

Georgia's Pre-K Professional Development Evaluation

Technical Appendix

Diane M. Early & Yi Pan
Frank Porter Graham Child Development Institute
University of North Carolina at Chapel Hill

Kelly L. Maxwell
Child Trends

This document is meant to provide technical details about Georgia's Pre-K Professional Development Evaluation's methods and results. Readers should refer to "Georgia's Pre-K Professional Development Evaluation: Final Report" to understand the study's purpose, context, and conclusions. That report is available at: <http://www.dec.al.ga.gov/>

Suggested Citation: Early, D. M., Pan, Y. & Maxwell, K. L. (2014). *Georgia's Pre-K Professional Development Evaluation: Technical Appendix*. Chapel Hill, NC: University of North Carolina at Chapel Hill.

This study was funded by Bright from the Start: Georgia Department of Early Care and Learning (DECAL). The opinions in this report do not necessarily reflect those of the funding agency.

Table of Contents

Table of Contents 2

Methods 3

 Study Overview 3

 Teacher Selection and Random Assignment 3

 Attrition and Teacher Movement 7

 Teacher, Classroom, and Program Characteristics 7

 Participation in the Professional Development Activities 8

 Information Collected 10

 Unconditional Models 13

Results 13

 Descriptive Information 13

 Analysis Strategy 15

 Effect of Professional Development Treatment Condition on Teacher-Child Interactions 15

 Logistic Regression Predicting Adequate Teacher-Child Interactions 16

 Effect of Professional Development Treatment Condition on Teachers' *Knowledge of Effective Teacher-Child Interactions* 17

 Between-Group Differences in Perceived Value of the Professional Development 18

 Between-Group Differences in Relationship with Coach/Instructor 18

 Association of Teacher, Class, and Site Characteristics with Posttest *CLASS* Scores 19

 Association between Coach/Instructor Characteristics and Posttest *CLASS* Scores 25

References 28

Georgia's Pre-K Professional Development Evaluation: Technical Appendix

This document is meant to provide technical details about Georgia's Pre-K Professional Development Evaluation's methods and results. Readers should refer to "Georgia's Pre-K Professional Development Evaluation: Final Report" to understand the study's purpose, context, and conclusions. That report is available at: <http://www.decal.ga.gov/>

Methods

Study Overview

This study's primary purpose was to evaluate the impact of two professional development models on teacher-child interactions in Georgia's Pre-K classrooms. Teachers were randomly selected to participate and were randomly assigned to one of the professional development conditions or to a control group. Because of this rigorous design we can be confident that any differences between the groups at the end of the study were caused by the professional development activities. Further, the findings reflect the type of change we would anticipate among Georgia's Pre-K teachers if these models were broadly implemented. Data collection included pre- and posttest classroom observations and teacher questionnaires, as well as coach/instructor questionnaires and administrative information regarding participation in the professional development activities.¹

Teacher Selection and Random Assignment

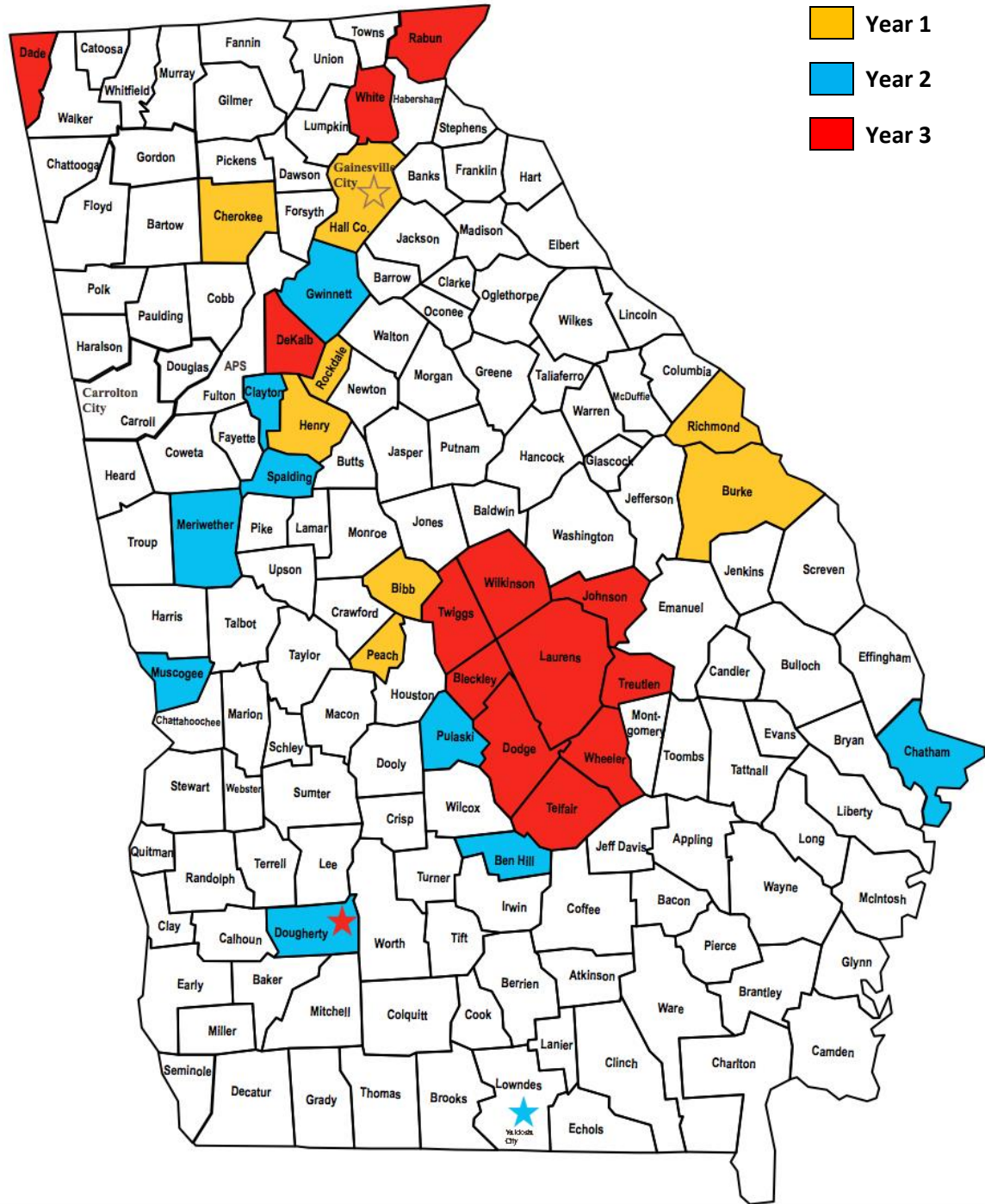
During this three year study (2011-12, 2012-13, and 2013-2014), a new cohort of teachers was selected for participation at the start of each school year of the project. As a first step, each year DECAL selected counties for participation based on their capacity to serve various geographic areas. Eligible counties were those where the school system had elected to participate in Georgia's K-12 Race To The Top (RT3) initiative.² Across the three years, almost all RT3 school systems were included.³ A map of the counties that were selected each year for participation in this study appears in Figure 1. Within the selected counties, all types of Georgia's Pre-K providers (e.g., schools, childcare centers, military bases) were eligible for participation.

¹ There were a few cases (e.g., Valdosta City in Lowndes county) where a city school district was included, but the surrounding county was not because the city and county school systems operated separately.

² During the third year, a few non-Race to the Top counties were included.

³ All RT3 counties were included at some point except Atlanta Public Schools and Carrollton City. Rabun county was included in the random selection process, but no teachers in that county were selected for participation.

Figure 1. Counties Selected for Participation in Georgia’s Pre-K Professional Development Evaluation



Once the counties were selected, DECAL sent a list of all Georgia’s Pre-K schools/centers and classes in each county to the FPG research team for random selection and assignment. DECAL determined the size for each group for each year, based on targets set in their RT3 Scope of Work, their consultants’ availability, and their resources to fund the supports. This resulted in slightly different numbers of teachers in each group.

