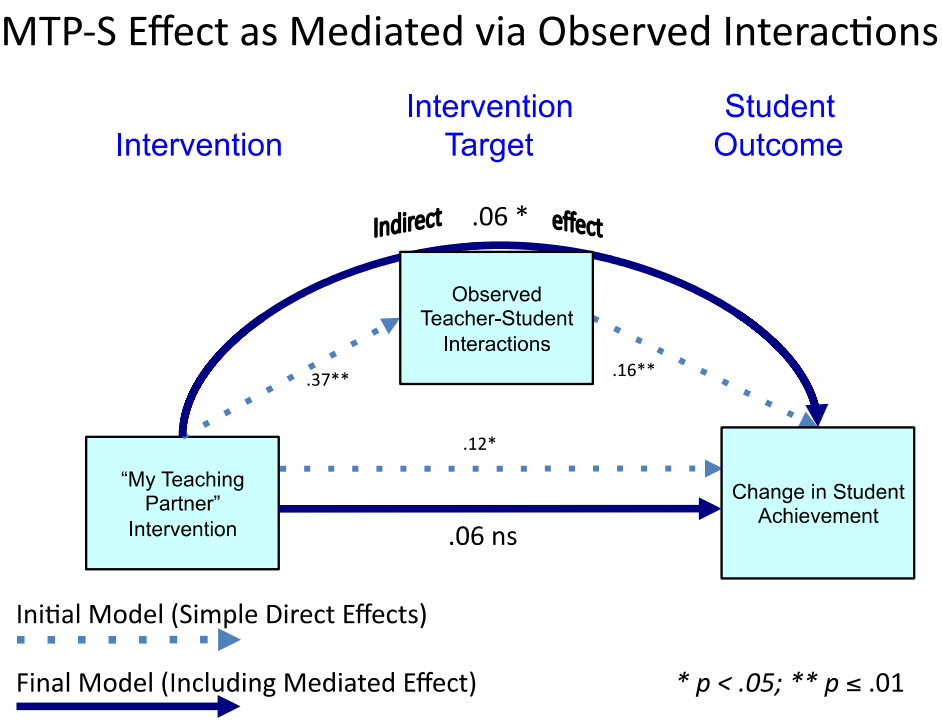

MTP-S Effect On Student Achievement
500.00
495.00
490.00
485.00
480.00
475.00
470.00
465.00
460.00
455.00
Pre-Test
Post-Test
Control Group
MyTeachingPartner
Note: Scores are adjusted for prior student achievement levels and baseline demographic factors.

Figure 2


MTP-S Effect as Mediated via Observed Interactions
Intervention
Intervention Target
Student Outcome
Indirect .06 * effect
Observed Teacher-Student Interactions
.37**
.16**
.12*
"My Teaching Partner" Intervention
Change in Student Achievement
.06 ns
Initial Model (Simple Direct Effects)
Final Model (Including Mediated Effect)
* p < .05; ** p ≤ .01