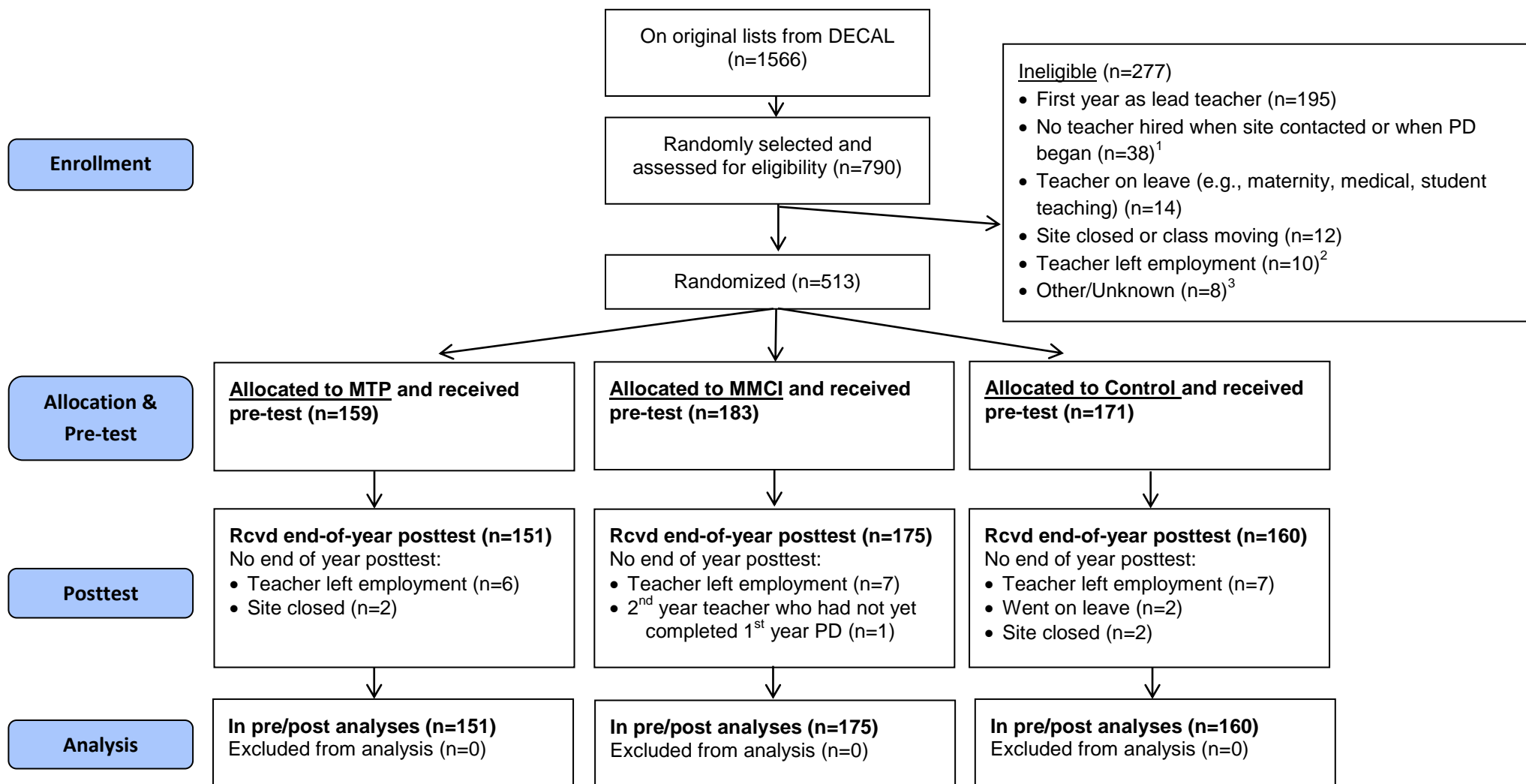
In the first year, random assignment took place at the school/center level. That is, once selected, the school/center was randomly assigned to one of the professional development models (i.e., MTP, MMCI, or control) and all classrooms within that school/center were assigned to the same model. The participating counties were organized into five regions. Assignment was blocked at the region level so that an equal number of teachers were selected into each condition in each of the five regions. In the second and third years, a stronger approach was utilized by randomly selecting and assigning at the classroom level (rather than school/center-level), allowing some classrooms within a school/center to be selected for participation while others were not and allowing different classrooms within the same school/center to be in different models. In Years 2 and 3, no blocking took place: all classrooms in the participating counties had an equal probability of selection and assignment to each condition and the number of participants in each region was not capped.

This change in selection procedures between the first and second year was made after consultation with the model developers and *CLASS* authors. Selecting at the classroom rather than site level had two major advantages: (1) it diminished the nesting of data within school/center, and (2) it decreased the odds that a single event—such as a center/school closing—would strongly undermine the intervention. The designers of the intervention models assured the research team that the supports provided to one teacher would not inadvertently affect teachers in other conditions within the same school/center.

Classes, rather than lead teachers, were selected for participation because often lead teachers were not assigned to classrooms until very close to the start of the academic year and occasionally lead teachers were not assigned until after the school year had begun. Thus, the final step in the random selection and assignment process involved learning which lead teacher was assigned to the selected classroom, determining if she or he was eligible for participation, and replacing any classes where the lead teacher was ineligible.

Figure 2 shows the numbers of classes/lead teachers at each step in the selection process, as well as reasons for ineligibility. The main reason for ineligibility was a teacher being in her or his first year as a Georgia's Pre-K teacher. DECAL provides introductory professional development to all first year Georgia's Pre-K teachers in which teachers attend a two-day face-to-face training, participate in six podcasts, complete an online assessment module, and an on-line competency quiz. DECAL thought it was important for all teachers to experience that program. Table 1 shows the number of lead teachers who participated in both the pre- and posttest in each condition, each year.

Figure 2. Georgia Professional Development Study Teacher Enrollment, Allocation, and Data Collection



1. One of these teachers was originally randomized and a pretest CLASS observation was conducted. However, we learned that she would be on leave for the rest of the year early enough to replace her in the sample. Her pretest data do not appear in any analyses.
2. All 10 of these teachers were originally randomized and a pretest CLASS observation was conducted. However, we learned that they had left their positions early enough to replace them in the sample. Their pretest data do not appear in any analyses.
3. These cases were excluded at DECAL's request. Reasons included: site instability ($n = 1$), teacher who had recently moved and had participated in CLASS-based PD at previous site ($n = 1$), and extreme resistance on the part of the teachers ($n = 2$). In the remaining four cases, the research team did not record DECAL's reasons for exclusion.

Table 1***Number of Teachers by Condition with Pre- and Posttest Scores***

	Year 1 2011-12	Year 2 2012-13	Year 3 2013-14	Total
MMCI	50	69	56	175
MTP	45	65	41	151
Control	51	63	46	160
TOTAL	146	197	143	486

Attrition and Teacher Movement

As seen in Figure 2, only 27 teachers or 5.3% of the original sample left the study between the pre- and posttest. Of these, eight were MMCI (4.4% of the original MMCI sample); eight were MTP (5.0% of the original MTP sample), and 11 were control (6.4% of the original control sample). Thus, the differential attrition rate was 2.0% (6.4 minus 4.4). This level of overall and differential attrition meets the What Works Clearinghouse (2014) definition of low attrition, using the conservative boundary. With an overall attrition of 5%, the conservative boundary for differential attrition is 6.1%.

Most ($n = 24$) of the teachers who did not receive a posttest observation stopped teaching in Georgia's Pre-K during the year; two were on maternity leave during the posttest period; the last one was in her second year of teaching but had not taken part in the 'new teacher' training so was moved to that training at DECAL's request. In order to be sure that the loss of these teachers was not biasing the sample, the pretest *CLASS* scores of these 27 teachers were compared to the pre-test *CLASS* scores of the 486 teachers who participated in both the pre- and posttests. No differences were found in any of the three *CLASS* domains. These 27 teachers have been excluded from all analyses, including the teacher characteristics presented in Table 2.

Additionally, seven teachers moved to a different Georgia's Pre-K center/school between the pre- and posttest. Those teachers were retained in the sample and the posttest data were collected in the new site locations. They are included in all analyses.

Teacher, Classroom, and Program Characteristics

Table 2 provides descriptive information about the final sample of participating lead teachers, classrooms, and programs. Participating teachers were well-educated, with almost all having a Bachelor's degree or higher (a requirement of Georgia's Pre-K). On average, they had spent over six years teaching in Georgia's Pre-K, but there was variability in teaching experience across teachers. Average class size was about 19 students⁴. More than half of the pre-k classrooms were in private settings (i.e., not public schools), and the sample was fairly evenly split between the Atlanta metro area and outside the Atlanta metro area.

⁴ At the start of each *CLASS* cycle, the observer counted the number of children present. Each classroom's group size was calculated by taking the average of those cycles.

In order to ensure that the groups were the same at the start of the study, teachers and classrooms in each of the three conditions were compared on all characteristics listed on Table 2. No between-group differences on these characteristics were found.⁵ Additionally, the groups were compared on proportion of enrolled children whose parent reported receiving public assistance⁶ and pretest CLASS scores. Again, no between-group differences were found. The lack of between-group differences means that the randomization process was successful in creating comparable groups, making us confident that any differences found after participating in the intervention were caused by the professional development, rather than by some other differences between the groups.

Table 2

Teacher, Classroom, and Program Characteristics

	Overall	MMCI	MTP	Control
<u>Teacher Characteristics</u>				
Mean (SD) years teaching in Georgia's Pre-K	6.11 (4.73)	5.97 (5.11)	6.30 (4.53)	6.08 (4.49)
Educational attainment				
Less than BA/BS	8.7%	8.1%	9.3%	8.8%
BA/BS	65.2%	66.0%	67.6%	62.1%
Advanced degree (MA/MS, Ph.D.)	26.1%	25.8%	23.2%	29.1%
Mean (SD) years of education ⁷	16.50 (1.23)	16.51 (1.22)	16.43 (1.23)	16.56 (1.23)
<u>Classroom Characteristics</u>				
Mean (SD) observed class size	18.95 (2.34)	19.21 (2.16)	19.12 (2.20)	18.51 (2.60)
Mean (SD) observed children per adult	9.36 (1.57)	9.42 (1.51)	9.48 (1.53)	9.17 (1.67)
<u>Program Characteristics</u>				
Center based/school-based	63%/37%	59%/41%	69%/31%	61%/39%
In Metro Atlanta/out of Metro Atlanta	48%/52%	46%/54%	50%/50%	47%/53%

Participation in the Professional Development Activities

In general, implementation of the professional development models was successful, with most teachers taking full advantage of the supports provided. As described below, however, there were some exceptions. The analyses presented in this report are based on an intent-to-treat approach in which all

⁵ For most variables, comparisons were made using hierarchical linear modeling to account for the nesting of teachers within programs. For the educational attainment variable, multilevel multinomial analysis did not converge, so a generalized estimating equation was used to analyze the 3-level categorical outcome, accounting for data clustering.

⁶ The criteria used by DECAL to define this group changed over the course of the study, thus the values had to be standardized within year.

⁷ Teachers were asked to indicate the highest level of education they had completed. All teachers had at least some college. Their responses were converted to years as follows: some college = 13, AA/AS Degree = 14, BA/BS degree = 16, some graduate coursework = 17, MA/MS = 18, Ed.D. or Ph.D. = 21

teachers were retained in the sample after assignment, regardless of actual participation in the professional development activities. The only exceptions were the 27 teachers (5.3%) who stopped teaching in Georgia's Pre-K between the pre-and posttest. Including all originally selected teachers in this way is a conservative test of the intervention's effectiveness and means that findings from this study tell us about the types of effects we would likely see if such supports were implemented broadly. Studies where teachers elect to participate rather than being randomly selected, or where teachers are excluded from the analyses if they do not take part in the professional development activities, only provide information about the types of effects seen in ideal circumstances.

In the real world, participation in any sort of intervention varies and by including all teachers who were selected, regardless of actual participation, we gain a clearer picture of real world effects. DECAL did a good job of encouraging teachers to take advantage of the supports, but as with any intervention, there was variation in the extent to which teachers took part. Details regarding the implementation of each of the interventions appear below.

MMCI. The MMCI sessions began in October or November and continued through February or March, with one training day per month. Each training day covered two of MMCI's 10 sessions. On a typical training day, participants would complete one session in the morning, then break for lunch, and reconvene for a second session in the afternoon. Sessions were co-taught by teams of Georgia's Pre-K consultants. The group sizes ranged from 8 to 20 teachers, with an average of 11. Sessions were located in various regions throughout the state to minimize the travel time for teachers. When multiple teachers from the same school or center were in the MMCI group, they were typically in the same MMCI session; however, all MMCI sessions contained teachers from multiple schools/centers. Of the 175 teachers in the MMCI group, 170 (97%) attended all 10 MMCI sessions. Of the five remaining teachers, one attended eight sessions, one teacher attended two sessions, and three did not attend any sessions.

MTP. MTP coaching began in September of each year and typically continued through April. Cycles of videotaping, sending the tape to the coach for review, and receiving feedback typically took two weeks to complete, but could take longer. There was no pre-determined goal for the number of MTP cycles teachers should complete. Instead, coaches and teachers were instructed to complete as many cycles as possible during the year, and when possible the research team waited until at least eight cycles had been completed before conducting the posttest. Forty-four teachers (29%) completed more than eight cycles; 40 (27%) completed exactly eight cycles; 59 (39%) completed five, six, or seven cycles, and eight teachers (5%) completed fewer than five. The average number of cycles completed was 7.57 ($SD = 1.86$, $range = 2$ to 13).

Control Group. In the first year of the study, teachers in the control group ($n = 51$) had access to the same online library of video clips demonstrating best practices in various aspects of teacher-child interactions as the MTP teachers. In the second and third years, teachers in the control group ($n = 109$) participated in the same types of professional development as Georgia's Pre-K teachers who were not in the study. DECAL contracted with Georgia State University to provide this training. Topics varied but included behavior management, child assessment, outdoor learning, and others.

Information Collected

This section describes the data collected from teachers, coaches, and instructors. Teachers were given \$100 in the fall and \$100 in the spring as a ‘thank you’ for their time and effort. Participating in data collection was considered part of the job duties of the coaches and instructors, so no additional incentive was provided.

Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008). The CLASS is an observation tool measuring teacher-child interactions. Both MTP and MMCI are designed to improve teacher-child interactions, as defined and measured by the CLASS. The CLASS is made up of 10 dimensions, organized into three domains. The Emotional Support domain includes the dimensions of positive climate, negative climate, teacher sensitivity, and regard for student perspectives. The Classroom Organization domain includes behavior management, productivity, and instructional learning formats. The Instructional Support domain includes concept development, quality of feedback, and language modeling. Each dimension is rated from 1 to 7 with 1 or 2 indicating the classroom is “low” on that dimension; 3, 4, or 5 indicating that the classroom is in the “mid-range”; and 6 or 7 indicating the classroom is “high” on that dimension. Observers rate the classrooms and teachers on the 10 dimensions roughly every 30 minutes throughout the observation morning. For this project, six 30-minute observation cycles were completed in each room. At the start of each of the six CLASS cycles, data collectors noted the number of children and staff present.

For this project, independent data collectors conducted a CLASS observation in the classroom of each participating teacher at the start and the end of the school year. On average, there were 194 ($SD = 29$, range = 128 to 259) calendar days between the pre- and posttest observations. By design, implementing MTP professional development took more time than MMCI or control, necessitating that the pre-observation take place earlier in the school year and the post-observation later in the year. We worked to mitigate this between-group difference by making the observation windows as short as possible; nonetheless, on average there were more days between pre- and posttest for MTP teachers ($mean = 219$, $SD = 21$) than for teachers in either the MMCI ($mean = 187$, $SD = 19$) or control ($mean = 179$, $SD = 30$) groups, and more days between pre- and posttest for MMCI than control.

All data collectors completed a two-day small group training session taught by CLASS trainers who had been certified by Teachstone, the organization started by the CLASS authors to train and support individuals using the tool. As part of this CLASS training, trainees watched multiple videotaped segments as a group and learned about the codes from the Teachstone trainers. Additionally, participants practiced scoring and discussed five to six 20-minute videotaped clips that had been coded by at least three master CLASS coders.

At the end of this training, data collectors completed reliability testing in which they independently watched and coded five 20-minute classroom segments posted on the secure Teachstone website. In order to be certified as ready to collect data, they had to attain the Teachstone training criteria of at least 80% agreement within 1 point of the master codes across the five videotaped cycles and at least two out of five codes within one point of the master codes within each dimension. Additionally, prior to collecting study data, newly certified observers for this project observed in a classroom with an experienced certified CLASS observer and were required to have 80% of all codes

within one point of the experienced observer for six *CLASS* cycles. In order to continue as a *CLASS* observer, this certification process was renewed on an annual basis. Supervision was provided at least weekly to all data collectors.

During data collection, for approximately 10% of the observations, a second data collector completed the *CLASS* in the same classroom at the same time, to ensure all data collectors were continuing to score in the same manner.⁸ In all, 112 observations were conducted with two individuals present. For Emotional Support, the two data collectors' scores were within one point of each other's 99% of the time and Cohen's weighted kappa was .63. For Classroom Management, their scores were within one point of each other's 96% of the time and Cohen's weighted kappa was .60. For Instructional Support, their scores were within one point of each other's 95% of the time and Cohen's weighted kappa was .57. As a reference, Landis and Koch (1977) refer to weighted kappas between .41 and .60 as representing moderate agreement and weighted kappas between .61 and .80 as substantial agreement.

Observers were trained on proper data collection procedures by FPG project staff. They were unaware of the project's design and blind to the teachers' professional development conditions. A different individual conducted the pre- and posttest *CLASS* observation in each classroom.⁹

Teacher questionnaires. Each participating teacher was asked to complete a questionnaire at the same time as the *CLASS* observations were conducted. The response rate was high, with 484 of 486 teachers (99.6%) completing the pretest questionnaire and 465 (95.7%) completing the posttest questionnaire.

The pretest teacher questionnaire included information about teacher characteristics (e.g., education, experience), *Knowledge of Effective Teacher-Child Interactions*¹⁰ and *Adult-Centered Beliefs*. The posttest questionnaire included both of those scales again, as well as *Perceived Value of the Professional Development* and *Relationship with Coach/Instructor* (MMCI and MTP teachers only). All scales are described below.

Knowledge of Effective Teacher-Child Interactions (Hamre & LoCasale-Crouch, 2009). Sometimes knowledge changes before practice (Hamre et al., 2012), so in addition to observations of practice, we also gathered information about teachers' knowledge of effective teacher-child interactions. This 9-item scale tests teachers' knowledge of interactions that lead to positive development, using a *CLASS* framework. It presents respondents with scenarios that they might encounter in the classroom and asks them to select the best response to each from four alternatives. It is scored as percent correct out of nine. Using a slightly longer version of this tool (14 items)¹¹, Hamre and colleagues (2012) found that teachers who participated in a course on effective teacher-child interactions, similar to MMCI, scored higher than control-group teachers. A sample of an item reads:

⁸ Data from only one of the two are included in this report's main analyses. The individuals whose scores would be included in the main analyses were selected in advance of the observation.

⁹ There was one exception to this rule, due to an error in data collector assignment.

¹⁰ This scale was included on the pre-test questionnaire only in the second and third years of the study, not the first year. It was included on the posttest all three years; therefore, posttest data were analyzed.

¹¹ The Hamre et al. version included five items that were specifically about literacy instruction. Those items were omitted for this study because the teachers were not provided with supports specific to literacy instruction.

Before reading a story about autumn, the teacher wants to develop the children's understanding of autumn concepts by making connections to previous learning. One strategy she can use is: (1) having children share what they remember about the book they read yesterday; (2) sing a song that cues the class it is time for book reading, (3) review the letter sounds and parts of the word fall, and (4) remind them about their discussion of leaves falling off trees.

Adult-Centered Beliefs. Teachers' adult-centered beliefs were measured with a 16-item scale adapted from Schaefer and Edgerton's (1985) parental modernity scale. These items distinguish between "traditional" or relatively adult-centered perspectives on interactions with children and more "modern or progressive" child-centered perspectives. Teachers responded using a 5-point scale ranging from *strongly disagree* to *strongly agree*. Scores were derived by computing the mean of all items, with child-centered beliefs reversed-scored. Teachers with more adult-centered views agreed with statements such as "Children should always obey the teacher." Teachers with more child-centered beliefs endorsed statements such as "Children have a right to express their own point of view and should be allowed to express it." Pianta and colleagues (2005) found that more adult-centered beliefs were negatively correlated with several measures of classroom quality, including teacher-child interactions as measured by the *CLASS*. Those authors argue that more child-centered beliefs may reflect a better understanding of children's developmental needs and teachers' comfort and skill in interacting with young children. Cronbach's alpha for this 16-item scale in the current sample of teachers was .74.

Perceived Value of the Professional Development (LoCasale-Crouch, Downer, & Hamre, 2009a). In the spring, all teachers were asked to respond to nine items regarding their perceptions of the professional development they had received that year, using a 5-point scale ranging from *strongly disagree* to *strongly agree*. The items were first used by the National Center for Research on Early Childhood Education for use in evaluating MTP and a course similar to MMCI. Sample items include "I feel more confident in my role as a teacher than I did before this professional development" and "This professional development stimulated my enthusiasm for further learning." Cronbach's alpha for this 9-item scale in the current sample was .95. The nine items were averaged together to create a Perceived Value of the Professional Development score.¹²

Relationship with the Coach/Instructor (LoCasale-Crouch, Downer, & Hamre, 2009a). MMCI and MTP teachers were asked to respond to an additional five items, using the same 5-point scale. These items were all specific to the role and relationship with the coach/instructor and were not asked of control teachers because their professional development did not necessarily involve a coach/instructor (e.g., access to on-line materials). A sample item reads: "The instructor/coach was enthusiastic about teaching/coaching." Cronbach's alpha for this 5-item scale in the current sample was .88. Scores are the simple mean of the items.

¹² One item was inadvertently omitted for the control group questionnaire in Year 1, so their values are their average score on eight items only.

MTP Coach and MMCI Instructor questionnaires. Each spring, MTP coaches and MMCI instructors¹³ were asked to complete questionnaires that included items about educational background, years of experience as a consultant and the *Knowledge of Effective Teacher-Child Interactions* and *Adult-Centered Beliefs* scales described above. Cronbach's alpha for the 16-item *Adult-Centered Beliefs* scale was .75. Additionally, coaches and instructors responded to questions regarding their confidence in their understanding of the *CLASS* tool and ability to be an effective coach/instructor, using five items written by LoCasale-Crouch, Downer, and Hamre (2009b). An example of an item on this scale reads: "I am confident teachers will change their practice as a result of working with me." Coaches/instructors responded using a five-point scale ranging from strongly disagrees to strongly agree. Cronbach's alpha in the current sample was .89. Scores are the simple mean of the items.

Questionnaire data from 28 of the 30 (93%) coaches and instructors who took part in this project at any point are included in the current analyses. MMCI sessions were co-taught by pairs of Georgia's Pre-K consultants. All analyses reported here average the responses of each pair prior to analysis.

Unconditional Models

As noted above, there was a change in random assignment strategies between the first and second years of the study. In the first year, random assignment took place at the center/school level; in the second and third year it was at the classroom level. To check if there was sufficient nesting within center/school in the final sample to warrant multi-level modeling, the variance in the outcomes was partitioned into its within-site and between-site components by fitting an unconditional model with no predictors (Bryk & Raudenbush, 1992). Intraclass correlation coefficients (ICC), a measure of the ratio of the variance that lies between sites to the total variance, were calculated for each outcome. The ICC were as follows: .19 for Emotional Support, .21 for Classroom Organization, and .35 for Instructional Support and were all statistically significant. Based on these results we determined that 2-level hierarchical linear models would be used for the primary research questions.

Results

Descriptive Information

As a first step in understanding between-group differences, we present the descriptive statistics for each of the key variables. As seen on Table 3, in all three groups, the average scores on Emotional Support and Classroom Organization were at the upper end of the mid-range at both pre- and posttest. On Instructional Support, on average, all three groups were at the upper end of the low range at both pre- and posttest.

¹³ MMCI sessions were co-taught by pairs of Georgia's Pre-K consultants. All analyses reported here average the responses of each pair prior to analysis.

Table 3***Descriptive Statistics for Key Variables by Professional Development Model***

	<u>MMCI</u>		<u>MTP</u>		<u>Control</u>	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Emotional Support						
n	175	175	151	151	160	160
Mean	5.63	5.87	5.53	5.73	5.57	5.58
Standard Deviation	0.68	0.68	0.76	0.70	0.77	0.77
Range	2.79-6.83	2.50-6.96	2.88-6.92	3.38-6.88	2.83-6.92	2.21-6.75
Classroom Organization						
n	175	175	151	151	160	160
Mean	5.25	5.50	5.11	5.39	5.19	5.30
Standard Deviation	0.79	0.84	0.93	0.83	0.85	0.84
Range	2.22-6.89	2.44-6.89	1.50-6.83	2.56-6.83	2.33-6.67	2.72-6.72
Instructional Support						
n	175	175	151	151	160	160
Mean	2.56	2.92	2.61	2.76	2.65	2.65
Standard Deviation	0.80	0.91	0.91	0.92	0.91	0.83
Range	1.06-5.22	1.17-5.28	1.00-5.61	1.06-5.50	1.11-4.94	1.06-4.61
Number Correct on the Knowledge of Effective Teacher-Child Interactions						
n	NA	156	NA	144	NA	149
Mean	NA	7.57	NA	7.20	NA	7.20
Standard Deviation	NA	1.32	NA	1.22	NA	1.23
Range	NA	2-9	NA	3-9	NA	3-9
Perceived Value of the Professional Development						
n	NA	166	NA	145	NA	151
Mean	NA	4.27	NA	4.22	NA	3.95
Standard Deviation	NA	0.63	NA	0.74	NA	0.66
Range	NA	1.63-5.00	NA	1.00-5.00	NA	1.00-5.00
Relationship with the Coach/Instructor						
n	NA	166	NA	145	NA	NA
Mean	NA	4.54	NA	4.72	NA	NA
Standard Deviation	NA	0.46	NA	0.52	NA	NA
Range	NA	3.40-5.00	NA	1.00-5.00	NA	NA

Analysis Strategy

All analyses were conducted using two-level hierarchical linear models (HLM) with covariates, accounting for the nesting of teachers within sites. Using HLM in this study accounts for potential correlations among teachers within a same school/center and produces adjusted standard error estimates.

For each set of analyses presented below, the reduced form of the equation is presented. In this notation, fixed effects are represented by betas (β), and random effects are reflected in the two error terms accounting for variation between teachers within sites (ε_{ij}) and variation between sites (b_{0j}).

In the impact analyses, the treatment variable was coded as a class variable with the control group as the reference cell. Therefore, point estimates for between-group comparisons are equivalent to differences between adjusted posttest means of different groups. Effect sizes were calculated by dividing the difference between treatment group and control group means by the pooled standard deviation of the observed posttest. All covariates were grand mean centered prior to analysis.

Effect of Professional Development Treatment Condition on Teacher-Child Interactions

The reduced form of the equation to assess the effect of treatment condition on teacher-child interactions appears below (Equation 1).

$$y_{ij} = \beta_{00} + \beta_{01} \times MTP_{ij} + \beta_{02} \times MMCI_{ij} + \beta_{03} \times pretest_{ij} + b_{0j} + \varepsilon_{ij} \quad (\text{Equation 1})$$

Findings appear in Table 4 and indicate that Emotional Support post test scores were higher for both MMCI and MTP teachers as compared to controls, and Instructional Support posttest scores were higher for MMCI teachers as compared to controls.

Table 4**Results from HLMs of CLASS Posttest Scores**

Outcome	Predictor	PE	SE	t	p	ES
Emotional Support	Intercept	3.79	0.24	15.86	<.001	
	Pretest	0.32	0.04	7.71	<.001	0.33
	MMCI vs. Control	0.26	0.07	3.44	<0.001	0.36
	MTP vs. Control	0.16	0.08	2.02	0.046	0.22
	MTP vs. MMCI	-0.10	0.08	-1.34	0.184	0.14
Classroom Organization	Intercept	3.84	0.23	16.56	<.001	
	Pretest	0.28	0.04	6.56	<.001	0.29
	MMCI vs. Control	0.17	0.09	1.85	0.066	0.20
	MTP vs. Control	0.11	0.09	1.18	0.240	0.13
	MTP vs. MMCI	-0.06	0.09	-0.62	0.535	-0.07
Instructional Support	Intercept	1.91	0.14	13.95	<.001	
	Pretest	0.28	0.04	6.27	<.001	0.27
	MMCI vs. Control	0.24	0.09	2.57	0.011	0.27
	MTP vs. Control	0.11	0.10	1.17	0.243	0.13
	MTP vs. MMCI	-0.13	0.09	-1.34	0.183	0.14

Notes: PE = point estimate, SE=standard error, ES=effect size

Logistic Regression Predicting Adequate Teacher-Child Interactions

Another way to think about the effects of these professional development models is to consider the proportion of teachers who reached a level of quality that we expect to improve children's outcomes. Some past research using a precursor to the current CLASS tool concluded that an Emotional Support score of 5.00 or more and an Instructional Support score of 3.25 or more is needed for pre-k programs to meaningfully contribute to children's social and academic outcomes (Burchinal, Vandergrift, Pianta, & Mashburn, 2010).

Findings from the current study indicate that after the year of professional development, 34% of MMCI teachers, 30% of MTP teachers, and 23% of control teachers attained the cutpoints of 5.0 or higher on Emotional support *and* a 3.25 or higher on Instructional Support. Two-level logistic regression was conducted to see if there was a between group difference (MMCI, MTP, control) in the likelihood of attaining both cutpoints, controlling for a corresponding baseline dichotomous variable created using the same cutpoints on the pretest data. The estimated odds of reaching both of these cutpoints was .56 ($\exp(-0.58)$) for MTP teachers, .64 ($\exp(-0.45)$) for MMCI teachers, and .37 ($\exp(-1)$) for control teachers. The estimated odds ratio of reaching both cutpoints was 1.52 ($\exp(0.42)$) for MTP compared to control teachers ($p > .05$), 1.73 ($\exp(0.55)$; $p < .05$) for MMCI compared to control teachers; and 1.13 ($\exp(0.55-0.42)$; $p > .05$) for MMCI compared to MTP teachers.

Thus, participation in MMCI increased a teacher’s probability of attaining this level of teacher child-interactions, as compared to control teachers. There was no statistically significant difference between MTP and control or between MTP and MMCI in the odds of attaining this level of interaction. Results of these models appear in Tables 5 and 6.

Table 5

Two-level Logistic Regression Models Predicting Odds of Reaching both Cutpoints at Posttest

Effect	Est	SE	DF	t	p
Intercept	-1.47	0.21	335	-6.86	<.0001
Baseline	0.94	0.25	147	3.76	0.0002
MTP	0.42	0.28	147	1.54	0.1267
MMCI	0.55	0.26	147	2.08	0.0394

Table 6

Log Odds and Odds Ratio Results

Effect	Est	SE	DF	t	p
log odds for MTP	-0.58	0.20	147	-2.84	0.0051
log odds for MMCI	-0.45	0.19	147	-2.43	0.0162
log odds for Baseline	-1.00	0.21	147	-4.82	<.0001
log odds ratio MTP to control	0.42	0.28	147	1.54	0.1267
log odds ratio MMCI to control	0.55	0.26	147	2.08	0.0394
log odds ratio MMCI to MTP	0.12	0.26	147	0.49	0.6275

Notes: PE = point estimate, SE=standard error

Effect of Professional Development Treatment Condition on Teachers’ Knowledge of Effective Teacher-Child Interactions

The models testing the effect of the treatment condition on teachers’ *Knowledge of Effective Teacher-Child Interactions* were identical to the models testing the effect of the treatment on *CLASS* posttest scores, except pretest scores were not included in these models. In Year 1, the teachers’ *Knowledge of Effective Teacher-Child Interactions* scale was not included on the teacher questionnaire, so controlling it statistically at pretest would have meant omitting all Year 1 data. As described in the Methods section of this appendix, teachers were assigned to condition at random, and there is no evidence that the teachers varied across condition in terms of *CLASS* pretest scores or teacher, classroom, or site characteristics. Additionally, HLM was used to compare teachers’ *Knowledge of Effective Teacher-Child Interactions* at pretest across the three treatment conditions (MTP, MMCI, control) in Years 2 and 3 and no significant differences emerged. Thus, comparing posttest scores on this measure without controlling for pretest scores was a reasonable approach. See Equation 2.

$$y_{ij} = \beta_{00} + \beta_{01} \times MTP_{ij} + \beta_{02} \times MMCI_{ij} + b_{0j} + \epsilon_{ij} \quad (\text{Equation 2})$$

Table 7 shows the HLM results. Findings indicated that MMCI teachers' posttest scores on *Knowledge of Effective Teacher-Child Interactions* were higher than those of MTP or control-group teachers.

Table 7

Results from HLM of Teachers' Posttest Knowledge of Effective Teacher-Child Interactions

Predictor	PE	SE	t	p	ES
Intercept	7.20	0.1	68.77	<.001	
MMCI vs. Control	0.37	0.15	2.52	0.013	0.29
MTP vs. Control	0.00	0.15	0.02	0.987	0.00
MTP vs MMCI	-0.36	0.15	-2.49	0.014	-0.28

Notes: PE = point estimate, SE=standard error, ES=effect size

Between-Group Differences in Perceived Value of the Professional Development

The models comparing the treatment groups on *Perceived Value of the Professional Development* were identical to the models testing the effect of the treatment on teachers' *Knowledge of Effective Teacher-Child Interactions* (see Equation 2). Pretest scores on this scale were not obtained in any year of the study because the questions could not have been answered prior to experiencing the professional development. Table 8 shows the HLM results. Findings indicated that both MMCI and MTP teachers perceived their professional development as more valuable than control-group teachers. There was no difference between MMCI and MTP teachers on this scale.

Table 8

Results from HLM of Perceived Value of the Professional Development

Predictor	PE	SE	t	p	ES
Intercept	3.95	0.06	69.00	<.001	
MMCI vs. Control	0.32	0.08	4.17	<.001	0.46
MTP vs. Control	0.30	0.08	3.77	<.001	0.43
MTP vs MMCI	-0.02	0.08	-0.26	0.792	-0.03

Notes: PE = point estimate, SE=standard error, ES=effect size

Between-Group Differences in Relationship with Coach/Instructor

Equation 2 was repeated using *Relationship with the Coach/Instructor* as the outcome. However, this model included only MMCI and MTP teachers. Control group teachers did not necessarily have a coach/instructor so those questions were not asked of control group teachers. Table 9 shows the HLM result. Findings indicate that MTP teachers had more positive views of the coach/instructor than the MMCI teachers.

Table 9

Results from HLM of Perception of the Coach/Instructor

Predictor	PE	SE	t	p	ES
Intercept	4.52	0.04	111.96	<.001	
MTP vs MMCI	0.20	0.06	3.56	<0.001	0.40

Notes: PE = point estimate, SE=standard error, ES=effect size

Association of Teacher, Class, and Site Characteristics with Posttest CLASS Scores

A two-step process was used to assess the associations between teacher, class, and site characteristics and CLASS posttest scores. First, all characteristics under consideration were included in separate HLM models for MMCI and MTP teachers to see which might be associated with posttest scores when controlling pretest scores (see Equation 3).

The characteristics tested included:

- Teachers' *Adult-Centered Beliefs*, as measured on the pretest teacher questionnaire
- Teachers' years of experience as a Georgia's Pre-K teacher, as measured on the pretest teacher questionnaire
- Teachers' years of education, as measured on the pretest teacher questionnaire¹⁴
- Class size, as observed during the pretest CLASS, averaged across the six cycles
- Child-to-staff ratio, as observed during the pretest CLASS, averaged across the six cycles
- Proportion of children in the classroom whose parent reported receiving public assistance, as reported by DECAL¹⁵
- Center vs. school
- Inside vs outside metropolitan Atlanta area¹⁶

$$Y_{ij} = \beta_{00} + \beta_{01} \times pretest_{ij} + \beta_{02} \times Belief_{ij} + \beta_{03} \times YrsExp_{ij} + \beta_{04} \times YrsEd_{ij} + \beta_{05} \times ClassSize_{ij} + \beta_{06} \times CTRatio_{ij} + \beta_{07} \times PubAsst_{ij} + \beta_{10} \times Center_{0j} + \beta_{20} \times Metro_{0j} + b_{0j} + \epsilon_{ij} \quad (\text{Equation 3})$$

Note that these models did not test associations with coach/instructor characteristics because we intended to use these analyses to select variables to test in larger models that included control teachers. Only characteristics that were meaningful for all three conditions were tested. Coach/instructor characteristics are considered in the next section.

¹⁴ Teachers were asked to indicate the highest level of education they had completed. All teachers had at least some college. Their responses were converted to years as follows: some college = 13, AA/AS Degree = 14, BA/BS degree = 16, some graduate coursework = 17, MA/MS = 18, Ed.D. or Ph.D. = 21

¹⁵ The types of public assistance included in this definition by DECAL changed between the second and third years of the study. For that reason, this variable was standardized (z-scored) within year prior to analysis.

¹⁶ Metropolitan Atlanta was defined as within the following 10 counties: Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, and Rockdale.

Table 10 shows the results for MMCI teachers, and Table 11 shows the results for MTP teachers. Among MMCI teachers, those with fewer years of education and those in metropolitan Atlanta had higher Emotional Support scores at posttest, controlling for pretest and the other teacher, classroom, and site characteristics. MMCI teachers with lower scores on the *Adult-Centered Beliefs* scale, those with fewer years of education, and those in metropolitan Atlanta had higher Classroom Organization scores at posttest. Further, MMCI teachers in metropolitan Atlanta had higher Instructional Support scores at posttest in these models.

Among MTP teachers, those in metropolitan Atlanta had higher posttest scores on Classroom Organization scores than those outside Atlanta, controlling for pretest and the other teacher, classroom, and site characteristics. Further, when there were fewer children per adult in the classroom, MTP teachers' posttest Instructional Support scores were higher in these models.

Table 10

Association of MMCI Teacher Characteristics and CLASS Posttest Scores

Outcome	Predictor	PE	SE	t	p	ES
Emotional Support	Intercept	5.75	0.09	65.79	<0.001	
	Pretest	0.25	0.07	3.86	<0.001	0.25
	Adult-Centered Beliefs	-0.10	0.08	-1.21	0.238	-0.08
	Years of experience in Georgia's Pre-K	0.00	0.01	0.40	0.691	0.00
	Years of education	-0.10	0.04	-2.56	0.016	-0.18
	Class size	-0.01	0.03	-0.5	0.618	-0.03
	Child-to-staff ratio	-0.05	0.04	-1.25	0.221	-0.11
	Public assistance	-0.01	0.05	-0.20	0.843	-0.02
	School (0) vs. center (1)	-0.03	0.12	-0.23	0.817	-0.04
	Outside (0) vs. in (1) metro Atlanta	0.26	0.11	2.50	0.014	0.38
Classroom Organization	Intercept	5.37	0.11	47.12	<.001	
	Pretest	0.19	0.08	2.49	0.019	0.18
	Adult-Centered Beliefs	-0.25	0.11	-2.22	0.035	-0.15
	Years of experience in Georgia's Pre-K	0.01	0.01	0.83	0.415	0.06
	Years of education	-0.13	0.05	-2.72	0.011	-0.19
	Class size	0.01	0.03	0.26	0.795	0.03
	Child-to-staff ratio	-0.04	0.05	-0.89	0.380	-0.07
	Public assistance	-0.03	0.06	-0.44	0.660	-0.04
	School (0) vs. center (1)	-0.12	0.15	-0.76	0.447	-0.14
	Outside (0) vs. in (1) metro Atlanta	0.39	0.14	2.86	0.005	0.46
Instructional Support	Intercept	2.77	0.12	23.25	<.001	
	Pretest	0.27	0.08	3.22	0.003	0.24
	Adult-Centered Beliefs	-0.20	0.13	-1.59	0.123	-0.11
	Years of experience in Georgia's Pre-K	0.02	0.01	1.25	0.222	0.11
	Years of education	-0.07	0.06	-1.29	0.207	-0.09
	Class size	0.04	0.04	1.09	0.285	0.10
	Child-to-staff ratio	-0.09	0.06	-1.58	0.125	-0.15
	Public assistance	-0.04	0.07	-0.65	0.521	-0.05
	School (0) vs. center (1)	-0.24	0.16	-1.51	0.133	-0.26
	Outside (0) vs. in (1) metro Atlanta	0.54	0.14	3.77	<0.001	0.60

Table 11

Association of MTP Teacher Characteristics and CLASS Posttest Scores

Outcome	Predictor	PE	SE	t	p	ES
Emotional Support	Intercept	5.60	0.11	50.88	<.001	
	Pretest	0.22	0.08	2.85	0.011	0.24
	Adult-Centered Beliefs	-0.18	0.09	-1.88	0.077	-0.15
	Years of experience in GA Pre-K	0.02	0.01	1.30	0.210	0.13
	Years of education	-0.04	0.04	-0.86	0.403	-0.07
	Class size	0.02	0.04	0.65	0.524	0.06
	Child-to-staff ratio	-0.10	0.05	-1.92	0.072	-0.22
	Public assistance	-0.06	0.06	-1.04	0.312	-0.09
	School (0) vs. center (1)	0.05	0.14	0.39	0.700	0.07
	Outside (0) vs. in (1) metro Atlanta	0.22	0.12	1.86	0.066	0.31
	Classroom Organization	Intercept	5.29	0.13	41.66	<.001
Pretest		0.26	0.07	3.76	0.002	0.29
Adult-Centered Beliefs		-0.14	0.11	-1.32	0.204	-0.10
Years of experience in GA Pre-K		0.02	0.01	1.82	0.087	0.11
Years of education		-0.04	0.05	-0.80	0.432	-0.06
Class size		0.02	0.04	0.53	0.600	0.05
Child-to-staff ratio		-0.08	0.06	-1.28	0.217	-0.15
Public assistance		-0.06	0.07	-0.84	0.411	-0.07
School (0) vs. center (1)		-0.02	0.16	-0.13	0.895	-0.02
Outside (0) vs. in (1) metro Atlanta		0.32	0.14	2.27	0.025	0.39
Instructional Support		Intercept	2.57	0.15	17.22	<.001
	Pretest	0.13	0.09	1.41	0.175	0.13
	Adult-Centered Beliefs	-0.16	0.13	-1.24	0.231	-0.10
	Years of experience in GA Pre-K	0.02	0.02	1.13	0.274	0.10
	Years of education	0.02	0.06	0.29	0.777	0.03
	Class size	0.03	0.05	0.72	0.484	0.07
	Child-to-staff ratio	-0.21	0.07	-2.81	0.012	-0.35
	Public assistance	-0.03	0.08	-0.34	0.740	-0.03
	School (0) vs. center (1)	0.03	0.19	0.15	0.885	0.03
	Outside (0) vs. in (1) metro Atlanta	0.25	0.16	1.55	0.123	0.27

As a second step in considering differential associations between treatment and outcome, all variables that were significantly associated with any of the *CLASS* posttest scores in any of the above models were included in a single model, along with their interaction with professional development condition. Thus, these models included: (1) teacher's *Adult-Centered Beliefs*, (2) teacher's education, (3) child-to-staff ratio, and (4) outside vs. in metropolitan Atlanta, along with the interaction of each of these with MTP and MMCI (using Control as a reference group), and pretest scores. See Equation 4.

$$Y_{ij} = \beta_{00} + \beta_{01} \times pretest_{ij} + \beta_{02} \times MTP_{ij} + \beta_{03} \times MMCI_{ij} + \beta_{04} \times Belief_{ij} + \beta_{05} \times YrsEd_{ij} + \beta_{06} \times CTRatio_{ij} + \beta_{10} \times Metro_{0j} + \beta_{07} \times MTP_{ij} \times Belief_{ij} + \beta_{08} \times MTP_{ij} \times YrsEd_{ij} + \beta_{09} \times MTP_{ij} \times CTRatio_{ij} + \beta_{010} \times MTP_{ij} \times Metro_{0j} + \beta_{011} \times MMCI_{ij} \times Belief_{ij} + \beta_{012} \times MMCI_{ij} \times YrsEd_{ij} + \beta_{013} \times MMCI_{ij} \times CTRatio_{ij} + \beta_{014} \times MMCI_{ij} \times Metro_{0j} + b_{0j} + \epsilon_{ij} \quad (\text{Equation 4})$$

Findings for this overall model with interactions appear in Tables 12, 13, and 14. The effect of MMCI on both Emotional Support and Classroom Organization was stronger for teachers who had less education. The effect of MMCI on Instructional Support was stronger for teachers in the metropolitan Atlanta area than those outside the metropolitan area. The effect of MTP on Instructional Support was stronger for teachers in classes with fewer children per adult.

Table 12
Association of Teacher, Classroom, and Site Characteristics with Post-Intervention Emotional Support Scores

Predictor	PE	SE	t	p	ES
Intercept	5.54	0.08	73.53	<.001	
Pretest	0.28	0.04	6.53	<.001	0.28
MTP vs. Control	0.12	0.11	1.15	0.254	0.17
MMCI vs. Control	0.18	0.1	1.77	0.079	0.25
Adult-Centered Beliefs	-0.04	0.1	-0.44	0.661	-0.03
Years of education	0.03	0.05	0.69	0.495	0.05
Child-to-staff ratio	-0.04	0.03	-1.19	0.238	-0.09
Outside (0) vs. in (1) metro Atlanta	0.10	0.11	0.89	0.375	0.14
MTP * Adult-Centered Beliefs	-0.1	0.13	-0.75	0.453	-0.08
MTP * Years of education	-0.08	0.06	-1.19	0.236	-0.14
MTP * ratio	-0.02	0.05	-0.36	0.720	-0.04
MTP * metro	0.10	0.16	0.65	0.515	0.14
MMCI * Adult-Centered Beliefs	-0.09	0.14	-0.63	0.530	-0.07
MMCI * years of education	-0.14	0.06	-2.33	0.021	-0.24
MMCI * ratio	-0.01	0.05	-0.25	0.800	-0.02
MMCI * metro	0.16	0.15	1.05	0.297	0.22

Table 13***Association of Teacher, Classroom, and Site Characteristics with Post-Intervention Classroom Organization Scores***

Predictor	<i>PE</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>ES</i>
Intercept	5.24	0.09	58.76	<.001	
Pretest	0.25	0.04	5.68	<.001	0.25
MTP vs. Control	0.06	0.13	0.50	0.620	0.07
MMCI vs. Control	0.06	0.12	0.51	0.608	0.07
Adult-Centered Beliefs	-0.09	0.12	-0.80	0.424	-0.06
Years of education	0.04	0.05	0.79	0.434	0.06
Child-to-staff ratio	-0.04	0.04	-1.11	0.269	-0.07
Outside (0) vs. in (1) metro Atlanta	0.13	0.13	0.99	0.321	0.15
MTP * Adult-Centered Beliefs	-0.01	0.16	-0.07	0.943	-0.01
MTP * years of education	-0.09	0.07	-1.21	0.230	-0.13
MTP * ratio	0.01	0.06	0.21	0.837	0.02
MTP * metro	0.15	0.18	0.8	0.427	0.18
MMCI * Adult-Centered Beliefs	-0.22	0.16	-1.37	0.174	-0.14
MMCI * years of education	-0.18	0.07	-2.50	0.014	-0.26
MMCI * ratio	0.01	0.06	0.21	0.832	0.02
MMCI * metro	0.20	0.18	1.12	0.264	0.24

Table 14

Association of Teacher, Classroom, and Site Characteristics with Post-Intervention Instructional Support Scores

Predictor	PE	SE	t	p	ES
Intercept	2.62	0.1	27.34	<.001	
Pretest	0.25	0.05	5.56	<.001	0.24
MTP vs. Control	0.03	0.13	0.26	0.797	0.03
MMCI vs. Control	0.02	0.13	0.15	0.880	0.02
Adult-Centered Beliefs	-0.07	0.12	-0.59	0.559	-0.04
Years of education	-0.03	0.06	-0.48	0.631	-0.04
Child-to-staff ratio	-0.01	0.04	-0.16	0.871	-0.02
Outside (0) vs. in (1) metro Atlanta+	0.06	0.14	0.39	0.694	0.07
MTP * Adult-Centered Beliefs	-0.05	0.17	-0.31	0.757	-0.03
MTP * years of education	0.04	0.08	0.57	0.571	0.06
MTP * ratio	-0.14	0.06	-2.24	0.027	-0.25
MTP * metro	0.18	0.2	0.92	0.361	0.2
MMCI * Adult-Centered Beliefs	-0.16	0.17	-0.94	0.351	-0.1
MMCI * years of education	-0.05	0.08	-0.73	0.468	-0.07
MMCI * ratio	-0.04	0.06	-0.73	0.469	-0.07
MMCI * metro	0.42	0.19	2.20	0.030	0.47

Association between Coach/Instructor Characteristics and Posttest CLASS Scores

As noted above, coach/instructor characteristics could not be included in the overall models because teachers in the control condition did not necessarily have a coach or instructor. For that reason, separate HLMs were conducted for MTP and MMCI teachers predicting posttest scores in the three domains, controlling for pretest scores, using the coach/instructor characteristics of: *Adult-Centered Beliefs*, *Knowledge of Effective Teacher-Child Interactions*, *Confidence*, and years of experience as Georgia’s Pre-K Consultant. All variables were measured toward the end of the school-year, on the spring questionnaire. See Equation 5.

$$Y_{ij} = \beta_{00} + \beta_{01} \times pretest_{ij} + \beta_{02} \times Belief_{ij} + \beta_{03} \times Knowledge_{ij} + \beta_{04} \times Confidence_{ij} + YrsExp_{ij} + b_{0j} + \epsilon_{ij} \quad \text{(Equation 5)}$$

Results for MMCI teachers appear in Table 15, and results for MTP teachers appear in Table 16. Among MMCI teachers, those whose instructor had more years of experience as a DECAL consultant had significantly higher Instructional Support posttest scores, controlling for pretest scores and the other coach/instructor characteristics. Among MTP teachers, no associations were found between coach characteristics and posttest scores.

Table 15

Association of MMCI Instructor Characteristics and CLASS Posttest Scores

Outcome	Predictor	PE	SE	t	p	ES
Emotional Support	Intercept	5.86	0.05	110.23	<0.001	
	Pretest	0.28	0.07	3.97	<0.001	0.28
	Coaches' Adult-Centered Beliefs	-0.02	0.22	-0.07	0.942	-0.01
	Coaches' Knowledge of Effective Teacher-Child Interactions	0.05	0.07	0.70	0.491	0.05
	Coaches Confidence	0.02	0.11	0.20	0.844	0.02
	Years of Experience as Georgia's Pre-K Consultant	0.06	0.03	1.62	0.115	0.2
Classroom Organization	Intercept	5.48	0.07	80.62	<0.001	
	Pretest	0.23	0.07	3.05	0.004	0.21
	Coaches' Adult-Centered Beliefs	0.06	0.27	0.22	0.828	0.02
	Coaches' Knowledge of Effective Teacher-Child Interactions	0.07	0.1	0.72	0.479	0.06
	Coaches Confidence	0.01	0.14	0.04	0.965	0.01
	Years of Experience as Georgia's Pre-K Consultant	0.08	0.04	1.85	0.073	0.21
Instructional Support	Intercept	2.89	0.07	40.81	<0.001	
	Pretest	0.31	0.08	3.74	<0.001	0.27
	Coaches' Adult-Centered Beliefs	-0.12	0.29	-0.42	0.679	-0.04
	Coaches' Knowledge of Effective Teacher-Child Interactions	0.00	0.10	0.00	0.998	0.00
	Coaches Confidence	0.07	0.15	0.46	0.649	0.05
	Years of Experience as Georgia's Pre-K Consultant	0.10	0.05	2.08	0.046	0.25

Table 16***Association of MTP Coach Characteristics and CLASS Posttest Scores***

Outcome	Predictor	PE	SE	t	p	ES
Emotional Support	Intercept	5.72	0.06	94.76	<.001	
	Pretest	0.31	0.08	4.08	0.001	0.34
	Coaches' Adult-Centered Beliefs	0.05	0.15	0.33	0.746	0.03
	Coaches' Knowledge of Effective Teacher-Child Interactions	0.06	0.07	0.82	0.422	0.07
	Coaches Confidence	0.31	0.16	1.92	0.069	0.17
	Years of Experience as Georgia's Pre-K Consultant	0.02	0.02	0.71	0.484	0.08
	Classroom Organization	Intercept	5.38	0.07	78.32	<.001
Pretest		0.32	0.07	4.52	<0.001	0.36
Coaches' Adult-Centered Beliefs		0.08	0.18	0.45	0.657	0.04
Coaches' Knowledge of Effective Teacher-Child Interactions		0.09	0.08	1.12	0.274	0.09
Coaches Confidence		0.37	0.19	1.98	0.062	0.17
Years of Experience as Georgia's Pre-K Consultant		0.02	0.03	0.79	0.436	0.07
Instructional Support		Intercept	2.72	0.08	33.44	<.001
	Pretest	0.27	0.09	2.95	0.008	0.26
	Coaches' Adult-Centered Beliefs	0.14	0.21	0.67	0.508	0.07
	Coaches' Knowledge of Effective Teacher-Child Interactions	-0.07	0.10	-0.73	0.473	-0.06
	Coaches Confidence	0.00	0.22	-0.01	0.989	0.00
	Years of Experience as Georgia's Pre-K Consultant	0.00	0.03	-0.05	0.959	0.00

References

- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical Linear Models in social and behavioral research: Applications and data analysis methods (First Edition)*. Newbury Park, CA: Sage Publications.
- Hamre, B. K. & LoCasale-Crouch, J. (2009). *Knowledge of effective teacher-child interactions*. Unpublished measure, University of Virginia.
- Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., LoCasale-Crouch, J. L., Downer, J. T., ... Scott-Little, C. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Education Research Journal*, 49(1), 88–123. doi:10.3102/0002831211434596
- Landis, J., R. & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159-174.
- LoCasale-Crouch, J. Downer, J. T. & Hamre, B. K. (2009a). *Perceptions of professional development*. Unpublished measure, University of Virginia.
- LoCasale-Crouch, J. Downer, J. T. & Hamre, B. K. (2009b). *Coach confidence*. Unpublished measure, University of Virginia.
- Pianta, R. C., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, C., & Barbarin, O. (2005). Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child-teacher interactions? *Applied Developmental Science*, 9(3), 144–159. doi: 10.1207/s1532480xads0903_2
- Pianta, R. C., La Paro, K. M., & Hamre, B. (2008). *Classroom assessment scoring system (CLASS): Pre-K version*. Baltimore, MD: Paul H. Brookes.
- Schaefer, E., & Edgerton, M. (1985). Parental and child correlates of parental modernity. In I. E. Sigel (Ed.), *Parental belief systems* (pp. 121–147). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- What Works Clearinghouse (2014). *Procedures and standards handbook: Version 3.0*. US Department of Education. Available: ies.ed.gov/ncee/wwc/DocumentSum.aspx?sid=19